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Jojoba: A Guide to the Literature

by Anna Elias-Cesnik

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J O J O B A  
Guide to the Literature

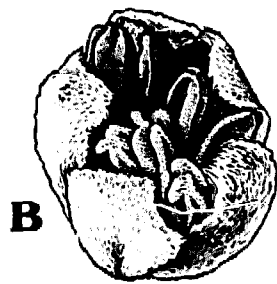
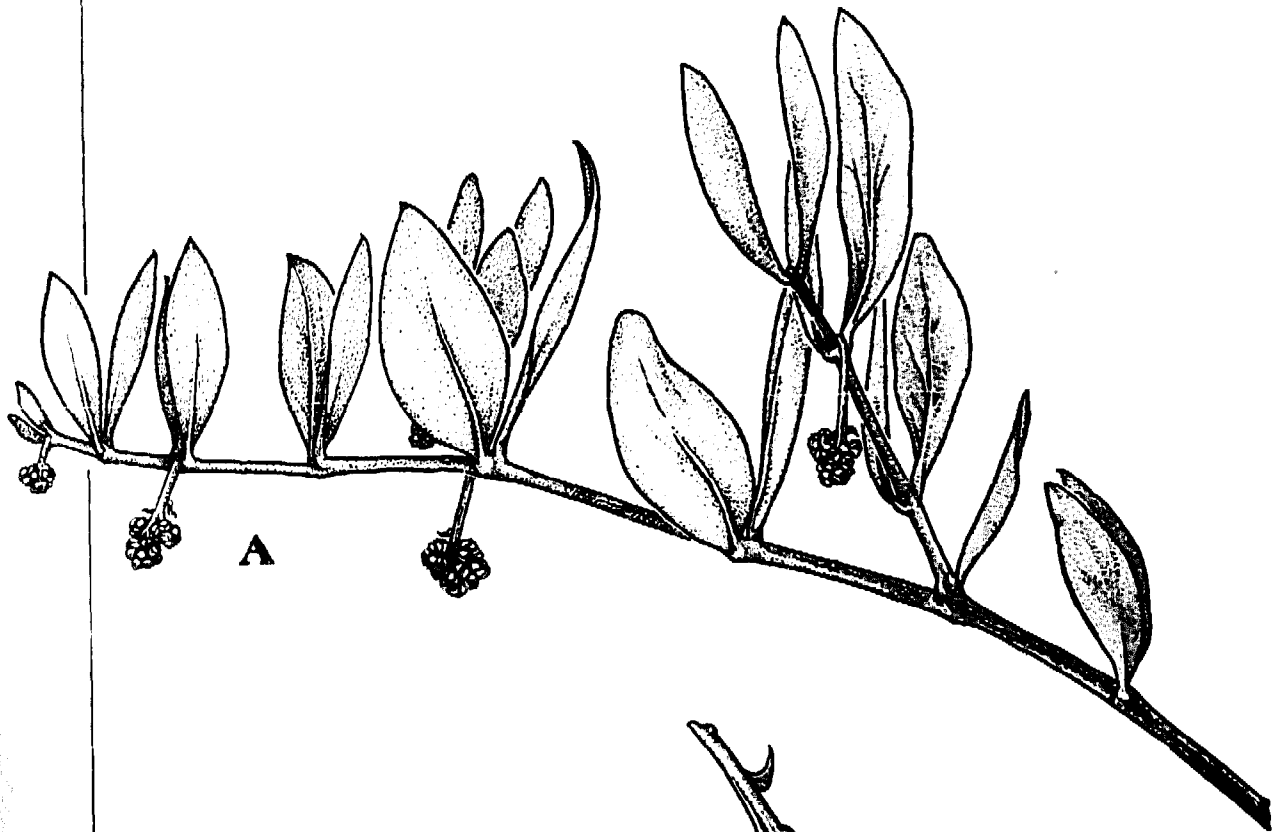
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by  
Anna Elias-Cesnik

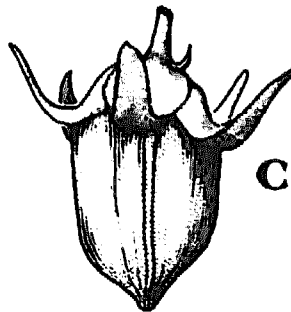
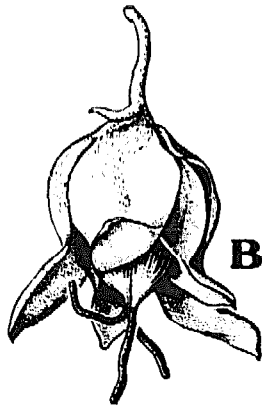
Office of Arid Lands Studies  
College of Agriculture  
University of Arizona  
Tucson, Arizona

1982



- A) branch
- B) male flower enlarged
- C) cluster of male flowers

*Simmondsia chinensis*



♀

- A) branch
- B) female flower  
enlarged
- C) maturing fruit
- D) seed

*Kay Mirocha*

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(Link) Schneider

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## Preface

Jojoba (Simmondsia chinensis Link Schneider) is an evergreen, desert shrub native to the southwestern United States and northern Mexico. Jojoba seeds have long been used by indigenous desert people to dress wounds, facilitate childbirth, cure stomach problems and restore hair growth. The earliest known documentation of jojoba appears in a 1701 letter from the Jesuit priest Eusebio F. Kino to King Phillip V of Spain. Kino discusses the Pima Indian tribe of New Spain and their use of jojoba's medicinal fruit. This citation predates the historical descriptions of Clavijero (1789) and Velarde (1716).

Jojoba has now found its way into contemporary commercial applications. The oil has been targeted for several potential uses that include lubricants, cosmetics and pharmaceuticals. Jojoba is ideally suited in many of these fields because of the oil's unique chemical structure. The seed oil, sometimes referred to as a liquid wax, is unique in the plant world and has been compared with the oil of the endangered sperm whale. Large-scale attempts have been made to domesticate and cultivate jojoba plants. Also, an industry, based on the seed harvested from natural stands, has been established.

The University of Arizona has been involved in jojoba research since the 1930s. The University's Office of Arid Lands Studies (OALS) has promoted the use and study of this renewable natural resource largely through information dissemination since the early 1970s.

After the First International Conference on Jojoba, held at the University of Arizona in 1972, OALS published a comprehensive annotated bibliography and literature review on jojoba titled Jojoba: A Wax-Producing Shrub of the Sonoran Desert (Sherbrooke and Haase, 1974). A supplement to the 1974 bibliography was published as Jojoba: An Annotated Bibliographic Update (Sherbrooke, 1978).

World-wide interest in jojoba and the demand for information during the last decade have been phenomenal. A more current reference tool now seems appropriate. This document, as the title suggests, is a comprehensive guide to the literature on jojoba. It integrates nearly 400 citations referenced in the first two OALS bibliographies with more than 300 new citations. The literature guide includes: a) an annotated bibliography citing jojoba-specific research works; b) a selected bibliography of historical, ethnobotanical and early taxonomic and systematic literature; and c) a key word index.

Following the tradition set forth by Sherbrooke and Haase, I hope that this literature guide will provide an equally helpful background of knowledge to stimulate further interest and investigation of jojoba and its economic development.



# Acknowledgment

I am indebted to my friends and colleagues at OALS who have provided constant support and encouragement of this endeavor. The work and advice of Wade Sherbrooke, whose previous publications constitute a large part of this document, have been invaluable. A sincere debt of gratitude is owed to Vicki Lee Thomas who endured the painstaking task of data entry with unceasing good cheer and professionalism.

Thanks also to: Beth Hoff, abstractor; Kay Mirocha, botanical illustrator; Paul Mirocha, artist and cover designer; Mercy Valencia, translator and abstractor; and Emily Whitehead, data entry technician.

# Annotated Bibliography

0001

ABRAMOVICH, R./TAL, M./FORTI, M.

1978

SELECTION AND IMPROVEMENT OF SIMMONDSIA.

PAGES 89-91 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

DIFFERENT PLANTS WERE CROSSED TO OBTAIN HYBRIDS WITH COMBINATIONS OF DESIRABLE TRAITS. NO GOOD PRODUCERS WERE FOUND IN THE F1 ADULT HYBRIDS. ANALYSES OF VARIOUS MORPHOLOGICAL CHARACTERISTICS IN THE HYBRIDS SHOWED NO DOMINANCE IN ANY OF THE TRAITS STUDIED. INBREEDING AND BACK-CROSSES ARE BEING TRIED. AN INVESTIGATION OF THE RELATIONSHIP BETWEEN PRODUCTION AND VARIOUS MORPHOLOGICAL TRAITS REVEALED NO CORRELATION BETWEEN THE SIZE OF YIELD AND PARAMETERS MEASURED.

HYBRIDS/PLANT BREEDING/SEED YIELD

0002

ABRAMOVICH, R./TAL, M./FORTI, M.

1978

VEGETATIVE PROPAGATION OF SIMMONDSIA CHINENSIS (JOJOBA) BY CONVENTIONAL METHODS: HORMONE EFFECT AND SEASONAL VARIATION.

PAGES 84-89 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

JOJOBA ROOTING EXPERIMENTS WERE CONDUCTED IN A PLASTIC PROPAGATION HOUSE USING A PEAT:POLYSTYRENE (1:1) ROOTING MEDIUM. CUTTINGS FROM BRANCHES DEVELOPED ON EXCISED PLANTS WERE DIPPED FOR 1 TO 2 MINUTES IN WATER SOLUTIONS CONTAINING VARIOUS CONCENTRATIONS OF INDOLE BUTYRIC ACID (IBA). INCREASING IBA CONCENTRATIONS DECREASED TWIG NUMBERS AND LEAF LENGTH. TWIG LENGTH AND LEAF NUMBER WERE AFFECTED ONLY SLIGHTLY. THE PERCENT OF ROOTING, AND LENGTH AND NUMBER OF ROOTS AFFECTED BY SEASONAL FACTORS WERE INVESTIGATED. ROOTING PERCENTAGE INCREASED IN SUMMER. THE NUMBER OF ROOTS INCREASED FROM FALL TO WINTER AND DECREASED AGAIN TOWARD SPRING AND SUMMER. LENGTH OF ROOTS INCREASED STEADILY FROM FALL TO SPRING AND DECLINED TOWARD SUMMER.

PROPAGATION/ROOTS/CHEMICAL REACTIONS

0003

ABRAMOVICH, R./TAL, M./FORTI, M.

1982

SOURCES OF PLANT MATERIAL FOR MASS-PRODUCTION OF JOJOBA CUTTINGS.

PAGES 137-148 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA. CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

STOCK PLANTS (TO BE USED AS A SOURCE FOR CUTTINGS) WERE PRODUCED FROM CUTTINGS EXCISED FROM SELECTED ADULT, FIELD-GROWN JOJOBA PLANTS. STOCK PLANTS WERE GROWN EITHER IN THE GREENHOUSE OR THE FIELD. BRANCHES WERE EXCISED ONCE A YEAR AFTER THEIR NUMBER AND LENGTH HAD BEEN DETERMINED. FIELD-GROWN STOCK PLANTS PRODUCED MORE AND LONGER BRANCHES THAN GREENHOUSE-GROWN STOCK PLANTS. ALSO, THE PERCENTAGE OF ROOTING FROM STOCK-PLANT CUTTINGS WAS MUCH HIGHER THAN CUTTINGS EXCISED FROM ADULT PLANTS.

PROPAGATION/COMMERCIAL PRODUCTION

0004

ADAMS, J.A. ET AL

1977

GASEOUS EXCHANGE OF SIMMONDSIA CHINENSIS (JOJOBA) MEASURED WITH A DOUBLE ISOTOPE POROMETER AND RELATED TO WATER STRESS, SALT STRESS, AND NITROGEN DEFICIENCY.

CROP SCIENCE 17(1):11-15.

GASEOUS EXCHANGE WAS STUDIED BY EXPOSING LEAVES SIMULTANEOUSLY TO RADIOISOTOPES OF WATER (SUP 3 HHO) AND CARBON DIOXIDE (SUP 14 CO SUB 2) TO DETERMINE CONDUCTANCES TO WATER VAPOR AND TOTAL CONDUCTANCES TO CARBON DIOXIDE ASSIMILATION, RESPECTIVELY. FIXATION RATES OF CARBON DIOXIDE AND MESOPHYLL CONDUCTANCES TO CARBON DIOXIDE WERE CALCULATED. LEAF CONDUCTANCE TO WATER VAPOR AND CARBON DIOXIDE FIXATION RATES DECREASED MARKEDLY ONLY AT VERY LOW VALUES OF SOIL-WATER AND LEAF-XYLEM PRESSURE POTENTIALS AND RECOVERED TO MAXIMUM VALUES AFTER BEING SUBJECTED TO SOIL WATER POTENTIALS BELOW -40 BARS, INDICATING THE EXTREME DROUGHT TOLERANCE OF SIMMONDSIA CHINENSIS. THE RATIOS OF CONDUCTANCE TO CARBON DIOXIDE:CONDUCTANCE TO WATER INCREASED AS WATER STRESS BECAME MORE INTENSE, SUGGESTING THAT TRANSPIRATION WAS REDUCED RELATIVELY MORE THAN PHOTOSYNTHESIS, WHICH COULD HAVE CONSIDERABLE VALUE UNDER DROUGHT STRESS. PLANTS UNDER INTENSE WATER STRESS GENERALLY HAD LITTLE OR NO REDUCTION IN MESOPHYLL CONDUCTANCE TO CARBON DIOXIDE.

THERE WAS NO SIGNIFICANT DECREASE IN CONDUCTANCE TO WATER VAPOR, CARBON DIOXIDE FIXATION RATE, OR MESOPHYLL CONDUCTANCE TO CARBON DIOXIDE WITH INCREASING SALINITY DOWN TO ROOT MEDIUM OSMOTIC POTENTIALS AS LOW AS -9 BARS. THIS IS CONSISTENT WITH THE REPORTED HIGH SALT TOLERANCE OF SIMMONDSIA CHINENSIS. NITROGEN-DEFICIENT PLANTS HAD SIGNIFICANT REDUCTIONS IN CARBON DIOXIDE FIXATION RATE AND MESOPHYLL CONDUCTANCE TO CARBON DIOXIDE BUT NOT IN CONDUCTANCE TO WATER VAPOR.

TRANSPIRATION/CARBON DIOXIDE/DROUGHT TOLERANCE/PHOTOSYNTHESIS/  
SALINE WATER/SALT TOLERANCE/STRESS/WATER BALANCE/PLANT NUTRIENTS/  
SOIL-WATER-PLANT RELATIONSHIPS

0005

ADAMS, J.A. ET AL

1978

RESPONSES OF STOMATA AND WATER, OSMOTIC, AND TURGOR POTENTIALS OF JOJOBA TO WATER AND SALT STRESS.

AGRONOMY JOURNAL 70(3):381-387.

BECAUSE OF THE INTEREST IN CULTIVATING JOJOBA AND UNCERTAINTIES REGARDING ITS RESPONSE TO DROUGHT AND SALINITY, SELECTED PLANTS WERE WATER- AND SALT-STRESSED IN GREENHOUSE SOIL AND SAND CULTURE EXPERIMENTS. RESPONSES OF LEAF WATER, OSMOTIC AND TURGOR POTENTIALS TO STRESS AND ASSOCIATED STOMATAL BEHAVIOR WERE STUDIED. STOMATAL CONDUCTANCE WAS

COMPARED TO WATER STRESS TO DETERMINE IF THERE WAS A CONTINUOUS INCREASE IN STOMATAL CLOSURE WITH INCREASING STRESS OR IF CLOSURE OCCURRED ABRUPTLY AT A THRESHOLD. COMPARISONS WERE MADE BETWEEN CONDUCTANCE OF UPPER AND LOWER LEAF SURFACES TO CONTRAST THEIR RESPONSE TO WATER STRESS. THE EFFECT OF TRANSPIRATION RATES ON LEAF XYLEM PRESSURE POTENTIALS WAS STUDIED TO EVALUATE THE USE OF LEAF XYLEM PRESSURE POTENTIAL MEASUREMENTS INDICATING SOIL WATER AVAILABILITY.

STOMATA/WATER USE/SALINITY

0006

AHLUWALIA, J.S./SAHA, N.C.

1980

UNSATURATED WAX ESTERS AS FUTURE RAW MATERIALS FOR INDUSTRIAL APPLICATIONS.

SYMPOSIUM 5, PAPER 6 IN J. SHAH, ED., CHEM TECH '80 INTERNATIONAL CONGRESS, BOMBAY, INDIA. 7 P.

UNSATURATED WAX ESTERS ARE A UNIQUE CLASS OF RAW MATERIALS FOR MANY PRESENT AND FUTURE CHEMICAL INDUSTRIES. SPERM WHALE AND JOJOBA OILS ARE THE ONLY KNOWN SOURCES OF THESE WAX ESTERS. SINCE SPERM WHALE OIL IS NOT AVAILABLE AND THERE IS NOT ENOUGH JOJOBA OIL BEING PRODUCED TO MEET CURRENT DEMANDS, JOJOBA-TYPE WAX ESTERS SHOULD BE SYNTHESIZED FROM VEGETABLE OILS RICH IN LONG-CHAIN MONOENE FATTY ACIDS.

INDIA/SPERM WHALE OIL/CHEMICAL COMPOSITION/OIL/LUBRICANTS/COSMETICS/ESTERS/FATTY ACIDS/SATURATION/SYNTHETIC OILS

0007

AIC INCORPORATED (A TRIBAL DEVELOPMENT CORPORATION)

1975

SAN CARLOS APACHE MARKETING AND COOPERATIVE ASSOCIATION INC.--CANDLE MARKET SURVEY AND MARKETING STRATEGY.

UNPUBLISHED CONTRACT (OMBE TASK ORDER 0165-902; 4-36664; PROJECT 09-20-27360-00) REPORT PREPARED FOR THE SAN CARLOS APACHE MARKETING COOPERATIVE ASSOCIATION, INC., P.O. BOX 681, SAN CARLOS, ARIZONA, 85550. 13 UNNUMBERED PAGES AND 3 APPENDICES.

A BRIEF SURVEY OF MARKET POTENTIAL FOR JOJOBA WAX CANDLES.

CANDLES/ECONOMIC DEVELOPMENT/PRODUCT DEVELOPMENT/INDIAN RESERVATIONS

0008

AL-ANI, H.A. ET AL

1972

THE PHYSIOLOGICAL ECOLOGY OF DIVERSE POPULATIONS OF THE DESERT SHRUB SIMMONDSIA CHINENSIS.

JOURNAL OF ECOLOGY 60:41-57.

THE MECHANISMS BY WHICH A BROAD-LEAVED EVERGREEN CAN PERSIST IN SEVERE DESERT ENVIRONMENTS WERE STUDIED. TO PROVIDE AN EVOLUTIONARY DIMENSION, COMPARISONS WERE MADE BETWEEN POPULATIONS EXISTING IN HABITATS REPRESENTING DIFFERENT DEGREES OF ARIDITY AND TEMPERATURE EXTREMES, BOTH COASTAL (SAN DIEGO) AND DESERT

HABITATS (MORONGO CANYON, TWENTYNINE PALMS, TUCSON). THE SEASONAL PHYSIOLOGICAL MEASUREMENTS RECORDED INCLUDED LEAF WATER POTENTIAL, NET PHOTOSYNTHESIS, DARK RESPIRATION AND CARBOHYDRATE CONTENT. POSITIVE NET PHOTOSYNTHESIS WAS MAINTAINED THROUGH THE DAY EVEN UNDER LOW LEAF WATER POTENTIALS DURING EXTENSIVE DROUGHT PERIODS. DURING HIGH DROUGHT PERIODS PLANTS GREATLY REDUCED RESPIRATION RATES. BY MAINTAINING CARBON GAIN DURING THE DROUGHT PERIOD AND BY REDUCING CARBON LOSS, THESE PLANTS MAINTAIN A FAVORABLE CARBOHYDRATE BALANCE. ANOTHER REMARKABLE FEATURE OF THEIR PHOTOSYNTHETIC APPARATUS IS THEIR ABILITY TO MAINTAIN ACTIVE PHOTOSYNTHESIS EVEN UNDER EXTREMELY HIGH SUMMER TEMPERATURES OF 40 C TO 47 C. ECOTYPIC DIFFERENTIATION, BASED ON PHOTOSYNTHETIC CAPACITY IN RELATION TO DROUGHT, WAS ESTABLISHED BY BOTH FIELD AND LABORATORY TESTS.

PHYSIOLOGICAL ECOLOGY/PLANT PHYSIOLOGY/STRESS/DROUGHT TOLERANCE/ADAPTATION/  
CARBOHYDRATES/PHOTOSYNTHESIS/RESPIRATION/PLANT ECOLOGY/ECOTYPES/ARIZONA/  
CALIFORNIA/SONORAN DESERT/MOJAVE DESERT/SYNECOLOGY/EVOLUTION/NATIVE POPULATIONS

0009

AL-ANI, H.A./STRAIN, B.R./MOONEY, H.A.

1972

THE PHYSIOLOGICAL ECOLOGY OF DIVERSE POPULATIONS OF THE DESERT SHRUB  
SIMMONDSIA CHINENSIS.

JOURNAL OF ECOLOGY 60(1):41-57.

A SEASONAL STUDY OF THE PHYSIOLOGICAL ECOLOGY OF SIMMONDSIA CHINENSIS WAS MADE IN COASTAL (SAN DIEGO) AND DESERT HABITATS (MORONGO CANYON, TWENTYNINE PALMS, TUCSON) TO INVESTIGATE THE DIFFERENTIAL ENVIRONMENTAL RESPONSES OF THESE POPULATIONS. SEASONAL PHYSIOLOGICAL MEASUREMENTS RECORDED LEAF WATER POTENTIAL, NET PHOTOSYNTHESIS, DARK RESPIRATION, AND CARBOHYDRATE CONTENT. SYNECOLOGICAL STUDIES ALSO WERE CONDUCTED AT THE FOUR SITES. IN ALL HABITATS, PLANTS OF THE FOUR POPULATIONS WERE PHYSIOLOGICALLY ACTIVE DURING THE ENTIRE YEAR OF STUDY, INDICATING THAT THESE PLANTS ARE TRUE DROUGHT ENDURERS AND HAVE THE CAPACITY TO MAINTAIN A POSITIVE CARBON BALANCE EVEN UNDER CONDITIONS OF SEVERE DESERT DROUGHT. SEASONAL METABOLIC ACTIITIES, GENERALLY CORRELATED WITH LEAF WATER POTENTIAL VARIATIONS, WERE GREATER IN THE DESERT PLANTS THAN IN THE COASTAL SAN DIEGO PLANTS. THE RESULTS OF THE FIELD AND LABORATORY STUDIES INDICATE THAT POPULATIONS OF SIMMONDSIA CHINENSIS HAVE INCREASING ADAPTABILITY TO DROUGHT, WHICH RELATES TO DECREASING AVAILABLE MOISTURE IN THEIR NATURAL ENVIRONMENTS.

PHYSIOLOGICAL ECOLOGY/WATER USE/CLIMATE

0010

ALCORN, S.M./YOUNG, D.

1979

DISEASES OF JOJOBA.

PAGES 13-17 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA PLANTS ARE SUSCEPTIBLE TO SEVERAL PLANT PATHOGENS. THEY INCLUDE ORGANISMS THAT CAN INFECT SEEDLINGS OR OLDER PLANTS UNDER A VARIETY OF ENVIRONMENTAL CONDITIONS. ALTHOUGH PREPLANT SOIL TREATMENTS SHOULD PROTECT EMERGING JOJOBA SEEDLINGS AGAINST A VARIETY OF ORGANISMS, INCLUDING PHYTOPHTHORA PARASITICA AND PYTHIUM APHANIDERMATUM, PROTECTING ESTABLISHED PERENNIAL PLANTS AGAINST SUCH PATHOGENS AS PHYMATOTRICHUM OMNIVORUM AND VERTICILLIUM DAHLIAE HAS YET TO BE CONFIRMED BY FIELD TESTS. THE PRUDENT

GROWER MAY WANT TO AVOID PLANTING IN AREAS KNOWN TO BE INFESTED WITH THESE FUNGI. CIRCUMSTANTIAL EVIDENCE AND KNOWLEDGE OF THE BEHAVIOR OF SIMILAR ORGANISMS SUGGEST THAT FREE WATER IS CRITICAL FOR SPORE GERMINATION AND/OR INFECTION BY THESE FUNGI.

PATHOGENS/PHYMATOTRICHUM OMNIVORUM/VERTICILLIUM DAHLIAE/DISEASES

0011

ALMEIDA, F.A.G.

1979

ECOLOGICAL STUDIES OF NATIVE JOJOBA PLANTS -- SIMMONDSIA CHINENSIS (LINK) SCHNEIDER -- IN ARIZONA.

UNIVERSITY OF ARIZONA, DEPARTMENT OF PLANT SCIENCES, TUCSON. PH.D. DISSERTATION, 96 P.

JOJOBA WAS STUDIED AT THREE DIFFERENT SITES IN ARIZONA. THE STUDY CONSIDERED: 1) THE VEGETATIVE AND REPRODUCTIVE GROWTH IN RELATION TO AIR AND SOIL TEMPERATURES, PRECIPITATION, AVAILABLE WATER CAPACITY AND POTENTIAL EVAPOTRANSPIRATION; 2) THE MONTHLY DEVELOPMENT OF TOTAL NONSTRUCTURAL CARBOHYDRATES AND PROTEINS IN THE FOLIAGE, RELATING THEM TO SOME OF THE ECOLOGICAL FACTORS NOTED ABOVE; 3) THE DEVELOPMENT OF THE SEED OIL AND MEAL PROTEIN IN RELATION TO THE MATURITY OF THE SEED; AND 4) THE PLANT YIELD VARIABLES IN RELATION TO THE ENVIRONMENTAL FACTORS STUDIED.

ARIZONA/WATER USE/PLANT NUTRIENTS/SEED YIELD/OIL/SEED MEAL/MOISTURE CONTENT

0012

ANDERSON, D.R./DAUGHERTY, J.P.

1975

PROPOSAL AND FEASIBILITY STUDY FOR THE COMMERCIAL PRODUCTION AND MARKETING OF JOJOBA.

UNPUBLISHED DOCUMENT PREPARED UNDER THE DIRECTION OF THE UNIVERSITY OF SANTA CLARA AND FMC INTERNATIONAL, S.A. FOR THE SOUTHERN CALIFORNIA JOJOBA PROJECT, INC. 50 P. PLUS APPENDICES.

THE FEASIBILITY OF PRODUCING JOJOBA ON A COMMERCIAL SCALE WAS STUDIED. TWO SHORT-TERM MARKETS WERE IDENTIFIED FOR POTENTIAL USERS OF JOJOBA DERIVATIVES: 1) THE COSMETIC AND THE PHARMACEUTICAL INDUSTRIES; AND 2) THE CANDLE AND THE POLISHING WAX INDUSTRIES. A LONG-TERM MARKET IS THE SULFURIZED OIL INDUSTRY. A PROPOSAL WAS GENERATED FOR THE SYSTEMATIC DEVELOPMENT OF A COMMERCIAL JOJOBA INDUSTRY. THE PROPOSED BUDGET OF APPROXIMATELY 10 MILLION DOLLARS WOULD BE SPENT OVER FIVE YEARS TO DEVELOP AN ADDITIONAL 3,000 ACRES OF JOJOBA, AND TO DEVELOP AND PURCHASE MECHANICAL HARVESTERS. THE BREAK-EVEN POINT WAS PROJECTED IN THE 12TH OR 13TH YEAR. AN ECONOMIC RATE OF RETURN OF INVESTED CAPITAL WOULD BE APPROXIMATELY 13.5 PERCENT DURING A 20-YEAR PERIOD.

CALIFORNIA/CANDLES/COSMETICS/COST ANALYSIS/ECONOMIC DEVELOPMENT/MARKET DEMAND/ INDIAN RESERVATIONS/PRODUCT DEVELOPMENT

0013

ANONYMOUS

1975

JOJOBA.

AMERICAN CANDLEMAKER 4(3):2-4.

FOR CANDLE PRODUCTION, INITIAL TESTS INDICATE AN APPRECIABLE RISE IN MELTING POINTS OF CANDLE WAXES WITH THE ADDITION OF 33 PERCENT HYDROGENATED JOJOBA OIL PLUS ONE PERCENT POLYETHYLENE CRYSTALS. THE BEST PARAFFIN-JOJOBA MIX USING PAPER-CORE WICKING WAS STUDIED.

CANDLES/HYDROGENATED OIL/PRODUCT DEVELOPMENT

0014

ANONYMOUS

1978

HARVESTING INCREASING YIELD OF JOJOBA SEEDS.

ARIZONA FARMER-RANCHMAN 57(4):6,8.

WATER HARVESTING, A TECHNIQUE FOR GATHERING AND STORING RUNOFF FROM RAIN OR SNOW HAS BEEN INVESTIGATED BY RESEARCHERS AT THE U.S. DEPARTMENT OF AGRICULTURE WATER CONSERVATION LABORATORY IN PHOENIX, ARIZONA. WATER HARVESTING HAS BEEN APPLIED TO A 2.5-ACRE NATIVE STAND OF JOJOBA NEAR PHOENIX.

NATIVE POPULATIONS/WATER HARVESTING/IRRIGATION/WATER USE

0015

APACHE MARKETING COOPERATIVE ASSOCIATION/OFFICE OF ARID LANDS STUDIES

1976

ARIZONA JOJOBA STUDY PROGRESS REPORT FOR THE PERIOD JUNE 1, 1975-MAY 31, 1976.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 32 P. PLUS APPENDICES.

THIS PROJECT REPORT WAS SUBMITTED TO THE OFFICE OF NATIVE AMERICAN PROGRAMS, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C. BACKGROUND OF THE PROJECT, 1975-1976 ACTIVITIES, 1975 NATIVE JOJOBA SEED HARVEST, ESTABLISHMENT OF A 25-ACRE EXPERIMENTAL JOJOBA PLANTATION, INDUSTRIAL DEVELOPMENT ACTIVITIES, PRODUCT DISTRIBUTION, CANDLE SHOP DEVELOPMENT, SALES OF JOJOBA PRODUCTS, PUBLICATIONS, ECOLOGICAL RESEARCH, INTERNATIONAL ACTIVITIES, AND LONG-TERM PROGRAM PLANNING ARE DISCUSSED.

ARIZONA/CANDLES/ECONOMIC DEVELOPMENT/MARKET DEMAND/PLANT ECOLOGY/SEED HARVEST/PLANTATION ESTABLISHMENT/NATIVE POPULATIONS/INDIAN RESERVATIONS/PRODUCT DEVELOPMENT

0016

ARAGAO, R.G.M.

1976

GROWTH AND MORPHOGENESIS OF JOJOBA SIMMONDSIA CHINENSIS (LINK) SCHNEID. SHOOT TIPS IN VITRO.

UNIVERSITY OF ARIZONA, DEPARTMENT OF PLANT SCIENCES, TUCSON. PH.D. DISSERTATION, 114 P.

SHOOT TIPS, 1 TO 3 MM LONG, CONTAINING THE MERISTEM DOME SURROUNDED BY ONE TO TWO PAIRS OF THE YOUNGEST LEAF PRIMORDIA WERE EXCISED AND CULTURED ASEPTICALLY FOR 60 AND 150 DAYS ON MODIFIED MURASHIGE AND SKOOG MEDIA. SIGNIFICANT DIFFERENCES IN FRESH WEIGHT OF EXPLANTS WERE OBSERVED BETWEEN TREATMENTS WITH



DIFFERENT LEVELS OF KINETIN, DIFFERENT LEVELS OF NAPHTHALENEACETIC ACID, AND BY INTERACTION OF THESE GROWTH REGULATORS. KINETIN ALONE, OR IN COMBINATIONS WITH 0.25 TO 0.75 MG/L OF NAPHTHALENEACETIC ACID HAD A SPECIFIC EFFECT IN INDUCING SHOOT AND LEAF DIFFERENTIATION AT ALL CONCENTRATIONS CULTURED FOR 150 DAYS. NAPHTHALENEACETIC ACID ADDED ALONE TO NUTRIENT MEDIUM OR IN COMBINATIONS WITH 0.75 AND 1.00 MG/L OF KINETIN WAS VERY EFFECTIVE IN INDUCING ROOT FORMATION. MANY DIFFERENTIATED ROOTS WERE NEGATIVELY GEOTROPIC AND FORMED MANY ROOT HAIRS. EXPLANTS THAT DIFFERENTIATED CALLUS, SHOOTS AND LEAVES DID NOT FORM ROOTS. EXPLANTS THAT DIFFERENTIATED CALLUS AND ROOTS DID NOT FORM SHOOTS AND LEAVES; THUS COMPLETE PLANTLETS WERE NOT FOUND.

PLANT CHEMISTRY/PLANT GROWTH/PLANT PHYSIOLOGY/TISSUE CULTURE/PROPAGATION/  
VEGETATIVE PROPAGATION

0017

ARAGAO, R.G.M./HOGAN, L.

1976

CRESCIMENTO E DIFERENCIACAO DE TECIDOS DE JOJOBA SIMMONDSIA CHINENSIS (LINK) SCHNEID, IN VITRO (GROWTH AND DIFFERENTIATION OF JOJOBA, SIMMONDSIA CHINENSIS (LINK) SCHNEID, IN VITRO, IN PORTUGUESE).

CIENCIA AGRONOMICA 6(1-2):75-84.

JOJOBA SHOOT TIPS CONTAINING THE MERISTEM DOME SURROUNDED BY ONE PAIR OF THE YOUNGEST LEAF PRIMORDIA WERE EXCISED AND CULTURED ASEPTICALLY FOR 60 DAYS ON MODIFIED MURASHIGE AND SKOOG MEDIUM. KINETIN AND NAPHTHALENEACETIC ACID WAS ADDED TO THE NUTRIENT MEDIUM TO DETERMINE THE BEST COMBINATION OF GROWTH REGULATORS TO PRODUCE DIFFERENTIATED ORGANS WHEN SUBMITTED TO A DEFINED MEDIUM. THE REQUIREMENTS FOR NAPHTHALENEACETIC ACID AND/OR KINETIN SEEMED TO BE SPECIFIC AND INDISPENSABLE AT ADEQUATE CONCENTRATIONS OR IN BALANCED RATIOS BOTH FOR INITIATION OF CALLUS AND FOR THE DEVELOPMENT OF ROOTS, SHOOTS AND LEAVES. STATISTICAL TESTS BASED ON THE AVERAGE FRESH WEIGHT OF THE EXPLANTS SHOWED HIGHLY SIGNIFICANT DIFFERENCES BETWEEN EXPLANTS TREATED WITH DIFFERENT LEVELS OF NAPHTHALENEACETIC ACID OR KINETIN, AND BY THE INTERACTION OF KINETIN AND NAPHTHALENEACETIC ACID.

PLANT GROWTH/KINETIN/NAPHTHALENEACETIC ACID/PROPAGATION/TISSUE CULTURE/  
PLANT NUTRIENTS

0018

ARAGAO, R.G.M./MONTEIRO, D.C.

1982

A CULTURA DA JOJOBA NO NORDESTE DO BRASIL. (JOJOBA CULTIVATION IN NORTHEASTERN BRAZIL, IN PORTUGUESE).

BANCO DO NORDESTE DO BRASIL S.A., UNIVERSIDADE FEDERAL DO CEARO. 64 P.

JOJOBA RESEARCH AND DEVELOPMENT IN NORTHEASTERN BRAZIL INCLUDE THE STUDY OF GENETICS, OIL DEMAND, PLANTING AND CULTIVATION METHODS.

BRAZIL/CULTIVATION/GENETICS/PLANTATION ESTABLISHMENT

0019

AREGULLIN, M./GONZALEZ, V./GARCIA, J.

1978

DERIVADOS DE JOJOBA COMO PLASTIFICANTES EN CLORURO DE POLIVINILO  
(POLYVINYLCHLORIDE-BLENDED DERIVATIVES OF JOJOBA AS PLASTICIZERS, IN SPANISH).

PAGES 97-102 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

THE EPOXIDIZED AND MALLEINIZED DERIVATIVES OBTAINED FROM FATTY UNSATURATED ACIDS ARE EMPLOYED COMMONLY AS PLASTICIZERS AND STABILIZERS ON POLYOLEFINS, ESPECIALLY POLYVINYLCHLORIDE. SOME SERIES OF EPOXIDIZED AND MALLEINIZED DERIVATIVES WERE PREPARED FROM JOJOBA WAX AT DIFFERENT MODIFICATION EXTENTS AND HAVE BEEN BLENDED WITH POLYVINYLCHLORIDE. RESULTS ARE SIMILAR TO THE ABATEMENT EFFECT PRODUCED BY COMMERCIAL PRODUCTS.

FATTY ACIDS/CHEMICAL STRUCTURE/CHEMICAL REACTIONS/OIL

0020

AYERZA, R. (H.)

1981

IMPLANTACION DE JOJOBA EN ARGENTINA (PLANTING TRIALS IN ARGENTINA, IN SPANISH).

JOJOBA HAPPENINGS 36:4-5 (ENGLISH TRANSLATION: JOJOBA HAPPENINGS 36:6-7).

THREE JOJOBA PLANTATIONS WERE ESTABLISHED IN VILLA DOLORES, PROVINCE OF CORDOBA, ARGENTINA. PRETREATMENT OF THE SEED IMPROVED GERMINATION PERCENTAGES. NO SIGNIFICANT DIFFERENCES WERE NOTED BETWEEN SEVERAL SOWING SYSTEMS, ALTHOUGH ONE SITE FAILED BECAUSE OF PERSISTENT FREEZING TEMPERATURES.

ARGENTINA/PLANTATION ESTABLISHMENT/GERMINATION/TEMPERATURE/FREEZING

0021

AYERZA, R. (H.)

1982

LA JOJOBA EN ARGENTINA (JOJOBA IN ARGENTINA, IN SPANISH).

PAGES 467-470 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA WAS FIRST PLANTED IN ARGENTINA IN 1977. BY 1982 51 HECTARES HAD BEEN PLANTED. REPRESENTATIVES OF THE SEMILLERO LA MAGDALENA VISITED OTHER COMMERCIAL PLANTATIONS IN MEXICO, UNITED STATES, ISRAEL, COSTA RICA, INDIA AND AUSTRALIA AND HAVE DEVELOPED A SPECIALIZED CARD FILE ON JOJOBA. RESEARCH HAS BEEN PERFORMED ON GERMINATION, TRANSPLANTS, DIRECT SEEDING, DISEASES AND ASSOCIATED VEGETATION.

ARGENTINA/PLANTATION ESTABLISHMENT/GERMINATION/SEEDLINGS/DISEASES

0022

AYERZA, R. (H.)

1982

INFORME DE LAS ACTIVIDADES QUE REALIZA EL SEMILLERO LA MAGDALENA (REPORT OF ACTIVITIES COMPLETED BY EL SEMILLERO LA MAGDALENA, IN SPANISH).

JOJOBA S.A., BUENOS AIRES. 91 P.

INVESTIGATIONS OF SEMILLERO LA MAGDALENA, ARGENTINA, INCLUDE SEED PRODUCTION AND GERMPLASM STUDIES FOR MANY DESERT PLANTS SPECIES INCLUDING JOJOBA AND LEUCAENA SP. DESERT-ADAPTED MAMMALS ARE STUDIED FOR MEAT PRODUCTION. AT THREE JOJOBA PLANTATIONS GERMINATION, TRANSPLANTING AND DIRECT SEEDING TECHNIQUES, AND PESTS ARE RESEARCHED.

ARGENTINA/DESERT PLANTS/LAND MANAGEMENT/ECONOMIC DEVELOPMENT/PESTS/  
PLANT USES/WOODY PLANTS/PROPAGATION

0023

BAILEY, D.C.

1978

ANOMALOUS GROWTH AND VEGETATIVE ANATOMY OF SIMMONDSIA CHINENSIS.

DEPARTMENT OF BOTANY, UNIVERSITY OF MARYLAND, COLLEGE PARK. M.S. THESIS,  
68 P.

THE ANATOMY OF THE STEM, ROOT, AND LEAF AND THE MODE OF TISSUE FORMATION IN THE STEM OF SIMMONDSIA CHINENSIS WERE INVESTIGATED. PERIVASCULAR TISSUE IS PRESENT AS PART OF THE PRIMARY BODY; OUTERMOST CELL LAYERS OF THIS TISSUE MATURE AS A FIBROUS SHEATH. THE FIRST SHORT-LIVED EXTRAFASCICULAR CAMBIUM IS GENERATED WITHIN THE REMAINING PARENCHYMATOUS PERIVASCULAR TISSUE. SUCCESSIVE INDEPENDENT EXTRAFASCICULAR CAMBIA, ORGANIZED AS COMPLETE RINGS OR LARGE ARCS, ARISE WITHIN CENTRIFUGAL PARENCHYMA PRODUCED BY PREVIOUS CAMBIA. EXTRAFASCICULAR CAMBIA PRODUCE SECONDARY XYLEM CENTRIPETALLY AND CONJUNCTIVE TISSUE BANDS AND STRANDS OF SECONDARY PHLOEM CENTRIFUGALLY. CONJUNCTIVE TISSUE INITIALS PRODUCE RAY-LIKE STRUCTURES OF CONJUNCTIVE TISSUE; TRUE ASCULAR RAYS ARE ABSENT. THE PHELLOGEN IS ACTUALLY A REGION OF TRANSITION WHERE THE CENTRIFUGAL PARENCHYMA OF PREVIOUS EXTRAFASCICULAR CAMBIA UNDERGOES FURTHER CELLULAR SUBDIVISION; A TRUE PHELLOGEN IS LACKING. XYLEM BANDS DO NOT REPRESENT ANNUAL OR SEASONAL GROWTH INCREMENTS, AND ANOMALOUS GROWTH IN SIMMONDSIA IS AN UNEQUIVOCAL EXAMPLE OF CORPUS LIGNOSUM CIRCUMVALLATUM.

PLANT GROWTH/PLANT ANATOMY/CORPUS LIGNOSUM CIRCUMVALLATUM

0024

BAILEY, D.C.

1980

ANOMALOUS GROWTH AND VEGETATIVE ANATOMY OF SIMMONDSIA CHINENSIS.

AMERICAN JOURNAL OF BOTANY 67(2):147-161.

THE ANATOMY OF THE LEAF, ROOT AND STEM, AND THE MODE OF TISSUE FORMATION IN THE STEM OF JOJOBA WERE INVESTIGATED. PERIVASCULAR TISSUE IS PRESENT AS PART OF THE PRIMARY BODY; OUTERMOST CELL LAYERS OF THE TISSUE MATURE AS A FIBROUS SHEATH. THE FIRST SHORT-LIVED EXTRAFASCICULAR CAMBIUM IS GENERATED WITHIN THE REMAINING PARENCHYMATOUS PERIVASCULAR TISSUE. SUCCESSIVE INDEPENDENT

EXTRAFASCICULAR CAMBIA, ORGANIZED AS COMPLETE RINGS OR LARGE ARCS, ARISE WITHIN PERIPHERAL CONJUNCTIVE PARENCHYMA PRODUCED BY PREVIOUS CAMBIA. EXTRAFASCICULAR CAMBIA PRODUCE SECONDARY XYLEM CENTRIPETALLY AND CONJUNCTIVE TISSUE BANDS AND STRANDS OF SECONDARY PHLOEM CENTRIFUGALLY. CONJUNCTIVE TISSUE INITIALS PRODUCE RAYLIKE STRUCTURES OF CONJUNCTIVE TISSUE; TRUE VASCULAR RAYS ARE ABSENT. THE PHELLOGEN IS ACTUALLY A REGION OF TRANSITION WHERE THE PERIPHERAL CONJUNCTIVE PARENCHYMA OF PREVIOUS EXTRAFASCICULAR CAMBIA UNDERGOES FURTHER CELLULAR SUBDIVISION; A TRUE PHELLOGEN IS LACKING. XYLEM BANDS DO NOT REPRESENT ANNUAL OR SEASONAL GROWTH INCREMENTS, AND SECONDARY GROWTH IN JOJOBA IS AN UNEQUIVOCAL EXAMPLE OF THE CONCENTRIC ANOMALY.

PLANT ANATOMY/CONCENTRIC ANOMALY/PLANT GROWTH

0025

BAIRD, R.O.

1948

JOJOBA--POTENTIAL DESERT CROP.

RECLAMATION ERA (JULY):121-122.

MANY IMPROVED PRODUCTS ARE POSSIBLE BY UTILIZATION OF JOJOBA OIL, BUT SOURCES ARE LIMITED. MARGINAL LANDS COULD BE USED FOR CULTIVATION OF LOW-WATER-REQUIRING JOJOBA PLANTS. THE RETURN ON INVESTMENT WOULD JUSTIFY THE VENTURE.

CULTIVATION/COST ANALYSIS/PRODUCT DEVELOPMENT/OIL

0026

BALAKRISHNA, V./IYENGAR, E.R.R.

1979

INTRODUCTION OF JOJOBA ON COASTAL SAND DUNES: PRELIMINARY STUDIES.

INDIAN SOCIETY OF DESERT TECHNOLOGY AND UNIVERSITY CENTER OF DESERT STUDIES, TRANSACTIONS 4(2):115-117.

GERMINATION IS ENHANCED WITH HIGHER TEMPERATURES. NURSERY STOCK SHOULD BE RAISED WHEN AMBIENT TEMPERATURES ARE HIGHER. THERE IS NO RESPONSE TO FERTILIZER APPLICATIONS AT THE EARLY SEEDLING GROWTH. GIBBERELIC ACID IS BENEFICIAL.

INDIA/GERMINATION/TEMPERATURE/PROPAGATION/FERTILIZERS

0027

BANIGAN, T.F./VERBISCAR, A.J.

1980

DETOXIFICATION OF BOTANICAL FOODSTUFFS.

UNITED STATES PATENT 4,209,539, JUNE 24, 1980.

CYANO (-CN) GROUPS OR RADICALS IN NATURAL FOOD PRODUCTS CONTRIBUTE TO TOXICITY OF THE FOOD IN ANIMALS AND HUMANS. IT IS DESIRABLE TO REMOVE SUCH CYANO GROUPS FROM FOOD MATERIALS. THIS CAN BE DONE BY TREATING SUCH FOOD PRODUCTS WITH AQUEOUS AMMONIACAL HYDROGEN PEROXIDE, WHICH CONVERTS THE CYANO GROUPS TO

INNOCUOUS AMIDE (-COCH SUB 2) OR OTHER GROUPS OR RADICALS. THIS TREATMENT CAN BE CONDUCTED AT AMBIENT TEMPERATURES (0 C TO 50 C) AND IS EXTREMELY FAST COMPARED TO AMMONIA ALONE OR HYDROGEN PEROXIDE ALONE, THE LATTER BEING INEFFECTIVE.

TOXICITY/CHEMICAL REACTIONS/CHEMICAL STRUCTURE

0028

BARLOW, F.

1978

AN EXAMINATION OF JOJOBA MEAL FOR TOXICITY OR ANTI-FEEDING EFFECTS ON INSECTS.

JOJOBA HAPPENINGS 23:6-9.

ALTHOUGH JOJOBA MEAL IS KNOWN TO BE INJURIOUS TO RATS, JOJOBA'S ANTIFEEDING COMPOUNDS HAVE NO EFFECT ON SCHISTOCERCA GREGARIA OR SPODOPTERA LITTORALIS. SOME FRACTIONS EXTRACTED FROM THE MEAL WERE TOXIC TO S. LITTORALIS BUT NOT TO S. GREGARIA. JOJOBA MEAL OR MEAL EXTRACTS DO NOT SHOW POTENTIAL AS AN ECONOMICALLY EFFICIENT INSECTICIDE.

TOXICITY/SIMMONDSIN/RODENTS/INSECTS/SEED MEAL/PROTEINS/PRODUCT DEVELOPMENT

0029

BEASLEY, C.A./YERMANOS, D.M.

1977

EFFECTS OF STORAGE ON IN VITRO GERMINABILITY OF JOJOBA POLLEN.

POLLEN ET SPORES 18(3):471-479.

JOJOBA POLLEN WAS HARVESTED IN JANUARY 1975 AND STORED AT 24C, 4C AND -20C. GERMINABILITY WAS ASSESSED FOR EACH STORAGE CONDITION DURING ONE YEAR. VITAL STAINING WAS NOT CORRELATED WITH THE CAPACITY OF POLLEN GRAINS TO PRODUCE TUBES. GERMINATION OF FRESH POLLEN VARIED ROUGHLY FROM 20 TO 40 PERCENT. POLLEN STORED AT 24C DECREASED MARKEDLY IN GERMINATION AFTER ONE WEEK AND DID NOT GERMINATE AFTER TWO MONTHS. GERMINATION OF POLLEN STORED AT 4C REMAINED COMPARABLE TO FRESH POLLEN FOR ABOUT TWO MONTHS AND THEN DECREASED TO NIL AT ABOUT EIGHT MONTHS. GERMINATION OF POLLEN STORED AT -20C DECREASED ONLY SLIGHTLY THROUGH EIGHT TO 10 MONTHS AND STILL RETAINED APPROXIMATELY 75 PERCENT GERMINABILITY (RELATIVE TO FRESH POLLEN) AFTER ONE YEAR.

POLLEN/TEMPERATURE/GERMINATION

0030

BEGG, J.E.

1977

JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) IN AUSTRALIA.

ARID ZONE NEWSLETTER 1977:126-127.

JOJOBA WAS INTRODUCED TO AUSTRALIA IN THE 1930S. SEED WAS IMPORTED FOR A PROGRAM TO EVALUATE SUITABILITY OF NATIVE AND INTRODUCED SPECIES FOR REVEGETATING DENUDED AREAS. EXPERIMENTAL PLANTINGS HAVE BEEN ESTABLISHED IN ALL OF AUSTRALIA'S MAINLAND STATES. SITE EVALUATIONS WILL BE DONE; HOWEVER, PRODUCTION AND PRODUCTION SUITABILITY WILL NOT BE KNOWN BEFORE 1990.

AUSTRALIA/REVEGETATION/INTRODUCED SPECIES

0031

BEGG, J.E.

1979

JOJOBA RESEARCH IN AUSTRALIA.

PAGES 141-144 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE HISTORY OF JOJOBA IN AUSTRALIA DATES TO THE MID-1930S WHEN THERE WAS MUCH CONCERN ABOUT THE PROBLEMS OF REVEGETATING DENUDED AREAS ASSOCIATED WITH MINING IN THE SEMIARID AREAS OF INLAND AUSTRALIA. INTEREST WAS REVIVED IN THE EARLY 1970S AND SMALL EXPERIMENTAL PLANTINGS WERE ESTABLISHED IN ALL OF THE MAINLAND STATES AND THE NORTHERN TERRITORY. WITH THE FIELD PLANTINGS, SEEDLINGS WERE RAISED IN THE CANBERRA PHYTOTRON AND TEMPERATURE-CONTROLLED GLASSHOUSES TO STUDY ASPECTS OF THE GROWTH AND DEVELOPMENT, PHYSIOLOGY AND BIOCHEMISTRY OF JOJOBA. BECAUSE OF THE LONG LEAD TIME BETWEEN SOWING AND FULL PRODUCTION, EFFECTIVE SITE EVALUATION IN TERMS OF PRODUCTION, AND THE STABILITY OF PRODUCTION UNDER AUSTRALIAN CLIMATIC CONDITIONS WILL NOT BE KNOWN BEFORE THE 1990S.

AUSTRALIA/EROSION CONTROL/CLIMATE

0032

BELSBY, A.

1992

FARMING EXPERIENCE IN JOJOBA CULTIVATION.

PAGES 410-413 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA ENTERPRISES BEGAN OPERATING IN CALIFORNIA IN 1978. AN INCREASE IN APPLICATIONS OF WATER AND THE AMOUNT OF NITROGEN IN THE FERTILIZER IMPROVED JOJOBA PLANT GROWTH. NEW PLANTING EQUIPMENT HAS BEEN DEVELOPED. HARVESTING EQUIPMENT IS BEING TESTED.

CALIFORNIA/FERTILIZERS/PLANTATION ESTABLISHMENT/SITE SELECTION/WATER USE/  
CULTIVATION

0033

BEN-GURION UNIVERSITY OF THE NEGEV

1974

SCIENTIFIC ACTIVITIES 1973/74.

BEN-GURION UNIVERSITY OF THE NEGEV, RESEARCH AND DEVELOPMENT AUTHORITY,  
BEER-SHEVA, ISRAEL. 85 P.

NO ABSTRACT.

ISRAEL/VEGETATIVE PROPAGATION

0034

BEN-GURION UNIVERSITY OF THE NEGEV

1975

SCIENTIFIC ACTIVITIES 1974/75.

BEN-GURION UNIVERSITY OF THE NEGEV, RESEARCH AND DEVELOPMENT AUTHORITY,  
BEER-SHEVA, ISRAEL. 142 P.

NO ABSTRACT.

ISRAEL.

0035

BEN-GURION UNIVERSITY OF THE NEGEV

1976

SCIENTIFIC ACTIVITIES 1976.

BEN-GURION UNIVERSITY OF THE NEGEV, RESEARCH AND DEVELOPMENT AUTHORITY, APPLIED  
RESEARCH INSTITUTE, BEER-SHEVA, ISRAEL. 137 P.

RESEARCH ACTIVITIES OF THE APPLIED RESEARCH INSTITUTE, BEER-SHEVA, ISRAEL,  
ARE REPORTED.

AGRONOMY/GENETICS/CHEMICAL STRUCTURE/TISSUE CULTURE/PROPAGATION/ISRAEL

0036

BENAVIDES, G.A.

1950

LA JOJOBA (JOJOBA, IN SPANISH).

SOCIEDAD BOTANICA DE MEXICO, BOLETIN 10:26-32.

THE HISTORY OF THE PLANT'S DISCOVERY AND THE DETERMINATION OF THE CHEMICAL  
COMPOSITION OF THE LIQUID WAX IN THE SEEDS ARE TRACED. ITS DISTRIBUTION,  
HABITAT AND PHYTO-ASSOCIATIONS IN MEXICO ARE OUTLINED. THE ECONOMIC POTENTIAL  
OF THE WAX IS LARGE ENOUGH TO WARRANT INVESTIGATION. THE FORAGE VALUE OF THE  
PLANT IS GREAT IN MEXICO. PLANTATIONS MIGHT BE POSSIBLE IN AREAS  
WHERE SOILS ARE TOO POOR FOR OTHER CROPS, SUCH AS TEHUACAN IN THE STATE OF  
PUEBLA.

FORAGE/SEED/OIL/MEXICO/SONORAN DESERT/PLANT ECOLOGY/CULTIVATION/SYNECOLOGY/  
SEED YIELD

0037

BENZIONI, A.

1978

FRUIT DEVELOPMENT AND WAX BIOSYNTHESIS IN JOJOBA.

NEW PHYTOLOGIST 81(1):105-109.

FRUIT DEVELOPMENT AND WAX SYNTHESIS POTENTIAL AT VARIOUS STAGES OF JOJOBA (SIMMONDSIA CHINENSIS) SEED DEVELOPMENT WERE STUDIED. THE WAX PRODUCTION PHYSIOLOGY IS BEING STUDIED TO IMPROVE CULTIVATION METHODS. EARLY FLOWERING DOES NOT APPEAR TO BE ADVANTAGEOUS. FRUITS FROM EARLY FLOWERS RIPENED MORE SLOWLY THAN THOSE FROM LATE FLOWERS, BUT BOTH MATURED AT APPROXIMATELY THE SAME TIME. ALSO, THE WAX SYNTHESIS POTENTIAL INCREASED RAPIDLY DURING OVULE DEVELOPMENT AND WAS RELATED WITH OVULE GROWTH UNTIL OVULES REACHED A WEIGHT OF 600 MG TO 700 MG (HALF THEIR MAXIMUM WEIGHT). THIS IS PROBABLY THE MOST EXTENSIVE PERIOD OF ENZYMES SYNTHESIS INVOLVED IN WAX FORMATION AND SHOULD BE CRITICAL IN DETERMINING SEED QUALITY. THEREFORE, FAVORABLE GROWTH CONDITIONS, ESPECIALLY WATER REGIME, ARE MANDATORY DURING THIS TIME.

FRUIT DEVELOPMENT/FLOWERING/WATER USE/OIL/PLANT PHYSIOLOGY

0038

BENZIONI, A./MIZRAHI, Y./NERD, A.

1982

EFFECTS OF WATER AND FERTILIZATION REGIME ON FLORAL BUD DORMANCY, FRUIT SET AND VEGETATIVE GROWTH OF JOJOBA PLANTS.

PAGES 162-166, 169-170 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

THE EFFECTS OF IRRIGATION AND FERTILIZATION ON VEGETATIVE GROWTH, BREAKING OF FLORAL BUD DORMANCY, FRUIT SET AND YIELD WERE STUDIED IN JOJOBA PLANTS GROWING IN THE NEGEV DESERT DURING 1978, 1979 AND 1980. TREATMENTS INCLUDED: 1) 20 UNTREATED PLANTS (CONTROL); 2) 40 PLANTS IRRIGATED MONTHLY WITH 0.5 CUBIC METERS WATER; 3) 40 PLANTS IRRIGATED MONTHLY WITH 0.5 CUBIC METERS WATER AND GIVEN A LOW DOSE FERTILIZER (10 G NH SUB 4 NO SUB 3, 10.3 G DESHEN KOL (20:20:20) AND 44 G KNO SUB 3 PER PLANT); 4) 20 PLANTS IRRIGATED MONTHLY WITH 0.5 CUBIC METERS WATER AND GIVEN A HIGH DOSE OF FERTILIZER (THREEFOLD CONCENTRATION AS IN TREATMENT 3); 5) 20 PLANTS IRRIGATED ONCE WITH 2 CUBIC METERS WATER IN MARCH; AND 6) 20 PLANTS IRRIGATED ONCE WITH 2 CUBIC METERS WATER IN APRIL. IN 1978, THE MOST MARKED EFFECT OF IRRIGATION WAS OBSERVED WITH REGARD TO BREAKING OF FLORAL BUD DORMANCY. TO INDUCE FLOWERING A LARGE AMOUNT OF WATER MUST BE GIVEN DURING A SHORT PERIOD OF TIME; HOWEVER, THE OPTIMAL WATER REGIME WAS DETERMINED. IN 1979 PRECIPITATION OF 40 MM TO 50 MM UNTIL JANUARY INDUCED EARLY FLOWERING IN CONTROL PLANTS BUT DID NOT INDUCE FLOWERING IN ANY OTHER TREATMENT. IN 1980, SUPPLEMENTARY IRRIGATION WAS NOT NEEDED TO INDUCE FLOWERING; PLANTS IN ALL TREATMENTS FLOWERED REGARDLESS OF THE IRRIGATION REGIME. GENERALLY, IRRIGATION ENHANCED ELONGATION AND GROWTH OF NEW BRANCHES.

FERTILIZATION WAS MOST EFFECTIVE IN 1978 AND RESULTED IN GROWTH ABOUT THREE TIMES HIGHER IN TREATMENT 4 THAN IN TREATMENT 2. YIELD SEEMS TO BE CONDITIONED BY PREVIOUS BRANCH ELONGATION. IN TURN, HIGH YIELDS MAY COMPETE WITH FURTHER GROWTH AND MAY EFFECT PRODUCTION IN THE FOLLOWING YEAR. IN 1979 YIELDS WERE HIGH AND GROWTH WAS REDUCED; THE FOLLOWING YEAR'S PRODUCTION WAS LOW. IN 1979, THE PRODUCTION INCREASE FROM TREATMENT 2 TO TREATMENT 4 WAS CORRELATED WITH THE VEGETATIVE GROWTH DURING 1978.

IRRIGATION/FERTILIZERS/FLOWERING/SEED YIELD/WATER USE/ISRAEL



0039

BERNAL, V.J.A.

1982

DETERMINACION DEL DISTANCIAMIENTO OPTIMO ENTRE PLANTAS DE JOJOBA SIMMONDSIA CHINENSIS BAJO CULTIVO EN LA COSTA DE HERMOSILLO (DETERMINING OPTIMAL BETWEEN-PLANT SPACING OF JOJOBA UNDER CULTIVATION ON THE COAST OF HERMOSILLO, IN SPANISH).

PAGES 57-65 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA SEEDLINGS WERE PLANTED IN AN EXPERIMENTAL DESIGN TO DETERMINE OPTIMAL BETWEEN-PLANT DISTANCES FOR SEED PRODUCTION. PLANTS WERE SPACED 0.80, 1.20, 1.60, 2.00 AND 2.40 METERS APART. VEGETATIVE GROWTH AND SEED PRODUCTION WERE MEASURED TO EVALUATE THE EFFECTS OF SPACING. DURING THE FIRST FOUR YEARS, YIELDS WERE GREATER FOR THE PLANTS CLOSEST TOGETHER. HOWEVER, AFTER THE FIFTH YEAR THE DISTANCE BETWEEN PLANTS WAS DIRECTLY PROPORTIONAL TO SEED YIELDS. THE DIFFERENCE IS ATTRIBUTED TO COMPETITION BETWEEN ROOTS.

MEXICO/SONORA/SEED YIELD/PLANT DISTRIBUTION/PLANTATION ESTABLISHMENT

0040

BIRNBAUM, E.

1978

PRELIMINARY STUDIES ON PROPAGATION OF SIMMONDSIA CHINENSIS BY TISSUE CULTURE.

PAGES 91-94 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

RESEARCH HAS BEEN EXTENDED TO TISSUE-CULTURE PROPAGATION OF SIMMONDSIA CHINENSIS. MULTI-BRANCHED MATERIAL IS OBTAINED FROM VEGETATIVE BUDS. ONCE SEPARATED, EACH BRANCH IS ROOTED IN A SUITABLE MEDIUM AND DEVELOPS INTO A PERFECT PLANTLET. TRIALS ARE BEING CONDUCTED ON METHODS FOR HARDENING THE ROOTED PLANTLETS BOTH FROM MIST AND TISSUE-CULTURE PROPAGATION.

PROPAGATION/TISSUE CULTURE

0041

BIRNBAUM, E.

1982

PROPAGATION OF JOJOBA BY TISSUE CULTURE.

PAGES 158-161 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

PROPAGATION OF JOJOBA FROM CUTTINGS AND BY TISSUE CULTURE HAS BEEN ATTEMPTED AT THE APPLIED RESEARCH INSTITUTE OF BEN-GURION UNIVERSITY. PROPAGATION BY CUTTINGS IS MOST APPROPRIATE WHEN SUFFICIENT QUANTITIES OF A SUPERIOR LINE ARE IN THE FIELD; PROPAGATION BY TISSUE CULTURE IS APPROPRIATE WHEN LARGE QUANTITIES OF GERMLASM ARE DESIRED. SINCE SUPERIOR QUALITIES AND TRAITS OF INDIVIDUAL WOODY PLANT SPECIMENS CANNOT BE ASSESSED UNTIL THE PLANT HAS REACHED ITS ADULT FORM, ALL EFFORTS HAVE BEEN DIRECTED TOWARD SELECTED SPECIMENS BETWEEN FIVE

AND 20 YEARS OF AGE. TISSUE CULTURE WORK WITH CALLUS HAS BEEN AVOIDED TO MINIMIZE THE DANGER OF INTRODUCING MUTANT LINES INTO COMMERCIAL PLANTATIONS. A MICRO-PROPAGATION METHOD BASED ON THE TECHNIQUE OF ACCELERATED AXILLARY BUD PROLIFERATION HAS BEEN DEVELOPED. INITIAL EXPERIMENTS USING THIS METHOD RESULTED IN ROOTING; HOWEVER, ALL PLANTLETS PERISHED WITHIN WEEKS OF PLANTING IN A CONTROLLED-ENVIRONMENT GREENHOUSE. THE REASON FOR LOW SURVIVAL RATES AFTER PLANTING APPEARED TO BE INSUFFICIENT HARDENING-OFF, A PROCESS THAT INVOLVES MORPHOLOGICAL AND PHYSIOLOGICAL FACTORS OF WHICH KNOWLEDGE IS LIMITED. EFFICIENT HARDENING-OFF PROCEDURES HAVE RESULTED IN HARDIER PLANTLETS, WHICH HAVE BEEN SUCCESSFULLY TRANSFERRED TO GREENHOUSE, NETHOUSE AND FIELD CONDITIONS

PROPAGATION/TISSUE CULTURE/ISRAEL

0042

BOOTH, A.N.

1973

JOJOBA OIL AND MEAL SUBACUTE TOXICITY STUDY WITH RATS.

PAGES 73-74 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

ALTHOUGH MANY OIL SEED MEALS ARE SOLD AS PROTEIN FEED SUPPLEMENTS, MANY HAVE POSED PROBLEMS OF TOXICITY. IN SPITE OF FREQUENT REFERENCE IN THE LITERATURE TO THE FACT THAT JOJOBA MEAL COULD BE USED AS A LIVESTOCK FEED, EXPERIMENTS ON RATS INDICATE THAT THE MEAL IS TOXIC TO SOME ANIMALS. RATS DIED ON DIETS OF 30 PERCENT AND 15 PERCENT MEAL, PROBABLY DUE TO STARVATION. ON DIETS OF 10 PERCENT OR LESS MEAL, RATS SURVIVED, BUT GROWTH WAS INHIBITED. HEATING OF THE MEAL APPEARED TO DECREASE THE GROWTH-INHIBITING EFFECT. AUTOPSY REVEALED: 1) SEVERE TESTICULAR ATROPHY WITH CESSATION OF SPERMATOGENESIS; 2) LARGE CYTOPLASMIC VACUOLES IN THE ACINAR CELLS OF THE PANCREAS; AND 3) FATTY INFILTRATION OF THE LIVER. JOJOBA MEAL COULD BE TOXIC TO SWINE AND POULTRY, BUT IT MAY BE DETOXIFIED IN THE RUMEN OF SHEEP AND CATTLE. THE FEEDING OF JOJOBA OIL (10 PERCENT) TO RATS ALSO RESULTED IN POOR GROWTH. DIGESTIBILITY OF THE OIL BY RATS WAS LESS THAN 20 PERCENT. MASSIVE EDEMA OF THE TESTES ALSO RESULTED.

SEED/TOXICITY/PROTEINS/REPRODUCTION/RODENTS/IMMUNOLOGY/DIGESTION/LIVESTOCK/  
SEED MEAL/OIL/FEEDING STUDIES

0043

BOOTH, A.N./ELLIGER, C.A./WAISS, A.C., JR.

1974

ISOLATION OF A TOXIC FACTOR FROM JOJOBA MEAL.

LIFE SCIENCES 15(6):1115-1120.

A NEW TOXIC GLUCOSIDE CALLED SIMMONDSIN HAS BEEN ISOLATED FROM JOJOBA MEAL AND IDENTIFIED AS A 2-(CYANOMETHYLENE)-3-HYDROXY-4, 5-DEMETHOXYCYCLOHEXYL BETA-D-GLUCOSIDE BY APPLICATION OF CONVENTIONAL CHEMICAL FRACTIONATION AND ANIMAL BIOASSAY TECHNIQUES. PRELIMINARY TOXICOLOGICAL STUDIES ON RATS AND MICE IMPLICATE THE BENZYL CYANIDE DERIVATIVE OF SIMMONDSIN AS THE TOXICANT.

CHEMICAL STRUCTURE/SEED MEAL/PALATABILITY/PLANT CHEMISTRY/RODENTS/SIMMONDSIN

0044

BORBON, D.J./RUIS M., A.

1979

HIDROGENACION DE LA CERA DE JOJOBA (HYDROGENATION OF JOJOBA OIL, IN SPANISH).

PAGES 199-205 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

A PARR AGITATED TYPE REACTOR WAS USED TO HYDROGENATE JOJOBA OIL. THE VARIABLES STUDIED WERE TEMPERATURE, PRESSURE AND CATALYST CONCENTRATION. THE WORKING CONDITIONS WERE: TEMPERATURE, 100 C TO 145 C; PRESSURE 200-240 LB/SQ IN; AND CATALYST CONCENTRATION, 5-8 G/L. THE AGITATION SPEED WAS CONSTANT AT 850 RPM. THE CATALYST USED WAS G-53 FROM GILDER CHEMICAL INC., (25 PERCENT NI). NEUTRALIZED OIL WITH AN ACID VALUE OF 0.1 AND AN IODINE VALUE OF 83 WAS USED. THE WORK WAS DONE FOLLOWING THE EVOP-SSD TECHNIQUE. THE REACTION WAS MONITORED BY DETERMINING IODINE VALUE WITH THE WIJS METHOD. THE CONVERSION RATE WAS FROM 82 PERCENT FOR A REACTION OF 120 MINUTES TO 99 PERCENT FOR A REACTION TIME OF 10 MINUTES. THE REACTION WAS DEFINED AS A PSEUDO-FIRST ORDER REACTION.

OIL/TEMPERATURE/PRESSURE/CHEMICAL REACTIONS/HYDROGENATION/HYDROGENATED OIL

0045

BOYD, R.W.

1982

MECHANICAL HARVESTING OF JOJOBA.

PAGES 32-35 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA. CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

A SYSTEMS ANALYSIS REVEALS THAT THE FINAL YIELD OF JOJOBA WILL BE INFLUENCED BY PLANT PHYSIOLOGY, DISEASES AND PESTS, TERRAIN, TIMING, PLANTING CONFIGURATIONS, HARVESTING TECHNIQUES, PERFORMANCE AND COSTS. HARVESTING SUCCESS WILL DEPEND ON WHERE JOJOBA IS PLANTED, THE PLANTING CONFIGURATION, PLANT POPULATION, PRUNING AND CULTURAL TECHNIQUES AND THE TYPE OF HARVESTER USED.

SEED HARVEST/SEED YIELD/CULTIVATION/PLANTATION ESTABLISHMENT

0046

BOYD, R.W.

1982

FARMING COST OF JOJOBA UNDER VARIOUS TYPES OF IRRIGATION.

PAGES 36-38 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA. CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

SELECTING A SUITABLE IRRIGATION SYSTEM FOR JOJOBA INCLUDES A CAREFUL ANALYSIS OF THE AMOUNT AND DISTRIBUTION OF RAINFALL AND THE SOIL TYPES WHERE JOJOBA IS GROWN. TIMING OF WATER APPLICATIONS, SOURCE, AMOUNT, COST AND QUALITY OF IRRIGATION WATER, AND PLANT REQUIREMENTS (VARYING WITH CLIMATE) ALSO MUST BE CONSIDERED.

FLOOD OR ROW IRRIGATION CAN BE USED WHEN WATER AVAILABILITY PER ACRE IS HIGH, WHEN WATER COSTS ARE CHEAP AND WHEN LABOR IS AVAILABLE. FLOOD IRRIGATION WILL RESULT IN HIGH WATER USE REGARDLESS OF PLANT REQUIREMENTS. SPRINKLER

IRRIGATION ALLOWS CONTROL OF WATER RATE APPLICATION. SPRINKLER IRRIGATION ALSO WILL ACCOMMODATE NURSE OR COVER CROPS. DRIP IRRIGATION ALLOWS DIRECT CONTROL OF WATER APPLICATION. ALTHOUGH SYSTEM COSTS ARE HIGHEST FOR DRIP IRRIGATION, LABOR TO MAINTAIN THE SYSTEM IS LOWEST. ALSO, WEED CONTROL COSTS ARE REDUCED. ENERGY COSTS FOR DRIP IRRIGATION ARE ROUGHLY 50 PERCENT OF THOSE FOR SPRINKLER SYSTEMS.

IRRIGATION/CLIMATE/WATER USE/COST ANALYSIS/ECONOMICS

0047

BRAUN, R.H.

1976

AGE ESTIMATION OF JOJOBA PLANTS.

JOJOBA HAPPENINGS 17:6-7.

DATA WERE COLLECTED ON HEIGHT, NUMBER OF BASAL STEMS, DIAMETER OF MAIN STEM, DIAMETER OF CROWN, AND BRANCHING IN 23 JOJOBA PLANTS ON THE COAST OF SONORA, MEXICO. PLANT MORPHOLOGY IS CORRELATED WITH AGE.

GROWTH FORM/MEXICO/AGE DETERMINATION

0048

BREDAHL, A.R.

1982

MARKETING EXPERIENCE IN JOJOBA PLANTATION SALES.

PAGES 427-432 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

LAND PLANTED WITH JOJOBA SHOWS POTENTIAL AS A GOOD INVESTMENT. LAND SHOULD RAPIDLY INCREASE IN VALUE.

LAND PRICES

0049

BREDAHL, A.R.

1980

SPECULATIVE FORECAST SHOWS FUTURE JOJOBA LAND PRICES.

PETROCULTURE (SUMMER):8-10.

A CONSERVATIVE EXTRAPOLATION OF CURRENT PRICES FOR LAND PLANTED WITH JOJOBA SHOWS AN INCREASED PRICE TREND BETWEEN 1980 AND 1985. BASED ON LAND SALES IN DESERT CENTER, CALIFORNIA, PRICES ARE 4,500 DOLLARS PER ACRE (JUST PLANTED); 5,500 DOLLARS PER ACRE (WITH ONE-YEAR-OLD PLANTS); AND 7,000 DOLLARS PER ACRE (WITH TWO-YEAR-OLD PLANTS). PROJECTED PER ACRE PRICES ARE: 8,500 DOLLARS (WITH THREE-YEAR-OLD PLANTS); 10,000 DOLLARS (WITH FOUR-YEAR-OLD PLANTS); AND 11,500 DOLLARS (WITH FIVE-YEAR-OLD PLANTS). INCOME, BASED ON THE FIFTH YEAR OF OPERATION, WOULD BE 1,500 DOLLARS PER ACRE. FUTURE EVENTS WILL SUPPORT MUCH HIGHER PRICES FOR PLANTED LAND SUCH AS MAJOR INVESTMENTS THAT WILL INCREASE INTEREST AND LIMITED PARTNERSHIPS, MAJOR PUBLIC OFFERINGS OF STOCK IN JOJOBA COMPANIES AND FOREIGN INVESTORS THAT WILL DEMAND GOOD JOJOBA LAND.

CALIFORNIA/PLANTATION ESTABLISHMENT/COST ANALYSIS/ECONOMIC DEVELOPMENT

0050

BRITISH MUSEUM (NATURAL HISTORY)

1979

JOJOBA: A NEW CULTIVATED CROP PLANT.

BRITISH MUSEUM (NATURAL HISTORY) PUBLICATION NO. 807, SURREY. 16 P.

JOJOBA MAY HAVE POTENTIAL AS A SUBSTITUTE FOR SPERM WHALE OIL. JOJOBA'S NATIVE HABITAT, DISTRIBUTION, MORPHOLOGY, PRODUCT USE, AND ITS POTENTIAL AS A CULTIVATED CROP ARE DESCRIBED.

NATIVE POPULATIONS/PLANT MORPHOLOGY/ECONOMIC DEVELOPMENT

0051

BROOKS, W.H. ET AL

1977

INVESTIGATION OF THE DEVELOPMENT OF AN INDIAN RESERVATION-BASED JOJOBA INDUSTRY.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 57 P.

A QUARTERLY REPORT OF WORK PERFORMED UNDER NATIONAL SCIENCE FOUNDATION GRANT NO. ISP77-04295 FOR THE PERIOD AUGUST 1, 1977, TO OCTOBER 31, 1977. PROJECT ACTIVITIES INCLUDE ECONOMIC ANALYSIS, SOCIAL IMPACT ANALYSIS, AND ENVIRONMENTAL IMPACT ANALYSIS.

COST ANALYSIS/ECONOMIC DEVELOPMENT/ENVIRONMENTAL EFFECTS/SOCIAL ASPECTS/  
INDIAN RESERVATIONS

0052

BROOKS, W.H.

1978

JOJOBA--A NORTH AMERICAN DESERT SHRUB; ITS ECOLOGY, POSSIBLE COMMERCIALIZATION, AND POTENTIAL AS AN INTRODUCTION INTO OTHER ARID REGIONS.

JOURNAL OF ARID ENVIRONMENTS 1(3):227-236.

THE PRESENT DISTRIBUTION OF JOJOBA (SIMMONDSIA CHINENSIS) IS LINKED WITH THE WINTER-SPRING RAINS OF A MEDITERRANEAN TYPE OF CLIMATE IN THE SONORAN DESERT REGIONS OF THE UNITED STATES AND SONORA AND BAJA CALIFORNIA IN MEXICO. OTHER ARID REGIONS MAY BE SUITABLE FOR JOJOBA PARTICULARLY PORTIONS OF THE ASIR PROVINCE IN WESTERN SAUDI ARABIA.

CLIMATE/SAUDI ARABIA/PRECIPITATION/PLANT DISTRIBUTION

0053

BROOKS, W.H.

1979

A REVIEW OF SOME ECOLOGICAL RELATIONSHIPS OF NATURAL JOJOBA STANDS IN ARIZONA.

PAGES 39-49 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

A PREVIOUS PHYTOSOCIOLOGICAL STUDY OF THE PERSISTENT PERENNIAL VEGETATION IN CENTRAL ARIZONA IDENTIFIED SPECIES CORRELATIONS WITH ELEVATIONAL AND TOPOGRAPHIC FACTORS. THESE EARLIER FINDINGS ARE COMBINED WITH MORE RECENT STUDIES TO INCLUDE TOPOGRAPHICAL, EDAPHIC AND PREDATOR RELATIONSHIPS IN TERMS OF THEIR INFLUENCE ON NATURAL STANDS OF JOJOBA (SIMMONDSIA CHINENSIS) IN THE ARIZONA UPLAND DIVISION OF THE SONORAN DESERT. SITE EVALUATION AND SURFACE WATER INFILTRATION, AS INFLUENCED BY SOIL TEXTURE AND CHEMISTRY, APPEAR TO BE MORE CRITICAL THAN FACTORS SUCH AS SLOPE ASPECT WHERE NATURAL STAND ESTABLISHMENT AND GROWTH ARE CONCERNED. PERSONS DEVELOPING CULTIVATED JOJOBA SITES, HOWEVER, MUST BE AWARE OF AIR DRAINAGE PATTERNS INFLUENCED BY LOCAL TOPOGRAPHY, ESPECIALLY IN THOSE AREAS WHERE LOW TEMPERATURES CAN BE EXPECTED. INCREASED NUMBERS OF CERTAIN RODENTS, BIRD SPECIES AND MULE DEER IN THE SURROUNDING AREA SHOULD BE CONSIDERED.

CLIMATE/PHYTOGEOGRAPHY/NATIVE POPULATIONS/SITE SELECTION/SOILS/WILDLIFE

0054

BROOKS, W.H. ET AL

1978

INVESTIGATION OF THE DEVELOPMENT IN AN INDIAN RESERVATION-BASED JOJOBA INDUSTRY.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 165 P.

THIS IS A SIX-MONTH REPORT OF WORK PERFORMED UNDER THE NATIONAL SCIENCE FOUNDATION GRANT NO. ISP77-04295 FOR THE PERIOD AUGUST 1, 1977, TO FEBRUARY 28, 1978. PROJECT ACTIVITIES INCLUDE ASSESSING INDUSTRIAL INCENTIVES AND IDENTIFYING AND EVALUATING THE ECONOMIC, SOCIAL, AND ENVIRONMENTAL CONSEQUENCES OF JOJOBA INDUSTRIES ON SOUTHWESTERN INDIAN LANDS.

INDIAN RESERVATIONS/ENVIRONMENTAL EFFECTS/ECONOMIC DEVELOPMENT

0055

BROOKS, W.H./FOSTER, K.E.

1980

MAN-INDUCED AND NATURAL IMPACTS ON SEED PRODUCTION AND REGENERATION IN WILD STANDS OF JOJOBA (SIMMONDSIA CHINENSIS). PHASE I REPORT TO U.S. FOREST SERVICE, ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 39 P.

CONTINUED EVALUATION OF ENVIRONMENTAL AND HUMAN FACTORS INFLUENCING NATURAL JOJOBA DISTRIBUTION AND REPRODUCTION WILL CONTRIBUTE TO SOUND MANAGEMENT PROGRAMS OF THAT NATURAL RESOURCE. A THREE-PHASE STUDY, FOR TONTO NATIONAL FOREST, ARIZONA, WAS INITIATED TO MONITOR VARIOUS ELEVATIONS AND LAND-USE AREAS. IN PHASE I, STUDY AREAS WERE SELECTED. INITIAL STAND SELECTION CRITERIA INCLUDED ESTABLISHED HISTORIES OF NO DISTURBANCE (EXCLOSURES), SEED HARVESTING AND OTHER HUMAN ACTIVITIES, CATTLE GRAZING AND USE OF THE STANDS BY WILDLIFE.

ARIZONA/NATIONAL PARKS/NATIVE POPULATIONS/PLANT DISTRIBUTION/REPRODUCTION/  
PHYTOGEOGRAPHY

0056

BROWN, J.H./OLENBERG, H.

1982

ISOMERIZATION OF JOJOBA OIL, ITS PRODUCTS AND RESULTANT COMPOSITIONS.

EUROPEAN PATENT APPLICATION EP 46,723, MARCH 3, 1982.

JOJOBA OIL CAN BE ISOMERIZED AT 150 F TO 350 F IN THE PRESENCE OF ACID-TREATED MONTMORILLONITE.

OIL/PRODUCT DEVELOPMENT/CHEMICAL STRUCTURE/ISOMERIZATION/PATENTS

0057

BROWN, S.C.

1976

BIOCHEMISTRY OF SIMMONDSIA CHINENSIS.

CLAREMONT GRADUATE SCHOOL, CLAREMONT, CALIFORNIA. M.A. THESIS, 72 P.

VARIOUS CHEMICAL TESTS (ELLAGITANNIN DETECTION, IRIDOID DETECTION, ALKALOID DETECTION, XANTHONE DETECTION, PHENOLIC ACID IDENTIFICATION, ISOENZYME AND PHENOLICS CHEMISTRY) WERE PERFORMED ON JOJOBA PLANT MATERIALS. PARTICULAR ATTENTION WAS PAID TO THE FLAVONOID CHEMISTRY BECAUSE OF ITS POTENTIAL IMPORTANCE IN TAXONOMIC DECISIONS. FIVE FLAVONOID CONSTITUENTS WERE DETECTED IN METHANOLIC SIMMONDSIA LEAF EXTRACTS. ALTHOUGH THE PHYLOGENETIC PLACEMENT OF THE TAXON SIMMONDSIA IS UNRESOLVED, ONE COULD ARGUE FOR A MONOTYPIC ORDER, THE SIMMONDSIALES, FROM A BIOCHEMICAL POINT OF VIEW. A COMPARISON BETWEEN SIMMONDSIA AND BUXACEAE, BASED ON DATA FROM THE LITERATURE, NOTES FEATURES OF POLLEN, CHROMOSOME NUMBER, WOOD ANATOMY, LEAF ANATOMY, GENERAL MORPHOLOGY AND EMBRYOLOGY.

LEAVES/PLANT CHEMISTRY/SYSTEMATICS

0058

BUNCE, J.A./CHABOT, B.F./MILLER, L.N.

1979

ROLE OF ANNUAL LEAF CARBON BALANCE IN THE DISTRIBUTION OF PLANT SPECIES ALONG AN ELEVATIONAL GRADIENT.

BOTANICAL GAZETTE 140(3):288-294.

PHYSIOLOGICAL RESPONSES TO WATER STRESS WERE DETERMINED UNDER LABORATORY CONDITIONS FOR EIGHT WOODY PERENNIAL SPECIES (LARREA TRIDENTATA, ACACIA GREGGI, SIMMONDSIA CHINENSIS, VAUQUELINA CALIFORNICA, JUNIPERUS DEPPEANA, PINUS PONDEROSA, FRAXINUS PENNSYLVANICA SPP. VELUTINA, AND ALNUS OBLONGIFOLIA) OCCUPYING DIFFERENT POSITIONS ALONG A MOISTURE GRADIENT IN THE SANTA CATALINA MOUNTAINS OF ARIZONA. ANNUAL LEAF CARBON (C) BALANCES WERE CALCULATED OVER A RANGE OF ELEVATIONS FROM NET PHOTOSYNTHESIS AND DARK RESPIRATION RESPONSES TO LEAF WATER POTENTIAL (LWP), THE DEPENDENCE OF LWP ON SOIL WATER POTENTIAL (SWP) AND YEARLY PATTERNS OF SWP. SPECIES RANKING IN ELEVATIONS WHERE ANNUAL LEAF C BALANCES WERE ZERO AGREED WITH THE RANKING OF ACTUAL LOWER ELEVATION LIMITS. THIS INTEGRATED MEASURE OF THE ABILITY OF SPECIES TO ACQUIRE C IN THE FIELD WAS THE ONLY PHYSIOLOGICAL RESPONSE THAT CORRECTLY RANKED THE SPECIES BY DISTRIBUTION LIMIT.

STRESS/ARIZONA/WATER USE/PLANT DISTRIBUTION/WATER STRESS

0059

BUNCE, J.A./MILLER, L.N.

1976

DIFFERENTIAL EFFECTS OF WATER STRESS ON RESPIRATION IN THE LIGHT IN WOODY PLANTS FROM WET AND DRY HABITATS.

CANADIAN JOURNAL OF BOTANY 54(21):2457-2464.

EXPERIMENTS WERE PERFORMED ON PLANTS OF SIMMONDSIA CHINENSIS, LARREA DIVARICATA, ACACIA GREGGII, JUNIPERUS DEPPEANA, FRAXINUS PENNSYLVANICA SPP. VELUTINA, AND ALNUS OBLONGIFOLIA COLLECTED NEAR TUCSON, ARIZONA, AND ON ALNUS REGOSA AND FRAXINUS PENNSYLVANICA SEEDLINGS COLLECTED NEAR ITHACA, NEW YORK. RESPIRATION IN THE LIGHT (DARK RESPIRATION) AND LEAF WATER STATUS WERE MONITORED ONCE A DAY IN LEAVES OF WOODY PLANTS AS SEEDLINGS DRIED DURING SEVEN- TO 10-DAY PERIODS. LIGHT RESPIRATION WAS ESTIMATED FROM AN ELECTRICAL ANALOGUE MODEL OF THE RESPONSE OF NET PHOTOSYNTHESIS TO AMBIENT CARBON DIOXIDE CONCENTRATION AND ALSO BY THE RATE OF CARBON DIOXIDE EVOLUTION INTO CARBON DIOXIDE-FREE AIR. RESPIRATION IN THE LIGHT INCREASED WITH WATER STRESS IN FOUR DRY-HABITAT SPECIES AND DECREASED WITH STRESS IN FOUR WET-HABITAT SPECIES. DARK RESPIRATION CHANGES COULD NOT ACCOUNT FOR THE DIFFERENT TRENDS OBSERVED. WHEN LIGHT RESPIRATION IN DRY-HABITAT PLANTS UNDER WATER STRESS WAS TEMPORARILY INHIBITED, NET PHOTOSYNTHESIS DURING RECOVERY FROM WATER STRESS WAS REDUCED, COMPARED WITH CONTROLS, FOR AT LEAST A WEEK. THIS MAY INDICATE A PROTECTIVE ROLE OF LIGHT RESPIRATION IN THESE PLANTS WHEN UNDER WATER STRESS.

LEAVES/PHOTOSYNTHESIS/PHYSIOLOGICAL ECOLOGY/RESPIRATION/WATER BALANCE/  
WATER STRESS

0060

BURDEN, J.D.

1970

ECOLOGY OF SIMMONDSIA CHINENSIS (LINK) SCHNEID. AT ITS LOWER ELEVATIONAL LIMITS.

ARIZONA STATE UNIVERSITY, TEMPE. M.S. THESIS, 71 P.

THE PHYTOSOCIOLOGICAL RELATIONSHIPS OF SIMMONDSIA CHINENSIS WERE DETERMINED AT 25 SITES. A SIMPLE CORRELATION MATRIX ANALYSIS INDICATED THAT THE DENSITY OF SIMMONDSIA CHINENSIS WAS POSITIVELY CORRELATED WITH THE DENSITIES OF CERCICIUM MICROPHYLLUM AND ERIOGONUM FASCICULATUM, ALSO WITH ASPECT AND SLOPE ANGLE. A LINEAR MULTIPLE REGRESSION ANALYSIS SHOWED THAT 45 PERCENT OF THE DENSITY VARIABILITY WAS ACCOUNTED FOR BY TOPOGRAPHIC AND EDAPHIC FACTORS. MICROENVIRONMENTAL INVESTIGATIONS AT THREE STATIONS (TOP, MID, AND BASE) INDICATE: 1) SUMMER TEMPERATURES DIFFER ONLY SLIGHTLY; 2) WINTER TEMPERATURES ARE 2.5 DEGREES COOLER AT TOP THAN AT BASE STATION; 3) MAXIMUM WATER STRESS IS IN EARLY SUMMER; 4) THE TOP STATION HAD A LONGER PERIOD OF MOISTURE THAN THE BASE STATION; AND 5) WINTER RAINS ARE MORE EFFICIENT AT RECHARGING SOIL MOISTURE THAN SUMMER RAINS. OPTIMAL CONDITIONS FOR SEED GERMINATION WERE DARKNESS, CONSTANT MOISTURE SUPPLY, AND TEMPERATURES OF 26 C TO 30 C.

SONORAN DESERT/PLANT ECOLOGY/NATURAL HISTORY/MICROENVIRONMENT/PHOTOPERIOD/  
SYNECOLOGY/VEGETATION ESTABLISHMENT/XEROPHYTES/GERMINATION/PLANT COMMUNITIES/  
LIGHT/TEMPERATURE/SOIL MOISTURE/ASPECT/SLOPE EXPOSURE/PRECIPITATION



0061

BUTTROSE, M.S./LOTT, J.N.A.

1978

CALCIUM OXALATE DRUSE CRYSTALS AND OTHER INCLUSIONS IN SEED PROTEIN BODIES: EUCALYPTUS AND JOJOBA.

CANADIAN JOURNAL OF BOTANY 56 (17):2083-2091.

DRUSE CRYSTALS OF CALCIUM OXALATE ARE KNOWN TO OCCUR IN SOME PROTEIN BODIES OF SOME PLANT SEEDS. OBSERVATIONS ON CRYSTALS AND OTHER CONTENTS OF PROTEIN BODIES OF EUCALYPTUS ERYTHROCORYS AND SIMMONDSIA CHINENSIS (JOJOBA) ARE REPORTED. RESULTS ARE PRESENTED FROM THIN SECTION STUDIES OF GLUTARALDEHYDE: OSO SUB 4 FIXED, DEHYDRATED AND EMBEDDED TISSUE; FREEZE-FRACTURE STUDIES; ENERGY DISPERSIVE X-RAY (EDX) ANALYSIS STUDIES OF FREEZE-DRIED TISSUE POWDERS (EUCALYPTUS ONLY); AND CHEMICAL ANALYSIS STUDIES OF P, MG, K, AND CA CONTENT (EUCALYPTUS ONLY). MANY EUCALYPTUS PROTEIN BODIES CONTAINED LARGE DRUSE CRYSTALS RICH IN CA BUT DEVOID OF P, K, AND MG, AND AN OCCASIONAL PROTEIN BODY FROM JOJOBA CONTAINED SOME DISPERSED CRYSTALS. EUCALYPTUS SEEDS WERE EXCEPTIONALLY HIGH IN CA CONTENT. EDX ANALYSIS RESULTS PROVIDE EVIDENCE FAVORING THE PHYTIN-RICH NATURE OF GLOBOID CRYSTALS IN THE TWO SPECIES. STRUCTURAL VARIATION IN THE GLOBOID CRYSTALS WAS GREAT, ESPECIALLY IN JOJOBA. EUCALYPTUS, WHOSE PROTEIN BODIES CONTAINED VERY LARGE GLOBOID CRYSTALS RICH IN P, MG, AND K, HAD HIGHER LEVELS OF THESE ELEMENTS THAN MOST SPECIES INVESTIGATED TO DATE.

CHEMICAL COMPOSITION/PROTEINS/EUCALYPTUS

0062

CADICAMO, P.A./CADICAMO, J.J.

1982

A STUDY OF JOJOBA OIL, ITS DERIVATIVES AND OTHER COSMETIC OILS.

COSMETICS AND TOILETRIES 98:67-70.

JOJOBA OIL AND ITS DERIVATIVES WERE COMPARED WITH PETROLATUM, SILICONE, AND LANOLIN, CASTOR AND MINERAL OILS TO TEST OCCLUSION, PENETRATION AND LUBRICITY. PETROLATUM TOTALLY OCCLUDED MOISTURE TRANSMISSION. JOJOBUTTER 51 WAS ALMOST AS EFFECTIVE. JOJOBA OIL REDUCED WATER LOSS BETTER THAN CASTOR OIL BUT NOT AS WELL AS THE BALANCE OF MATERIALS TESTED. HYDROGENATED JOJOBA OIL PENETRATED FASTER THAN ANY OTHER MATERIAL TESTED. JOJOBUTTER 51 RESISTED PENETRATION. JOJOBUTTER 31 HAD THE BEST LUBRICITY OF ALL MATERIALS TESTED.

COSMETICS/OIL/PETROLATUM/SILICONE/LANOLIN/CASTOR OIL/PRODUCT DEVELOPMENT

0063

CANALES L., B.

1976

COMISION NACIONAL DE LAS ZONAS ARIDAS, INFORME DE ACTIVIDADES 1972-1976 DE LA SUB-DIRECCION INDUSTRIAL. (NATIONAL COMMISSION OF ARID ZONES, REPORT OF ACTIVITIES 1972-1976 OF THE INDUSTRIAL SUBDIRECTORATE, IN SPANISH).

PAGES 1-53, IN GUAYULE, CANDELILLA, YUCCAS, JOJOBA, GOBERNADORA. COMISION NACIONAL DE LAS ZONAS ARIDAS, SUB-DIRECCION INDUSTRIAL, MEXICO, D.F. 53 P. PLUS APPENDICES.

A FEDERAL PROGRAM OF WILD JOJOBA SEED HARVEST IN NORTHERN BAJA CALIFORNIA IN 1975 DEMONSTRATED THAT IT IS ECONOMICALLY FEASIBLE TO COLLECT WILD SEED, PAY ATTRACTIVE PRICES TO SEED HARVESTERS, AND SELL THE OIL AT A PROFIT. CULTURAL MANIPULATION OF NATIVE POPULATIONS, 700 HECTARES, WAS INITIATED IN 1974 IN ENSENADA, BAJA CALIFORNIA. INVESTIGATIONS ON DOMESTICATION ARE PROCEEDING IN SONORA, AND IN SOUTHERN BAJA CALIFORNIA, WHERE HERMAPHRODITIC FORMS HAVE BEEN IDENTIFIED. THE MUNICIPALITY OF QUERETARO HAS ESTABLISHED A NURSERY FOR JOJOBA AND IS TRANSPLANTING SEEDLINGS. OBSERVATION GARDENS ARE BEING ESTABLISHED AT 140 AGRICULTURAL SCHOOLS IN ARID AREAS. PRODUCT DEVELOPMENT, PRODUCT UTILIZATION, AND WILD POPULATION INVENTORY STUDIES ARE PROCEEDING AND EFFORTS ARE BEING MADE TO INCREASE SCIENTIFIC COOPERATION ON JOJOBA BETWEEN THE UNITED STATES AND MEXICO. THE MARKET DEMAND FOR JOJOBA OIL EXCEEDS PRESENT WILD POPULATION POTENTIALS. COMMERCIAL PLANTATIONS NEED PROMOTION BECAUSE JOJOBA PROMISES TO BE A PROFITABLE CROP FOR ARID LANDS.

MEXICO/BAJA CALIFORNIA/COST ANALYSIS/ECONOMIC DEVELOPMENT/MARKET DEMAND/  
SEED HARVEST/SOCIAL ASPECTS/NATIVE POPULATIONS

0064

CANALES L., B.

1982

ALTA DENSIDAD DE SIEMBRA EN EL CULTIVO DE LA JOJOBA (HIGH SEEDING DENSITY IN CULTIVATION OF JOJOBA, IN SPANISH).

PAGES 73-84 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA'S ROOT SYSTEM GROWS VERTICALLY WITH ONLY A SMALL AMOUNT OF LATERAL GROWTH, THEREBY OCCUPYING LITTLE HORIZONTAL SPACE. THEREFORE, FIELDS CAN BE PLANTED MORE DENSELY WITHOUT CAUSING COMPETITION BETWEEN PLANTS. FIELDS WERE DIRECT-SEEDED USING 32,000 SEEDS PER HECTARE. THINNING ALLOWED MORE GROWTH AREA FOR THE STRONGER SEEDLINGS. THE FINAL POPULATION WAS 830 PLANTS PER HECTARE. THE THINNING PROCESS KEEPS MORTALITY AT A MINIMUM AND ALLOWS SELECTION OF THE BEST PLANTS. YIELDS ALSO WILL BE INCREASED.

MEXICO/ROOTS/PLANT DISTRIBUTION/DIRECT SEEDING/PLANTING MANAGEMENT

0065

CARDOSO, F.A.

1980

EXTRACTION, CHARACTERIZATION AND FUNCTIONAL PROPERTIES OF JOJOBA PROTEINS.

UNIVERSITY OF ARIZONA, TUCSON. PH.D. DISSERTATION, 89 P.

TWO DEFATTED JOJOBA SEED MEALS WERE PREPARED; ONE USING WHOLE SEEDS AND THE OTHER USING HULLED SEEDS. THE PROTEIN CONTENT OF BOTH MEALS WAS ABOUT 24 PERCENT. PROTEINS WERE EXTRACTED ACCORDING TO THEIR SOLUBILITY IN WATER, DILUTE SALINE, ALCOHOL AND ALKALI SOLUTIONS. THE MAJOR CONCENTRATION OF PROTEINS IN JOJOBA WERE ALBUMIN (65 PERCENT) AND GLOBULIN (21 PERCENT) FRACTIONS. ALL PROTEIN CONCENTRATES SHOWED VERY GOOD FAT ABSORPTION AND SOLUBILITY AT VALUES OF PH BELOW 3.0 AND ABOVE 4.0. ALBUMINS AND GLOBULINS SHOWED VERY GOOD FORMABILITY AND EMULSION PROPERTIES. THE PROLAMINE AND GLUTELIN CONCENTRATES SHOWED VERY POOR FOAMABILITY AND EMULSION PROPERTIES. THE BUFFERING CAPACITY OF JOJOBA PROTEIN CONCENTRATES WAS VERY LOW.

SEED MEAL/PROTEINS/CHEMICAL STRUCTURE/PH

0066

CARDOSO, F.A./PRICE, R.L.

1982

EXTRACTION, CHARACTERIZATION AND FUNCTIONAL PROPERTIES OF JOJOBA PROTEINS.

PAGES 305-316 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA SEED PROTEINS ARE POTENTIALLY USEFUL IN THE FOOD INDUSTRY. JOJOBA MEAL WAS TESTED FOR: NITROGEN SOLUBILITY, FOAMABILITY, EMULSIFICATION AND GELATION PROPERTIES. ALBUMIN AND GLOBULIN ARE SIMILAR TO PROTEIN SYSTEMS ALREADY IN USE; HOWEVER, PROLAMINE AND GLUTELIN SHOW POTENTIAL FOR ONLY LIMITED USE. NO LOSS OF PROTEIN DUE TO SEED COAT REMOVAL WAS EVIDENT. MORE TESTING WILL BE NECESSARY TO DETERMINE SPECIFIC APPLICATIONS.

CHEMICAL COMPOSITION/EMULSIFICATION/FOAMING/GELATION/SEED MEAL/  
NITROGEN SOLUBILITY/PROTEINS/SOYBEANS/FOODS

0067

CASTELLANOS V., A./MURRIETA, M.S.X./ESPERICUETA B., M.

1979

MANEJO Y FENOLOGIA DE SITIOS SILVESTRES DE JOJOBA EN SONORA, MEXICO  
(MANAGEMENT AND PHENOLOGY OF NATIVE JOJOBA IN SONORA, MEXICO, IN SPANISH).

PAGES 335-344 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA PHENOLOGY IS STUDIED IN TWO NATIVE STANDS, ONE HAS BEEN MANIPULATED AND ONE IS UNDISTURBED. RE-POPULATING JOJOBA IN NATURAL STANDS BY DIRECT SEEDING AND SEEDLING TRANSPLANT IS ANALYZED. SOME OF THE PARAMETERS STUDIED ARE ASSOCIATED VEGETATION, YIELD, DENSITY, COVER AND SEX RATIOS.

NATIVE POPULATIONS/PROPAGATION/PHENOLOGY/REVEGETATION

0068

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS DE LA UNIVERSIDAD DE SONORA (CICTUS)

1982

ECOLOGIA DE JOJOBA: III. SINTESIS E INTERPRETACION DE SUS PARAMETROS POBLACIONALES EN EL AREA DE PUERTO LIBERTAD, SONORA (ECOLOGY OF JOJOBA: III. SYNTHESIS AND INTERPRETATION OF POPULATIONS NEAR PUERTO LIBERTAD, SONORA, IN SPANISH).

PAGES 211-226 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

DISTRIBUTION OF NATURAL STANDS OF JOJOBA IN SONORA RESULT FROM EDAPHIC AND ABIOTIC CONDITIONS. CRITICAL STAGES FOR DISPERSAL ESTABLISHMENT AND MAINTENANCE OF JOJOBA STANDS WERE DOCUMENTED.

MEXICO/SONORA/PLANT DISTRIBUTION/ECOSYSTEMS/PLANT ECOLOGY/NATIVE POPULATIONS/  
PHENOLOGY

0069

CESATI, V.

1873

NOTE BOTANICHE DI VERIO ARGOMENTO: ILLUSTRAZIONE DELLA BROCCIA DICHOTOMA DEL MAURI, ORA SIMMONDISIA (SIC) CALIFORNICA, NUTTALL (BOTANIC NOTES ON VARIOUS TOPICS: ILLUSTRATION OF BROCCIA DICHOTOMA OF MAURI, NOW CALLED SIMMONDISIA CALIFORNICA, NUTTALL, IN ITALIAN).

ACCADEMIA DELLE SCIENZE FISICHE E MATEMATICHE, (NAPOLI) ATTI 5(21):1-9.

A CHRONOLOGICAL SERIES OF DESCRIPTIONS MADE BY VARIOUS AUTHORS (LINK, NUTTALL, TENORE, WALPERS, ROLLI, LE MAOUT AND DECAESNE, AND MUELLER) IS PRESENTED WITH ANNOTATIONS. THE PLANT AND ITS FLOWERS ARE ILLUSTRATED.

SYSTEMATICS/FLOWERING

0070

CHESSON, J.H./BURKNER, P.F.

1976

PRELIMINARY INVESTIGATIONS FOR JOJOBA HARVESTING.

AMERICAN SOCIETY OF ENGINEERS, TRANSACTIONS 19(4):614-616.

PULL-FORCE DATA FOR HARVESTING SHOW THAT NECESSARY PULL-FORCE DECREASED RAPIDLY DURING THE AUGUST HARVESTING SEASON. NATURAL-DROP HARVESTING WAS EXPLORED, BUT ABANDONED BECAUSE OF COMPETITION WITH RODENTS AND BIRDS FOR SEEDS. HAND PICKING RATES VARIED FROM 1.8 TO 2.7 KG/HOUR IN 1972 TO 2.7 TO 3.6 KG/HOUR IN 1974 (WET BASIS) DUE TO CROP ABUNDANCE. FIFTY PERCENT OF YIELD WAS TRASH, PRIMARILY SEED HULL. HAND TOOLS USED TO HARVEST RESULTED IN PLANT INJURY AND EXCESSIVE TRASH. A COFFEE HARVESTING SHAKER WAS EVALUATED, AND POWER SHEARS WERE USED TO CLIP BUSHES FOR SEED REMOVAL. CLIPPING WAS FASTER THAN HAND HARVESTING BUT RESULTED IN EXCESSIVE TRASH AND UNDETERMINED YIELD EFFECTS ON SHRUBS. ABSCISSION CHEMICALS, CYCLOHEXIMIDE AND ETHEPHON, WERE APPLIED TO TWO LARGE BUSHES WITH NO MEASURABLE EFFECT ON PULL-FORCE DATA. EARTH BASIN AND PORTABLE CANVAS COLLECTORS ALSO WERE EVALUATED. PESTS ARE CONSIDERED IMPORTANT COMPETITORS FOR SEED IF JOJOBA IS CULTIVATED IN DESERT AREAS. IN-FIELD HAND HARVESTING COSTS FOR JOJOBA OIL ARE ESTIMATED TO BE 8.80 DOLLARS. MECHANICAL HARVESTING MAY BE THE ONLY SOLUTION TO THE HIGH HAND-HARVESTING COSTS.

AGRONOMY/COST ANALYSIS/PHENOLOGY/RODENTS/SEASONAL VARIATION/SEED HARVEST

0071

CHILDS, P.C.

1976

APACHE MARKETING 1976 JOJOBA HARVEST.

JOJOBA HAPPENINGS 16:2-5.

THREE HUNDRED MEMBERS OF THE APACHE MARKETING COOPERATIVE ASSOCIATION, SAN CARLOS, ARIZONA, HARVESTED 25,000 POUNDS OF CLEAN, DRY SEED FROM NATIVE JOJOBA POPULATIONS IN 1976.

INDIAN RESERVATIONS/ARIZONA/NATIVE POPULATIONS/SEED HARVEST

0072

CHILDS, P.C.

1982

SUNLAND JOJOBA PLANTATION UPDATE.

PAGES 414-416 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

EXPERIENCES BY SUNLAND JOJOBA PLANTATION INDICATE A NEED FOR: AN EFFECTIVE HERBICIDE AND AN EFFICIENT MEANS OF APPLYING IT; DEVELOPMENT OF HARVESTING SYSTEMS; AND RESEARCH IN PROCESSING AND PRODUCT DEVELOPMENT.

COMMERCIAL PRODUCTION/PLANTATION ESTABLISHMENT

0073

CHILDS, P.C./BREEN, R.E., JR.

1980

JOJOBA INTERCROPPING SYSTEMS.

JOJOBA HAPPENINGS 30:8-10.

SHORT-SEASON COTTON WAS INTERCROPPED WITH JOJOBA. INTERCROPPING MAY BE A VIABLE SYSTEM FOR ESTABLISHING A PLANTATION WITH A MINIMAL INITIAL CAPITAL INVESTMENT.

INTERCROPPING/PLANTING MANAGEMENT/PLANTATION ESTABLISHMENT/COTTON/FERTILIZERS/ARIZONA

0074

CLARKE, J.A./YERMANOS, D.M.

1982

THE EFFECT OF JOJOBA OIL ON PLASMA CHOLESTEROL LEVELS AND LIPOPROTEIN PATTERNS IN NEW ZEALAND WHITE RABBITS.

PAGES 302-304 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

BLOOD CHOLESTEROL LEVELS ARE LOWERED WHEN UNSATURATED FATTY ACIDS ARE SUBSTITUTED FOR ANIMAL FATS IN THE DIET. FEEDING EXPERIMENTS WITH FEMALE NEW ZEALAND WHITE RABBITS DURING A PERIOD OF 30 DAYS SHOW THAT JOJOBA OIL, WHICH IS RICH IN UNSATURATED FATTY ACIDS, DOES NOT MERELY PASS THROUGH THE ALIMENTARY TRACT BUT IS ABSORBED. AT A 2 PERCENT SUPPLEMENTAL LEVEL, JOJOBA OIL IS EFFECTIVE IN LOWERING THE BLOOD CHOLESTEROL LEVEL.

ATHEROSCLEROSIS/CHOLESTEROL/FEEDING EXPERIMENTS/FATTY ACIDS/RABBITS

0075

CLARKE, J.A./YERMANOS, D.M.

1981

EFFECTS OF INGESTION OF JOJOBA OIL ON BLOOD CHOLESTEROL LEVELS AND LIPOPROTEIN PATTERNS IN NEW ZEALAND WHITE RABBITS.

BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS 102(4):1409-1415.

IN NEW ZEALAND WHITE RABBITS, INGESTION OF JOJOBA OIL AS A 2 PERCENT SUPPLEMENT TO AN ATHEROGENIC DIET CONTAINING 1 PERCENT CHOLESTEROL RESULTED IN A 40 PERCENT REDUCTION OF BLOOD CHOLESTEROL AND AN ALTERED LIPOPROTEIN PATTERN. THE MECHANISM BY WHICH JOJOBA OIL REDUCES BLOOD CHOLESTEROL LEVELS WAS NOT DETERMINED. UNDER THE SAME CONDITIONS, AT A 2 PERCENT LEVEL, SAFFLOWER OIL WAS NOT EFFECTIVE IN LOWERING BLOOD CHOLESTEROL LEVELS.

RABBITS/OIL/CHOLESTEROL/SAFFLOWER OIL/FEEDING STUDIES

0076

CLARKE, J.A./YERMANOS, D.M.

1982

THE USE OF JOJOBA OIL IN DEEP-FAT FRYING.

PAGES 261-266 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

IN DEEP-FAT FRYING EXPERIMENTS, JOJOBA OIL WAS COMPARABLE TO SOY, SAFFLOWER AND SESAME OILS; JOJOBA HAD THE ADVANTAGE OF BEING HIGHLY STABLE. FOR SOY, SAFFLOWER AND SESAME, HEATING AND FRYING RESULTED IN A MARKED DECREASE IN THE POLYUNSATURATED FATTY ACID LINOLEIC WITH A CORRESPONDING INCREASE IN THE SHORT CHAIN SATURATED FATTY ACIDS, PALMITIC AND MYRISTIC. IN CONTRAST, JOJOBA OIL SHOWED ONLY A SLIGHT REDUCTION IN THE PRINCIPLE UNSATURATED FATTY ACID EICOSENOIC AND ITS COMPOSITION AFTER TWO DAYS HEATING AND FRYING WAS ALMOST IDENTICAL TO UNUSED OIL. SOY, SAFFLOWER AND JOJOBA OILS SHOWED A 10-FOLD INCREASE IN FREE FATTY ACIDS, WHEREAS THE LEVELS IN SESAME WERE UNCHANGED. ALL OILS STARTED TO DEVELOP COLOR AFTER ABOUT 4 HOURS HEATING. JOJOBA FIRST BECAME COLORLESS AND THEN BEGAN YELLOWING AFTER 4 HOURS. AFTER 7 HOURS ALL OILS FOAMED. DURING THE FIRST HALF HOUR OF HEATING BOTH SESAME AND JOJOBA OIL GAVE OFF A PUNGENT ODOR. THE TASTE OF THE FRIED POTATOES WAS JUDGED SATISFACTORY FOR ALL OILS.

FOODS/SAFFLOWER OIL/SESAME OIL/OIL/FATTY ACIDS/CHEMICAL REACTIONS/  
DEEP-FAT FRYING/SOYBEAN OIL

0077

CLARKE, J.A./YERMANOS, D.M.

1980

JOJOBA--VARIABILITY IN OIL CONTENT AND COMPOSITION IN A COLLECTION OF 1,156 NATIVE PLANTS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 57(6):176-178.

THE OIL CONTENT AND COMPOSITION IN THE SEEDS OF 1,156 NATIVE JOJOBA PLANTS WERE EVALUATED. THE MEAN OIL CONTENT OF THE SAMPLES WAS 53.2 PERCENT. THE MEAN SINGLE SEED WEIGHT WAS 0.56 GRAMS. SINGLE SEED WEIGHT AND OIL CONTENT WERE SIGNIFICANTLY CORRELATED; HOWEVER, THERE WAS NO CORRELATION BETWEEN OIL CONTENT OF THE SEED AND SEED-YIELD PER PLANT. ANALYSIS OF THE OIL FOR FATTY ACIDS AND FATTY ALCOHOLS SHOWED VERY LITTLE VARIABILITY AMONG SAMPLES.

OIL/SEED/ALCOHOLS/ACIDS/CHEMICAL STRUCTURE/NATIVE POPULATIONS/SEED YIELD

0078

CLUFF, C.B.

1978

JOJOBA WATER-HARVESTING AGRISYSTEM EXPERIMENT, PAPAGO INDIAN RESERVATION, SELLS, ARIZONA.

JOJOBA HAPPENINGS 24:3-9.

A JOJOBA WATER-HARVESTING EXPERIMENT WAS ESTABLISHED ON 1 ACRE ON THE PAPAGO INDIAN RESERVATION, SELLS, ARIZONA, IN 1974. THREE LEADING CATCHMENT TREATMENTS WERE TESTED: SODIUM CHLORIDE, ASPHALT-PLASTIC-ASPHALT-CHIP AND PARAFFIN WAX. SALT TREATMENTS EFFECTIVELY SHED WATER AND CONTROLLED WEEDS ON CATCHMENT SLOPES.

WATER HARVESTING/ECONOMICS/INDIAN RESERVATIONS/SITE SELECTION/SOILS/SEED YIELD/PLANTATION MANAGEMENT

0079

CLUFF, C.B.

1973

RUNOFF FARMING FOR INCREASED JOJOBA YIELDS.

PAGES 39-45 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

OBSERVATIONS OF JOJOBA GROWTH IN AREAS OF HIGH NATURAL RUNOFF INDICATE THAT RUNOFF FARMING TECHNIQUES COULD BE USED TO INCREASE PRODUCTIVITY IN NATIVE STANDS AND TO ESTABLISH CULTIVATED PLANTATIONS. THE MICROCATCHMENT SYSTEM IS MOST EASILY APPLICABLE TO EXISTING JOJOBA PLANTS. THE SHAPED RUNOFF FARMING TECHNIQUE WOULD REQUIRE A PLANTATION OF NEW PLANTS. JOJOBA IS IDEAL FOR THESE TECHNIQUES BECAUSE IT IS DROUGHT RESISTANT. JOJOBA COULD BE GROWN IN FIELDS NOW BEING ABANDONED BECAUSE DROPS IN GROUNDWATER LEVELS HAVE ELIMINATED PUMP-IRRIGATED AGRICULTURE.

IRRIGATION/NEGEV DESERT/SURFACE WATER RUNOFF/ARIZONA/ISRAEL/WATER HARVESTING/SOIL-WATER-PLANT RELATIONSHIPS

0080

CLUFF, C.B./FOSTER, K.E.

1978

WATER HARVESTING AGRISYSTEM TO GROW JOJOBA ON IDLE FARMLANDS.

ARIZONA WATER RESOURCES NEWS BULLETIN 78(1,2):1-3.

A WATER-HARVESTING JOJOBA AGRISYSTEM FOR USE ON ABANDONED FARMLAND WAS DEVELOPED COOPERATIVELY BY THE UNIVERSITY OF ARIZONA'S OFFICE OF ARID LANDS STUDIES AND WATER RESOURCES RESEARCH CENTER. THE AGRISYSTEM IS APPLIED TO IDLE FARMLAND IN SOUTHERN ARIZONA'S AVRA VALLEY WITH JOJOBA AS A CASH CROP AND VEGETATIVE DUST CONTROL. ESTIMATED COSTS AND YIELDS BASED ON 1978 FIGURES ARE GIVEN. INCLUDES DIAGRAMS AND EXPLANATIONS OF THE COMPACTED EARTH SODIUM TREATED (CEST) WATER-HARVESTING AND COMPARTMENTED-RESERVOIR SYSTEMS.

WATER HARVESTING/WATER USE/COST ANALYSIS/ECONOMICS

0081

COIT, J.E.

1959

PROGRESS REPORT ON JOJOBA INVESTIGATIONS.

RITTENHOUSE DEMONSTRATION ORCHARD, VISTA, CALIFORNIA. (UNPUBLISHED).

DESCRIBES THE ORIGINAL PLANTING OF 14 PLANTS IN 1953, AND THE DEVELOPMENT OF THIS EXPERIMENTAL JOJOBA PLANTATION AT VISTA. DATA ON SEED HARVEST IN 1957, 1958, AND 1959 ARE PRESENTED. ESTABLISHMENT OF PLANTS OF THE VISTA VARIETY, AND OTHERS ARE NOTED. PROBLEMS TO BE OVERCOME BY THOSE WISHING TO ESTABLISH JOJOBA AS AN ECONOMICALLY FEASIBLE CULTIVATE ARE OUTLINED.

CALIFORNIA/CULTIVATION/SEED YIELD/PLANTING MANAGEMENT/PLANT BREEDING/  
GENETIC VARIABILITY/GENETICS

0082

COIT, J.E.

1962

HORTICULTURAL ASPECTS OF JOJOBA.

FRUIT VARIETIES AND HORTICULTURAL DIGEST 16:32-34.

AT A SMALL PLANTATION AT VISTA, CALIFORNIA, 14 SEEDLINGS WERE ESTABLISHED IN 1953. WEIGHTS OF HARVESTED SEED AFTER EIGHT YEARS OF NON-IRRIGATED GROWTH ARE GIVEN. ONE PLANT, OUTSTANDING IN PRECOSITY, YIELD, AND HABIT WAS USED TO PROPAGATE (BY ROOT CUTTINGS) A VARIETY TERMED VISTA. SEEDLINGS WERE IRRIGATED WITH RESULTANT RAPID GROWTH AND FRUITING AT 18 MONTHS. SOME IRRIGATION WILL RESULT IN BETTER GROWTH AND EARLIER BEARING THAN IS USUAL WITH FERAL POPULATIONS. OTHER GENETIC STOCK IS BEING GROWN EXPERIMENTALLY.

CALIFORNIA/CULTIVATION/IRRIGATION/SEEDLINGS/PHENOLOGY/PLANT GROWTH/  
SEED YIELD/PLANTING MANAGEMENT/GENETIC VARIABILITY/BREEDING

0083

COLE, S.L.

1979

ABERRANT SEX-RATIOS IN JOJOBA ASSOCIATED WITH ENVIRONMENTAL FACTORS.

DESERT PLANTS 1(1):8-11.

NATIVE JOJOBA PLANTS GROWING ON NORTH-FACING AND SOUTH-FACING SLOPES NEAR THE BOYCE THOMPSON SOUTHWESTERN ARBORETUM, WEST OF SUPERIOR IN PINAL COUNTY, ARIZONA, WERE EXAMINED AND CLASSIFIED ACCORDING TO SEX. THERE IS SOME CORRELATION BETWEEN ORIENTATION OF SLOPE AND THE MALE-FEMALE RATIO. ALTHOUGH STANDARD DEVIATIONS ARE FAIRLY LARGE, THE DATA INDICATE A DISTINCT TREND AND THEREFORE ARE VALUABLE. POPULATIONS OCCURRING ON NORTH-FACING SLOPES ARE COMPOSED OF NEARLY EQUAL PROPORTIONS OF MALE AND FEMALE PLANTS. SOME POPULATIONS ARE PREDOMINANTLY FEMALE; HOWEVER, ON SOUTH-FACING SLOPES, THE MALE PLANTS APPARENTLY ARE MORE SUCCESSFUL. THE ABERRANT SEX RATIOS MAY BE ATTRIBUTED TO ONE OF SEVERAL POSSIBLE CAUSES SUCH AS HEAT AND DRYNESS OF SOIL, HIGH TEMPERATURES, NUMBER OF SUNLIGHT HOURS, LEAF PHYSIOLOGY OR WATER STRESS CAUSED BY SEED PRODUCTION.

BOYCE THOMPSON SOUTHWESTERN ARBORETUM/SEX RATIOS/PHTOGEOGRAPHY/ARIZONA/LIGHT/  
LEAVES/WATER STRESS/NATIVE POPULATIONS



0084

COLLATZ, G.J.

1977

INFLUENCE OF CERTAIN ENVIRONMENTAL FACTORS ON PHOTOSYNTHESIS AND  
PHOTORESPIRATION IN SIMMONDSIA CHINENSIS.

PLANTA 134(2):127-132.

THE RESPONSE OF NET PHOTOSYNTHESIS AND APPARENT LIGHT RESPIRATION TO CHANGES  
IN OXYGEN, LIGHT INTENSITY AND DROUGHT STRESS WAS DETERMINED BY ANALYSIS OF  
NET PHOTOSYNTHETIC CARBON DIOXIDE RESPONSE CURVES. LOW OXYGEN TREATMENT  
RESULTED IN A LARGE REDUCTION IN THE RATE OF PHOTORESPIRATORY CARBON DIOXIDE  
EVOLUTION. LIGHT INTENSITY LEVELS INFLUENCED THE MAXIMUM NET PHOTOSYNTHETIC  
RATE AT SATURATING CARBON DIOXIDE. THESE RESULTS INDICATE THAT CARBON DIOXIDE,  
OXYGEN, AND LIGHT INTENSITY AFFECT THE LEVELS OF SUBSTRATES INVOLVED IN THE  
ENZYMATIC REACTIONS OF PHOTOSYNTHESIS AND PHOTORESPIRATION. INTRACELLULAR  
RESISTANCE TO CARBON DIOXIDE UPTAKE DECREASED IN LOW OXYGEN AND INCREASED  
AT LOW LEAF WATER POTENTIALS. THIS RESPONSE REFLECTS CHANGES IN THE EFFICIENCY  
WITH WHICH PHOTOSYNTHETIC AND PHOTORESPIRATORY SUBSTRATES ARE FORMED AND USED.  
WATER STRESS HAD NO EFFECT ON THE CARBON DIOXIDE COMPENSATION POINT OR THE  
CARBON DIOXIDE AT WHICH NET PHOTOSYNTHESIS BEGAN TO SATURATE AT HIGH LIGHT  
INTENSITY.

LEAVES/PLANT CHEMISTRY/PLANT PHYSIOLOGY/PHOTOSYNTHESIS/DROUGHT TOLERANCE

0085

COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

1978

ANNOTATED BIBLIOGRAPHY ON JOJOBA (SIMMONDSIA SP.) 1968-1977.

HORTICULTURAL ABSTRACTS, QUERY FILE NO. 9/78, VOLS. 29-48(6). 2 P.

NO ABSTRACT.

BIBLIOGRAPHIES

0086

COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

1979

JOJOBA (SIMMONDSIA CHINENSIS): 1968-1979.

HORTICULTURAL ABSTRACTS, QUERY FILE NO. 15/79, VOLS. 39-49(3). 3 P.

NO ABSTRACT.

BIBLIOGRAPHIES

0087

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION (CSIRO),  
DIVISION OF PLANT INDUSTRY

1979

JOJOBA: SIMMONDSIA CHINENSIS (LINK) SCHNEID.

CSIRO, DIVISION OF PLANT INDUSTRY, CANBERRA CITY, A.C.T. SHEET NO. 34-1.  
4 P.

A NUMBER OF GROWERS ARE ATTEMPTING TO ESTABLISH COMMERCIAL PLANTATIONS IN AUSTRALIA USING SEED COLLECTED FROM WILD PLANTS. ANY ATTEMPT AT ESTABLISHING A PLANTATION AT THIS STAGE MUST BE CONSIDERED EXPERIMENTAL. FOR A PLANTATION THAT COULD PROVIDE ADEQUATE, RELIABLE YIELDS, AN AREA OF LAND SHOULD BE SELECTED THAT MEETS THE REQUIREMENTS OF THE PLANTS AS THEY ARE KNOWN AT PRESENT. THE MOST PROMISING AREAS FOR TRIALS IN AUSTRALIA APPEAR TO BE COASTAL BELTS IN SOUTHERN AND SOUTHWESTERN WESTERN AUSTRALIA, AREAS IN THE EYRE PENINSULA AND THE SOUTHEASTERN PORTION OF SOUTH AUSTRALIA.

AUSTRALIA/PLANTATION ESTABLISHMENT/ECONOMIC DEVELOPMENT

0088

CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA

1978

MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, 10 AL 12 FEBRERO DE 1976, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO (PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE ON JOJOBA AND ITS USES, FEBRUARY 10-12, 1976, ENSENADA, BAJA CALIFORNIA, MEXICO, IN ENGLISH AND SPANISH).

CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, ENSENADA. 340 P.

NO ABSTRACT.

AGRONOMY/CHEMICAL REACTIONS/SPERM WHALE OIL/OIL/ECONOMIC DEVELOPMENT/  
PRODUCT DEVELOPMENT

0089

COOK, A.A.

1971

THAR SHE GROWS.

U.S. DEPARTMENT OF AGRICULTURE, FARM INDEX 10:4-8.

THE ENDANGERED SPECIES CONSERVATION ACT OF 1969 WILL END THE IMPORTATION OF SPERM WHALE OIL INTO THE UNITED STATES. THE U.S. DEPARTMENT OF AGRICULTURE (USDA) PLANT SCIENTISTS ARE CONSIDERING THREE CROPS AS POSSIBLE REPLACEMENT SOURCES OF THIS UNIQUE OIL. JOJOBA OIL IS VERY CLOSE IN CHEMICAL NATURE TO SPERM WHALE OIL. BUT BECAUSE OF THE LENGTHY PERIOD NEEDED TO ESTABLISH PLANTATIONS AND THE PROHIBITIVE COST OF HARVESTING WILD SEED, LITTLE DEVELOPMENTAL RESEARCH IS PLANNED. LIMNANTHES (MEADOW FOAM) MAY BE THE MOST PROMISING. ITS SEED OIL, A MIXTURE OF TRIGLYCERIDES, CAN BE CONVERTED CHEMICALLY TO WAX ESTERS COMPARABLE IN QUALITY TO THOSE OF JOJOBA. CRAMBE IS ANOTHER PROMISING NEW OILSEED CROP.

OIL/SEED/CONSERVATION/SPERM WHALE OIL

0090

COOK, E.M.

1977

TOXIC EFFECTS OF JOJOBA MEAL FED TO WEANLING MICE.

UNIVERSITY OF ARIZONA, TUCSON. M.S. THESIS, 47 P.

GROWTH AND FEED INTAKE ARE REDUCED IN WEANLING MICE FED A DIET CONTAINING JOJOBA MEAL OR ITS DERIVATIVE SIMMONDSIN. ONE OR MORE TOXINS ARE PRESENT IN JOJOBA MEAL IN ADDITION TO SIMMONDSIN. THESE TOXINS ARE MORE ACUTELY TOXIC THAN SIMMONDSIN AND MAY BE DERIVATIVES OF IT. FEEDING JOJOBA MEAL CAUSES LONG-TERM ADVERSE EFFECTS INCLUDING LOWERED REPRODUCTIVE ABILITY AND REDUCED ADULT WEIGHTS. LONGER PERIODS OF FEEDING JOJOBA DIETS INCREASE THE LONG-TERM EFFECT. THE LENGTH OF THE FEEDING PERIOD MAY HAVE MORE LONG-TERM EFFECTS ON REPRODUCTION THAN THE WEIGHT OF THE ANIMALS AT THE START OF THE FEEDING PERIOD OR THE SEVERITY OF THE DIET. JOJOBA MEAL IS UNFIT FOR ANIMAL OR HUMAN CONSUMPTION. HUMAN INVESTIGATORS SHOULD NOT EAT JOJOBA SEEDS OR JOJOBA MEAL. THE SMALL QUANTITIES OF JOJOBA USUALLY CONSUMED BY HUMANS PROBABLY ARE TOO SMALL TO CAUSE ANY DAMAGE, BUT THE POSSIBILITY OF LONG-TERM HARM HAS NOT BEEN DISPROVEN.

ALTHOUGH DETOXIFICATION METHODS HAVE BEEN REPORTED FOR JOJOBA MEAL, EXTENSIVE TESTS WILL BE NECESSARY TO PROVE THAT ALL SHORT- AND LONG-TERM TOXICITY PROBLEMS HAVE BEEN SOLVED.

SEED MEAL/PALATABILITY/REPRODUCTION/RODENTS/SIMMONDSIN/TOXICITY

0091

CORELLA, B.R./MEZA, J.

1982

AVANCES AGRONOMICOS DE LA JOJOBA SIMMONDSIA CHINENSIS (LINK) SCHNEIDER, BAJO CONDICIONES DE CULTIVO (AGRONOMIC ADVANCES WITH JOJOBA UNDER CULTIVATION, IN SPANISH).

PAGES 389-398 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

TECHNIQUES FOR SITE SELECTION, PROPAGATION, IRRIGATION, PRUNING, WEED CONTROL, SEXUAL IDENTIFICATION, POLLINATION, DISEASES, PESTS AND HARVESTING ARE LISTED.

MEXICO/SITE SELECTION/IRRIGATION/PRUNING/WEED CONTROL/SEX DETERMINATION/  
POLLINATION/PESTS/DISEASES/SEED HARVEST/PROPAGATION

0092

COTGAGEORGE, A.G. ET AL

1979

DETOXIFICATION OF JOJOBA SEED MEAL.

PAGES 171-184 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA WAS TREATED BY SEVERAL METHODS IN AN ATTEMPT TO REMOVE OR INACTIVATE THE TOXIN SIMMONDSIN. SIMMONDSIN WAS QUANTITATED BY EXTRACTING JOJOBA AND ANALYZING THE EXTRACT ON A GAS LIQUID CHROMATOGRAPH (GLC). TOXICITY WAS DETERMINED BY MOUSE FEEDING EXPERIMENTS. THE SIMMONDSIN IN JOJOBA SEEDS

DISAPPEARED AFTER FIVE DAYS OF GERMINATION; DETOXIFICATION WAS NOT CONFIRMED BECAUSE MOUSE FEEDING TESTS WERE NOT CONDUCTED USING THAT MEAL. ENZYMATIC HYDROLYSIS OF JOJOBA CAUSED SIMMONDSIN TO DISAPPEAR, BUT DID NOT YIELD A LESS TOXIC FEED. MICE FED A DIET OF 10 PERCENT HYDROLYZED JOJOBA MEAL FAILED TO GAIN WEIGHT AND, IN SOME CASES, DIED. EXTRACTION BY WATER EFFECTIVELY REMOVED SIMMONDSIN. MICE FEEDING TESTS SHOWED THAT A DIET OF 10 PERCENT WATER-EXTRACTED JOJOBA MEAL SUSTAINED NORMAL GROWTH AND WEIGHT GAIN IN WEANLING MICE. DEFATTED JOJOBA MEAL EXTRACTED WITH ETHANOL OR METHANOL SUSTAINED SLIGHTLY LOWER THAN NORMAL WEIGHT GAINS IN MICE. GLC ANALYSIS SHOWED SOME SIMMONDSIN REMAINING IN THE MEALS. GENERALLY, PROTEIN QUALITY AND QUANTITY WERE UNAFFECTED BY ALL OF THE ABOVE TREATMENTS.

SIMMONDSIN/TOXICITY/RODENTS/GAS LIQUID CHROMATOGRAPHY/FEEDING EXPERIMENTS

0093

CRAWFORD, D.

1979

MARKET PROSPECTS FOR THE DEVELOPMENT OF A COMMERCIAL ENTERPRISE.

PAGES 24-28 IN SOUTH AUSTRALIA DEPARTMENT OF AGRICULTURE AND FISHERIES, JOJOBA: REPORT ON THE WORKSHOP FEBRUARY 1979. COORDINATING COMMITTEE ON NEW AGRO-BASED PRODUCTS, DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA. 32 P.

JOJOBA COULD BE ESTABLISHED AS A SOUTH AUSTRALIAN AGRICULTURAL ENTERPRISE. JOINT EFFORTS BY COMMERCIAL ENTERPRISES AND THE GOVERNMENT WOULD ALLEVIATE SOME OF THE FINANCIAL RISK AND WOULD HASTEN EXPERIMENTATION. IT IS ESSENTIAL TO NOT EXPLOIT NATURAL RESOURCES BUT TO DEVELOP ALTERNATIVE RESOURCES, SUCH AS JOJOBA, WHICH CAN BE REGENERATED THROUGH AGRICULTURE.

AUSTRALIA/RENEWABLE NATURAL RESOURCES/PLANTATION ESTABLISHMENT

0094

CRAWFORD, E.

1979

BEWARE OF JOJOBA UNTIL PROVEN IN SOUTH AUSTRALIA.

PAGES 22-23 IN SOUTH AUSTRALIA DEPARTMENT OF AGRICULTURE AND FISHERIES, JOJOBA: REPORT ON THE WORKSHOP FEBRUARY 1979. COORDINATING COMMITTEE ON NEW AGRO-BASED PRODUCTS, DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA. 32 P.

SOUTH AUSTRALIAN EXPERIENCE WITH JOJOBA IS LIMITED EVEN THOUGH SEED WAS FIRST INTRODUCED AND PLANTED THERE IN 1950. SEEDLINGS PLANTED AT REGIONAL SITES BY THE BOTANIC GARDENS DEPARTMENT BETWEEN 1950 AND 1964 DIED. SEEDLINGS PLANTED IN POTS IN 1959 SURVIVED BUT DID NOT FLOWER IN 1978. SLOW EMERGENCE AND GROWTH HAVE BEEN OBSERVED IN EXPERIMENTAL PLANTINGS AT THE PARAFIELD PLANT INTRODUCTION AND MINNIPA RESEARCH CENTRES. FROST DAMAGE HAS NOT YET BEEN A PROBLEM. IF EXPERIMENTAL PLANTINGS ARE OF INTEREST THEN IT IS RECOMMENDED TO: 1) USE DIRECT SEEDING; 2) PLANT IN FORT FREE AREAS; AND 3) BE PATIENT WITH DELAYED FLOWERING. LIMITING FACTORS IN ESTABLISHING COMMERCIAL JOJOBA PLANTATIONS INCLUDE: 1) THE LENGTH OF TIME BEFORE PLANTATIONS REACH SIGNIFICANT PRODUCTION LEVELS; 2) THE INABILITY TO DETERMINE SEEDLING SEX; AND 3) THE LACK OF SEED SELECTIONS THAT PROVIDE VARIETIES SUITED TO CULTIVATION IN AUSTRALIA.

AUSTRALIA/CULTIVATION/PLANTATION ESTABLISHMENT

0095

CROSSWHITE, F.S.

1973

STUDIES OF SIMMONDSIA CHINENSIS AT THE BOYCE THOMPSON SOUTHWESTERN ARBORETUM.

PAGES 5-10 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

CULTIVATION OF JOJOBA HAS BEEN IN PROGRESS AT THE ARBORETUM SINCE 1925. INFORMATION HAS BEEN ACCUMULATED ON GERMINATION, GROWTH (IRRIGATED AND NON-IRRIGATED), ROOT GROWTH, SEED YIELD, ETC. THE ARBORETUM PROVIDED RESEARCHERS WITH SEED FROM SUPERIOR, ARIZONA, FOR EXPERIMENTATION.

BOYCE THOMPSON SOUTHWESTERN ARBORETUM/GERMINATION/CULTIVATION/EROSION CONTROL/IRRIGATION/INDIANS OF NORTH AMERICA/EROSION CONTROL/SEED YIELD

0096

DAUGHERTY, P.M./SINEATH, H.H./WASTLER, T.A.

1953

INDUSTRIAL RAW MATERIALS OF PLANT ORIGIN. IV: A SURVEY OF SIMMONDSIA CHINENSIS.

ECONOMIC BOTANY 12:296-306(1958)/GEORGIA INSTITUTE OF TECHNOLOGY, ENGINEERING EXPERIMENT STATION, BULLETIN 17:1-36.

JOJOBA OIL COULD BE USED IN LINOLEUM, PRINTING INKS, PAINTS, VARNISHES, POLISHING WAXES, DIETETIC SALAD DRESSINGS, PENICILLIN STABILIZERS, COSMETICS, FOOD PREPARATIONS, DETERGENTS AND LUBRICANTS. IT MAY HAVE MEDICAL APPLICATIONS IN INHIBITING GROWTH OF TUBERCLE BACILLI. ITS ECONOMIC POTENTIAL IS RELATED TO SPERM WHALE OIL AND CARNAUBA WAX. THE RESIDUAL MEAL MAY BE SOLD AS A LIVESTOCK FEED. OZONOLYSIS FOLLOWED BY OXIDATION WOULD YIELD SEVERAL POTENTIALLY VALUABLE COMPOUNDS NOT AVAILABLE FROM COMMERCIAL VEGETABLE OILS.

SEED/BIBLIOGRAPHIES/SEED MEAL/NEW MEXICO/OIL/PRODUCT DEVELOPMENT

0097

DE LA VEGA, M.

1977

LA JOJOBA: DOMESTICACION DE UN CULTIVO POTENCIAL (JOJOBA: DOMESTICATION OF A POTENTIAL CULTIVATE, IN SPANISH).

CENTRO DE INVESTIGACIONES AGRICOLAS DEL NOROESTE, CAMPO AGRICOLA EXPERIMENTAL DE LA COSTA DE HERMOSILLO, CIRCULAR CIANO NO. 92. HERMOSILLO, SONORA, MEXICO. 19 P. (IN SPANISH)

A DETAILED ACCOUNT OF METHODOLOGY USED IN CULTIVATING AND DOMESTICATING JOJOBA.

MEXICO/PLANTATION ESTABLISHMENT/PROPAGATION/IRRIGATION

0098

DE LA VEGA, M.

1978

LA JOJOBA BAJO CULTIVO: AVANCES PRELIMINARES EN SU MANEJO Y COMPORTAMIENTO (JOJOBA UNDER CULTIVATION: PRELIMINARY ADVANCES IN ITS MANAGEMENT AND BEHAVIOR, IN SPANISH).

PAGES 49-59 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

ATTEMPTS TO COMMERCIALLY EXPLOIT WILD JOJOBA ARE AIMED AT PRODUCING QUANTITIES OF SEED LARGE ENOUGH TO MAKE INDUSTRIALIZATION PROFITABLE. ADVANCES IN MANAGING NONDOMESTICATED JOJOBA AND SEED PROPAGATION METHODS ARE PRESENTED.

NATIVE POPULATIONS/PROPAGATION/ECONOMICS

0099

DE LA VEGA, M./DURAZO B., J.U./QUILANTAN V., L.

1979

INVESTIGACION DE JOJOBA DOMESTICADA EN EL NOROESTE DE MEXICO. (JOJOBA DOMESTICATION RESEARCH IN NORTHWESTERN MEXICO, IN SPANISH).

JOJOBA HAPPENINGS 26:7-8 (ENGLISH TRANSLATION: JOJOBA HAPPENINGS 26:9-10).

THE BEST PLANTING PERIOD FOR DIRECT SEEDING JOJOBA WAS BETWEEN MARCH AND SEPTEMBER. FLOWERING RAPIDLY INCREASED FROM 3.5 TO 4.5 YEARS AFTER PLANTING. FRUITING BEGAN 4.5 TO 5.5 YEARS AFTER PLANTING. PRUNING MAY REDUCE THE TIME BEFORE FLOWERING AND FRUITING BEGIN.

MEXICO/SONORA/GERMINATION/PLANTING MANAGEMENT/GROWTH FORM/FLOWERING

0100

DEVITT, M.T./ROSSELL, J.B.

1979

EDIBLE OILS FOR COATING FOODS.

UNITED KINGDOM PATENT APPLICATION NO. 2,016,042, SEPTEMBER 18, 1979.

CERTAIN HYDROGENATED PRODUCTS OF JOJOBA OIL MAY BE APPLIED AS A STABLE COATING TO IMPROVE THE SHELF LIFE OR APPEARANCE OF FOODS. THE PARTIALLY HYDROGENATED JOJOBA OIL REMAINS CLEAR FOR AT LEAST 24 HOURS AT 20 C AND THEREFORE MAY BE USED WITHOUT A SOLVENT. PARTIALLY HYDROGENATED COMPOSITIONS ALSO MAY BE SEPARATED INTO FRACTIONS OF DIFFERENT MELTING POINTS TO SEPARATE HIGHER MELTING COMPONENTS TO FURTHER MODIFY THE PROPERTIES OF THE PRODUCT. HYDROGENATED JOJOBA OIL CONTAINS A NATURALLY OCCURRING TOCOPHEROL AND IS THEREFORE AN EFFECTIVE ANTIOXIDANT ADDITIVE, PROVIDED THAT IT IS NOT PREVIOUSLY BLEACHED BY HYDROGEN PEROXIDE OR OTHER OXIDANT MATERIAL NEUTRALIZING THE ANTIOXIDANT EFFECT. THERE IS A SUBSTANTIAL IMPROVEMENT OVER A PROPRIETARY COATING OIL OF VEGETABLE ORIGIN.

OIL/FOODS/TOCOPHEROLS/CHEMICAL REACTIONS

0101

DHILLON, G.S./YERMANOS, D.M.

1979

TOLERANCE OF JOJOBA TO HERBICIDES.

PAGES 381-386 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

TO MEET THE NEED FOR INFORMATION ON HERBICIDES SUITABLE FOR JOJOBA PLANTATIONS, PRELIMINARY INVESTIGATIONS WERE STARTED TO SCREEN SOME OF THE MOST COMMONLY USED MATERIALS. BOTH PRE-EMERGENCE AND POST-EMERGENCE HERBICIDES WILL BE NEEDED WITH JOJOBA DURING THE INITIAL THREE TO FOUR YEARS AFTER PLANTING WHEN JOJOBA GROWS AT A SLOW RATE. THE AMOUNT OF HERBICIDE REQUIRED TO PRODUCE A GIVEN LEVEL OF PLANT RESPONSE IS VARIABLE FROM SOIL TO SOIL. VARIATION IN THE TOXICITY OF HERBICIDES IS CAUSED BY DIFFERENCES IN THE CAPACITY OF SOILS TO ADSORB HERBICIDES. HERBICIDES ADSORBED ON SOIL COLLOIDS ARE UNAVAILABLE TO THE PLANT AND PHYTOTOXICITY IS GOVERNED BY THE CONCENTRATION OF HERBICIDE REMAINING IN THE SOIL SOLUTION. HERBICIDES GENERALLY ARE ADSORBED BY SOIL COMPONENTS. CONTENT OF ORGANIC MATTER AND, TO SOME EXTENT, AMOUNT AND NATURE OF CLAY PRESENT LARGELY DETERMINES THE CAPACITY OF SOIL TO ADSORB HERBICIDES. THE DOSAGE OF SIMAZINE AND OTHER HERBICIDES REQUIRED TO PRODUCE A GIVEN PLANT RESPONSE WAS HIGHLY CORRELATED WITH SOIL ORGANIC MATTER. SINCE THE ORGANIC MATTER CONTENT OF THE SOIL IS OF CONSIDERABLE IMPORTANCE, TWO TYPES OF SOIL WERE USED IN ONE OF THE TWO EXPERIMENTS UNDERTAKEN.

HERBICIDES/PLANTATION ESTABLISHMENT/SOILS

0102

DIGUET, M.L.

1895

LE JOJOBA (SIMMONDSIA CALIFORNICA NUTT) C.A. (JOJOBA, IN FRENCH).

SOCIETE NATIONALE D'ACCLIMATATION DE FRANCE, BULLETIN 42:685-687.

JOJOBA'S ADAPTATION TO ARID ENVIRONMENTS AND ITS ECONOMIC POTENTIAL MAKE IT WORTHY OF INTRODUCTION INTO THE DESERT REGIONS OF FRENCH COLONIES IN NORTH AFRICA. THE SEEDS ARE EATEN. THE HIGH QUALITY OIL DOES NOT BECOME RANCID. LEAVES PERSIST ON THE PLANT EVEN DURING DRY PERIODS, POSSIBLY UTILIZING ATMOSPHERIC MOISTURE. THE DEVELOPMENT OF THE FRUIT AFTER FLOWERING IS DEPENDENT ON SUMMER RAINFALL. THE PLANT WILL RESPOND WELL TO IRRIGATION.

SEED/PHENOLOGY/FOODS/OIL/ADAPTATION/LEAVES/NORTH AFRICA

0103

DOUGLAS, M.

1947

JOJOBA, AN OIL PRODUCING PLANT OF THE SOUTHWESTERN STATES.

NEW YORK BOTANICAL GARDEN, JOURNAL 48:29-32/CHEMURGIC DIGEST 6(6):106-107.

DESCRIBES THE PLANT, ASPECTS OF ITS NATURAL HISTORY AND PATENTS FOR USES OF THE OIL.

ARIZONA/NATURAL HISTORY/OIL

0104

DUNCAN, C.C. ET AL

1974

RAPID ETHANOLYSIS PROCEDURE FOR JOJOBA WAX ANALYSIS BY GAS LIQUID CHROMATOGRAPHY.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 51(12):534-536.

A RAPID ETHANOLYSIS PROCEDURE PREPARES JOJOBA WAX FOR GAS LIQUID CHROMATOGRAPHIC ANALYSIS. THE WAX ESTERS ARE HYDROLYZED IN A TEST TUBE BY REFLUXING FOUR DROPS OF JOJOBA WAX IN FIVE PERCENT HYDROCHLORIC ACID IN ANHYDROUS ETHANOL. THE RESULTING FATTY ACID ETHYL ESTERS AND FATTY ALCOHOLS CAN BE SEPARATED AND QUANTIFIED IN A SINGLE GAS LIQUID CHROMATOGRAPHIC RUN.

ALCOHOLS/ESTERS/GAS LIQUID CHROMATOGRAPHY/OIL

0105

DUNSTONE, R.L.

1979

THE PHYSIOLOGY OF JOJOBA.

PAGES 1-7 IN SOUTH AUSTRALIA DEPARTMENT OF AGRICULTURE AND FISHERIES, JOJOBA: REPORT ON THE WORKSHOP FEBRUARY 1979. COORDINATING COMMITTEE ON NEW AGRO-BASED PRODUCTS, DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA. 32 P.

IT IS OF LIMITED VALUE TO JUDGE THE SUITABILITY OF THE AUSTRALIAN CLIMATE TO JOJOBA BY STUDYING ONLY THE CLIMATE OF AREAS WHERE THE SPECIES OCCURS NATURALLY. WORK HAS BEEN AIMED AT DEFINING THE ENVIRONMENTAL LIMITATIONS TO IMPORTANT PHYSIOLOGICAL SYSTEMS TO DELINEATE THE POSSIBLE DISTRIBUTION OF SUCCESSFUL JOJOBA PLANTATIONS. JOJOBA HAS SHOWN ITS STRENGTH IN ADAPTING TO DROUGHT RESISTANCE. SUBTROPICAL AND TROPICAL AREAS WITH SUMMER RAINFALL PATTERNS HAVE BEEN PREDICTED TO BE UNSATISFACTORY BECAUSE OF A LACK OF ANY KNOWN FLOWERING STIMULUS. FROST-SUSCEPTIBLE AREAS ALSO ARE UNSUITABLE BECAUSE, ALTHOUGH FLOWERS WILL INITIATE, THEY WILL BE KILLED BY FROST. AREAS WITH HEAVY SOILS ALSO WILL BE UNSATISFACTORY BECAUSE OF PLANT MORTALITY DUE TO WATERLOGGING. SEED YIELDS CANNOT BE PREDICTED AT THIS TIME.

CLIMATE/PLANT DISTRIBUTION/PLANTATION ESTABLISHMENT/WATER USE/FLOWERING/SOILS/SEED YIELD/FREEZING/PLANT PHYSIOLOGY

0106

DUNSTONE, R.L.

1980

JOJOBA (*SIMMONDSIA CHINENSIS*) FLOWER BUDS: TEMPERATURE AND PHOTOPERIOD EFFECTS IN BREAKING DORMANCY.

AUSTRALIAN JOURNAL OF AGRICULTURAL RESEARCH 31(4):727-738.

THE EFFECTS OF TEMPERATURE AND PHOTOPERIOD IN BREAKING FLOWER BUD DORMANCY WAS STUDIED ON JOJOBA PLANTS GROWING UNDER WELL WATERED CONDITIONS IN CONTROLLED ENVIRONMENTS. PLANTS 42 TO 48 MONTHS OLD PRODUCED ONLY DORMANT FLOWER BUDS WHEN GROWING IN DAY/NIGHT TEMPERATURES OF 27 C/22 C TO 36 C/31 C. WHEN THE PLANTS WERE MOVED TO LOWER TEMPERATURES OF 24 C/19 C OR 18 C/13 C, EVERY PLANT PRODUCED A FLOWERING FLUSH. IN TWO EXPERIMENTS, CLONAL MATERIAL WAS GROWN AT EITHER 30 C/25 C OR 36 C/31 C, AND THEN WAS MOVED TO LOWER TEMPERATURE



TREATMENTS. DOWN TO THE LOWEST TEMPERATURE USED (18 C/13 C), THE GREATER THE DROP IN TEMPERATURE, THE GREATER THE NUMBER OF FLOWERS THAT OPENED. FLOWERING OCCURRED UNDER BOTH SHORT (8-HOUR) OR LONG (16-HOUR) PHOTOPERIODS. THERE WAS A CRITICAL TEMPERATURE IN THE REGION OF 27 C/22 C TO 30 C/25 C WHEN NO FLOWERING OCCURRED. FLOWERING WAS NOT DEPENDENT ON A LARGE DIURNAL TEMPERATURE RANGE, BUT OCCURRED ONLY IF THE PLANTS WERE SUBJECTED TO A LOW TEMPERATURE FOR AT LEAST 21 DAYS.

FLOWERING/TEMPERATURE/LIGHT/DORMANCY/PHOTOPERIOD

0107

DUNSTONE, R.L./BEGG, J.E.

1979

DOMESTICATING JOJOBA.

AUSTRALIAN NATURAL HISTORY 19:328-330.

JOJOBA WAS INTRODUCED IN AUSTRALIA IN THE MID-1930S; HOWEVER, NO SEED WAS PRODUCED UNTIL 1977. IN 1979 THERE WERE 13 EXPERIMENTAL CULTIVATION SITES.

AUSTRALIA/SEED YIELD/PLANTATION ESTABLISHMENT

0108

DUNSTONE, R.L./DAYSON, I.A.

1982

PHOTOPERIOD EFFECTS ON GROWTH AND FLOWERING IN JOJOBA.

PAGES 66-72 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA. CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

THE EFFECT OF PHOTOPERIOD AND OF DAILY LIGHT ENERGY LEVELS ON GROWTH OF JOJOBA SEEDLINGS WAS MEASURED. TWELVE AND 24-HOUR PHOTOPERIODS WERE SELECTED TO GIVE A WIDE RANGE OF PHOTOPERIODS AND TOTAL DAILY LIGHT. A CRITICAL DAY LENGTH ABOVE OR BELOW WHICH JOJOBA BECOMES DORMANT OR FAILS TO INITIATE FLOWERS HAS NOT BEEN DEMONSTRATED. THEREFORE, THE CULTIVATION OF JOJOBA DOES NOT APPEAR TO BE LIMITED BY ANY ABSOLUTE LATITUDINAL CONSTRAINTS. IN CHOOSING A JOJOBA SITE, LATITUDE MAY BE DISREGARDED GIVING MORE CONSIDERATION TO SOIL TYPE, TEMPERATURE RANGE, RAINFALL AND TOTAL DAILY LIGHT.

LIGHT/PLANT GROWTH/GEOGRAPHY/PRECIPITATION

0109

DURAZO B., J.U.

1982

ESTUDIO POBLACIONAL Y RELACION DE SEXO ENCONTRADO EN DOS ESTABLECIMIENTOS COMERCIALES DE JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) EN LA COSTA DE HERMOSILLO, SONORA (THE STUDY OF POPULATIONS AND SEX RATIOS IN TWO COMMERCIAL JOJOBA SITES ON THE COAST OF HERMOSILLO, SONORA, IN SPANISH).

PAGES 93-98 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

TWO THREE-YEAR-OLD COMMERCIAL JOJOBA SITES WERE EXAMINED TO DETERMINE THE BEST RATIO OF MALE-TO-FEMALE PLANTS FOR MAXIMUM PRODUCTIVITY. ONE SITE WAS DIRECT-SEEDED. ONE SITE WAS ESTABLISHED WITH TRANSPLANTS. DIRECT SEEDING PROVIDED 43.9 PERCENT MORE PLANTS PER HECTARE THAN TRANSPLANTING. ON BOTH FIELDS, APPROXIMATELY 50 PERCENT OF THE PLANTS WERE FEMALE. THE TRANSPLANTED SITE YIELDED 5.2 KILOGRAMS OF SEED PER HECTARE; THE DIRECT-SEEDED FIELD YIELDED 15 KILOGRAMS OF SEED PER HECTARE.

MEXICO/DIRECT SEEDING/SEX DETERMINATION/SEX RATIOS/SEEDLINGS

0110

EHRLER, W.L./FINK, D.H.

1979

YIELD IMPROVEMENT OF JOJOBA BY RUNOFF FARMING.

PAGES 361-373 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

MICROCATCHMENTS WERE CONSTRUCTED FOR INDIGENOUS, WATER-STRESSED JOJOBA PLANTS TO IMPROVE GROWTH AND YIELD IN A MARGINAL RAINFALL REGION (200 MM ANNUALLY) AND TO ASSESS PLANT WATER REQUIREMENTS. THERE WERE 10 REPLICATIONS OF THE FOLLOWING TREATMENTS: T-0, NO CATCHMENT; T-1, CLEARED, SMOOTHED AND ROLLED CATCHMENT; T-2, TREATMENT T-1 PLUS WATER-REPELLENT SOIL COATINGS. THE FIVE-YEAR AVERAGE OF RAIN PLUS RUNOFF THAT THE PLANTS RECEIVED DURING THE CRITICAL PERIOD OF OCTOBER THROUGH JUNE WAS THREE TIMES HIGHER FOR T-1 AND SIX TIMES HIGHER FOR T-2 THAN THE CONTROLS. THE AVERAGE PLANT VOLUME INCREASED 36 PERCENT IN THE CONTROLS, 66 PERCENT IN T-1 AND 302 PERCENT IN T-2. THE PLANTS PRODUCED SEEDS ONLY THREE TIMES DURING THE FIVE-YEAR STUDY BECAUSE THE FLOWERS WERE DESTROYED BY FROST IN 1975 AND 1976. THE INCREASE IN MEAN SEED YIELD FOR T-1 AS COMPARED WITH T-0 WAS STATISTICALLY SIGNIFICANT ONLY IN 1978. THE YIELD OF T-2 WAS SIGNIFICANTLY GREATER THAN THAT OF T-0 IN ALL THREE YEARS AND GREATER THAN THAT OF T-1 IN 1977 AND 1978. THIS STUDY DEMONSTRATED THE FEASIBILITY OF USING SIMPLE RUNOFF-FARMING METHODS TO SIGNIFICANTLY INCREASE SEED YIELD ON NATIVE STANDS OF JOJOBA. IT ALSO HELPED TO ESTABLISH SOME BROAD LIMITS ON JOJOBA'S WATER REQUIREMENT IN A HOT CLIMATE: THE MINIMUM IS ABOUT 400 MM/YEAR, AND THE OPTIMUM POSSIBLY AS LOW AS 600 AND NO MORE THAN 1,300 MM/YEAR.

SEED YIELD/WATER STRESS/WATER USE/NATIVE POPULATIONS

0111

EHRLER, W.L./FINK, D.H./MITCHELL, S.T.

1978

GROWTH AND YIELD OF JOJOBA PLANTS IN NATIVE STANDS USING RUNOFF-COLLECTING MICROCATCHMENTS.

AGRONOMY JOURNAL 79(6):1005-1009.

WATER HARVESTING TECHNIQUES WERE APPLIED TO A WATER-STRESSED NATIVE STAND OF JOJOBA NEAR PHOENIX, ARIZONA. THIRTY SMALL, INDIGENOUS FEMALE BUSHES WERE SELECTED AND RANDOMLY DIVIDED INTO THREE TREATMENTS: T-0, NO WATER-HARVESTING CATCHMENTS; T-1, CLEARED, SMOOTHED, AND ROLLED 20-SQUARE METER CATCHMENTS; AND T-2, CLEARED, SMOOTHED, ROLLED 20-SQUARE METER CATCHMENT TREATED WITH A WATER-REPELLANT COATING. RAINFALL, RUNOFF, SOIL MOISTURE, RELATIVE LEAF WATER CONTENT, PLANT VOLUME AND SEED YIELD DATA WERE COLLECTED. THE FOUR-YEAR PRECIPITATION AVERAGE AND RUNOFF TO PLANTS DURING THE CRITICAL GROWTH-YIELD PERIOD, OCTOBER THROUGH JUNE, WAS T-0, 154 MM; T-1, 435 MM; AND T-2, 876 MM. THE PLANT VOLUME INCREASE AVERAGED 43 PERCENT, 44 PERCENT AND 237 PERCENT FOR

T-0, T-1, AND T-2 RESPECTIVELY. SEED YIELD IN 1974, THE FIRST YEAR, AVERAGED 0.5 G, 8 G AND 23 G PER PLANT FOR TREATMENTS T-0, T-1 AND T-2 RESPECTIVELY. FROST INJURY DESTROYED THE FLOWERS IN 1975 AND 1976. IN 1977, YIELDS INCREASED TO 27 G, 76 G, AND 208 G PER PLANT FOR THE RESPECTIVE TREATMENTS. MAXIMUM YIELD WAS 514 G PER PLANT. JOJOBA'S CONSUMPTIVE WATER REQUIREMENT EXCEEDS 450 MM, AND MAY BE AS GREAT AS 900 MM. WATER HARVESTING IS ONE WAY OF SUPPLYING THE REQUIRED AMOUNT OF WATER.

WATER HARVESTING/ARIZONA/NATIVE POPULATIONS/WATER USE/SEED YIELD/FLOWERING

0112

EL MARDI, M.O.

1979

FACTORS CONTRIBUTING TO THE INITIATION OF GROWTH AND DIFFERENTIATION OF JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEID.) IN VITRO.

UNIVERSITY OF ARIZONA, TUCSON. PH.D. DISSERTATION, 81 P.

EFFECTS OF GROWTH REGULATORS, MEDIA COMPOSITION AND LENGTH OF CULTURE PERIOD ON GROWTH AND DEVELOPMENT OF JOJOBA TISSUE WERE STUDIED. THE INABILITY OF THE JOJOBA CALLUS TO DIFFERENTIATE WAS RELATED TO THE LACK OF DIFFERENTIATED PHLOEM. THE IMPORTANCE OF NUCLEIC ACIDS IN ORGANOGENESIS IS ASSOCIATED WITH CYTODIFFERENTIATION RATHER THAN WITH THE FORMATION OF ORGANS.

TISSUE CULTURE/PLANT GROWTH/PLANT GROWTH REGULATORS

0113

EL MARDI, M.O./KHAIRI, M.M.A./YERMANOS, D.M.

1982

NURSERY REQUIREMENTS FOR JOJOBA PROPAGATION UNDER SUDAN CONDITIONS.

PAGES 433-438 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

FOR NURSERY-GROWN SEEDLINGS IN THE SUDAN, THE BEST SOIL MIX IS COMPOSED OF EQUAL PARTS SAND, RIVER SOIL AND LEAF MOLD. FOR GERMINATION, WATER IS APPLIED TWICE PER DAY; TO PREPARE SEEDLINGS FOR TRANSPLANTING, WATER IS APPLIED ONCE PER WEEK.

PROPAGATION/SOILS/WATER USE/SEEDLINGS

0114

EL-MANSY, H.I.

1978

GERMINATION AND GROWTH OF JOJOBA SEEDLINGS IN KUWAIT AS AFFECTED BY APPLICATIONS OF PLANT GROWTH REGULATORS.

PAGES 43-48 IN ANNUAL RESEARCH REPORT, KUWAIT INSTITUTE OF SCIENTIFIC RESEARCH.

TRANSPLANTING OF JOJOBA SEEDLINGS DURING THE SUMMER IN KUWAIT WAS SUCCESSFUL IN COASTAL AREAS. TEMPERATURE AND GROWTH REGULATORS INCREASED THE GROWTH OF THESE PLANTS. GIBBERELIC ACID, BENZYLADENINE, ABSCISSIC ACID, AND MALEIC HYDRAZIDE STIMULATED JOJOBA GROWTH.

KUWAIT/TEMPERATURE/PLANT GROWTH/NUTRIENTS/PROPAGATION/PLANT GROWTH REGULATORS

0115

ELLIGER, C.A./WAISS, A.C., JR./BOOTH, A.N.

1975

DETOXIFICATION OF JOJOBA MEAL.

UNITED STATES PATENT 3,919,432, NOVEMBER 11, 1975.

THE TOXICITY OF JOJOBA MEAL CAN BE REDUCED BY EXPOSING THE MEAL TO AMMONIA FOR 25 TO 35 DAYS IN A GAS-TIGHT CONTAINER. FEEDING EXPERIMENTS WITH RATS, USING 15 PERCENT TREATED JOJOBA MEAL IN A STANDARD RATION RESULTED IN WEIGHT GAIN; FIVE- TO 10-DAY TREATED MEAL WAS TOXIC. PROPERLY TREATED MEAL COULD BE USED AS A VALUABLE LIVESTOCK FEED.

SEED MEAL/FEEDING EXPERIMENTS/RODENTS/TOXICITY/PATENTS/PALATABILITY

0116

ELLIGER, C.A./WAISS, A.C., JR./LUNDIN, R.E.

1974

CYANOMETHYLENECYCLOHEXYL GLUCOSIDES FROM SIMMONDSIA CALIFORNICA.

PHYTOCHEMISTRY 13(10):2319-2320.

MILLED SEED WAS EXTRACTED IN SUCCESSION WITH PETROL, (C SUB 6 H SUB 6) AND ETOAC. CHROMATOGRAPHY OF THE ETOAC EXTRACT ON SILICA GEL YIELDED THREE FRACTIONS SHOWING CHARACTERISTIC CONJUGATED NITRILE ABSORPTION AT CA. 2220 CM SUP -1 IN THE INFRARED SPECTRA OF THE CRUDE MATERIAL. THE MAJOR COMPONENT WAS SIMMONDSIN. A MIXTURE OF SUBSTANCES, WHICH WAS ELUDED IN THE MOST POPULAR COLUMN FRACTION WAS ACETYLATED AND NECHROMATOGRAPHED, INDICATED THE PRESENCE OF HEXAACETATES OF THE TWO MONODESMETHYLSIMMONDSINS, ALTHOUGH THEY WERE NOT OBTAINED IN PURE FORM.

CHEMICAL STRUCTURE/PLANT CHEMISTRY/SIMMONDSIN/TOXICITY

0117

ELLIGER, C.A./WAISS, A.C., JR./LUNDIN, R.E.

1974

STRUCTURE AND STEREOCHEMISTRY OF SIMMONDSIN.

JOURNAL OF ORGANIC CHEMISTRY 39(19):2930-2931.

SIMMONDSIN (2-8CYANOMETHYLENE)-3-HYDROXY-4,5-DIMETH-OXYCYCLOHEXYL BETA-D-GLUCOSIDE) REFLUXED 1.5 HOURS IN IN HCL GAVE THE LACTONE AND 2-HYDROXY-5-METHOXYPHENYLACETIC ACID AND ITS LACTONE. THE CONFIGURATION OF THE CYANO GROUP IS SYN TO THE AXIAL BETA-GLUCOSYL SUBSTITUENT.

CHEMICAL STRUCTURE/TOXICITY/SIMMONDSIN

0118

ELLIGER, C.A./WAISS, A.C., JR./LUNDIN, R.E.

1973

SIMMONDSIN, AN UNUSUAL 2-CYANOMETHYLENECYCLOHEXYL GLUCOSIDE FROM SIMMONDSIA CALIFORNICA.

CHEMICAL SOCIETY (JOURNAL), PERKIN TRANSACTIONS I(19):2209-2212.

GROUND JOJOBA SEED WAS EXTRACTED IN SUCCESSION WITH HEPTANE, BENZENE, ETHYL ACETATE, AND METHANOL. A SUBSTANCE, TERMED SIMMONDSIN, IN THE ETHYL ACETATE FRACTION EXHIBITED ACTIVITY IN THE INHIBITION OF FEEDING, ALTHOUGH THE ACUTE ORAL TOXICITY WAS EXTREMELY LOW. SIMMONDSIN IS A 2-(CYANOMETHYLENE)-3-HYDROXY-4,5-DIMETHOXYCYCLOHEXYL BETA-D-GLUCOSIDE. ANALYSIS OF THE NMR SPECTRA OF THIS COMPOUND AND ITS PENTA-ACETATE PERMITTED ASSIGNMENT OF THE STEREOCHEMISTRY AND ESTABLISHED THE POINT OF ATTACHMENT OF THE GLUCOSE.

SEED MEAL/SEED/TOXICITY/SIMMONDSIN

0119

ELLIS, C.

1936

FACTIS AND PROCESS OF MAKING SAME.

UNITED STATES PATENT 2,054,283, SEPTEMBER 15, 1936.

A MUCH MORE SOLUBLE FORM OF FACTIS USING JOJOBA OIL AND SULFUR CHLORIDE MAY BE MORE READILY INCORPORATED WITH VARIOUS SOLUTIONS. IT ALSO MAY HAVE A MORE POWERFUL SOLVENT ACTION ON SUBSTANCES, SUCH AS RUBBER, WITH A BETTER BLENDING EFFECT. VARIOUS PROPORTIONS ALLOW USE IN A WIDE RANGE OF PRODUCTS. THE PREPARATION HAS BEEN INCORPORATED IN RUBBER, RUBBER CEMENTS AND SOLUTIONS, LINOLEUM, PAINTS, VARNISHES AND PLASTICS.

PATENTS/POLYMERIZATION/OIL/PRODUCT DEVELOPMENT

0120

ELLIS, M.

1979

THE AGRONOMY OF JOJOBA.

PAGES 8-15 IN SOUTH AUSTRALIA DEPARTMENT OF AGRICULTURE AND FISHERIES, JOJOBA: REPORT ON THE WORKSHOP FEBRUARY 1979. COORDINATING COMMITTEE ON NEW AGRO-BASED PRODUCTS, DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA. 32 P.

THE BEST CONDITIONS FOR SUCCESSFUL JOJOBA PRODUCTION ARE OUTLINED. DETAILS ARE GIVEN OF: A) PLANTATION LOCATION IN AUSTRALIA WITH RESPECT TO LATITUDE, SOILS, RAINFALL AND TEMPERATURE; AND B) CULTURAL PRACTICES SUCH AS STAND ESTABLISHMENT, PLANTING PLAN, PRUNING AND MECHANICAL HARVESTING, PESTS AND DISEASES, AND PROCESSING.

AUSTRALIA/LATITUDE/SOILS/WATER USE/TEMPERATURE/SEED HARVEST/DISEASES/  
PLANTATION ESTABLISHMENT

0121

ESCOBAR, R.

1935

LA JOJOBA (SIMMONDSIA CALIFORNICA) (JOJOBA, IN SPANISH).

ESCUELA PARTICULAR DE AGRICULTURA, CO. JUAREZ, CHIHUAHUA, BOLETIN 20(2):1-8./  
AGRICULTOR MEXICANO (JUAREZ) 51(4):49-56.

JOJOBA SEEDS AND OIL PROPERTIES WERE ANALYZED. PLANTINGS SHOULD BE PROPAGATED  
EAST OF THE CONTINENTAL DIVIDE IN CLIMATICALLY APPROPRIATE AREAS.

MEXICO/FOODS/FORAGE/SEED/CULTIVATION/MEDICINAL USES

0122

EVERETT, P.C.

1957

A SUMMARY OF THE CULTURE OF CALIFORNIA PLANTS AT THE RANCHO SANTA ANA BOTANICAL  
GARDEN 1927-1950.

RANCHO SANTA ANA BOTANICAL GARDEN, CLAREMONT, CALIFORNIA. 223 P.

OF 903 JOJOBA PLANTED, ONLY 275 WERE ALIVE IN 1950. ALTHOUGH DIFFICULT TO  
ESTABLISH, THE PLANTS WERE ENTIRELY HARDY IN EVERY RESPECT AND NEEDED NO FURTHER  
ATTENTION. YEARLY RECORDS WERE KEPT ON MOST PLANTS. OF 181 PLANTED AT POTRERO  
GRANDE, SAN DIEGO COUNTY, IN 1929, 141 WERE ALIVE IN 1948. NO LOSSES HAD BEEN  
RECORDED FOR 10 YEARS, PLANTS WERE 6 FEET TALL AND SPREAD 10 FEET ACROSS.  
GOOD GERMINATION USUALLY RESULTED WITHIN 14 TO 18 DAYS AFTER SOWING. AT  
AGUANGA, SAN DIEGO COUNTY, 96 SEEDS WERE PLANTED IN POTS, TRANSFERRED TO GALLON  
CANS AND THEN TRANSPLANTED: 60 SURVIVED IN GOOD CONDITION.

CALIFORNIA/CULTIVATION/GERMINATION/PLANTING MANAGEMENT/PLANT GROWTH

0123

FELDMAN, W.R.

1976

GEOGRAPHIC VARIATION OF YIELD PARAMETERS IN JOJOBA (SIMMONDSIA CHINENSIS  
(LINK) SCHNEIDER).

UNIVERSITY OF ARIZONA, DEPARTMENT OF PLANT SCIENCES, TUCSON. M.S. THESIS,  
83 P.

VARIATIONS IN JOJOBA SEED OIL YIELD PARAMETERS IN RELATION TO GEOGRAPHIC,  
SEASONAL, EDAPHIC AND CLIMATIC FACTORS IN CENTRAL ARIZONA WERE STUDIED.  
SIGNIFICANT DIFFERENCES IN WAX PERCENTAGE WERE FOUND AMONG SITES AND PLANTS  
AT THE TEST SITE. SIGNIFICANT DIFFERENCES BETWEEN 1973 AND 1974 ALSO WERE  
FOUND IN WAX PERCENTAGE, AVERAGE SEED WEIGHT PER PLANT, AND TOTAL YIELD PER  
PLANT. REGRESSION ANALYSIS SHOWED THAT WAX PERCENTAGE POSITIVELY CORRELATED  
WITH AVERAGE SEED WEIGHT AND NEGATIVELY CORRELATED WITH SITE ELEVATION. WAX  
PERCENTAGE VARIED DIRECTLY WITH PERCENT SILT AND INVERSELY WITH TOTAL SOLUBLE  
SALTS. AVERAGE WAX PERCENTAGE VARIED DIRECTLY WITH JANUARY 1974, RAINFALL  
AND INVERSELY WITH APRIL 1974, MEAN TEMPERATURE. AVERAGE SEED WEIGHT VARIED  
INVERSELY WITH OCTOBER 1974, MEAN TEMPERATURE AND DIRECTLY WITH DECEMBER 1973,  
MEAN TEMPERATURE. AVERAGE SEED WEIGHT VARIED DIRECTLY WITH NOVEMBER 1973,  
RAINFALL.

ARIZONA/CLIMATE/ELEVATION/OIL/PLANT DISTRIBUTION/SEASONAL VARIATION/SEED/  
SEED YIELD

0124

FELDMAN, W.R./HOGAN, L./PALZKILL, D.A.

1982

FACTORS AFFECTING GROWTH OF JOJOBA CUTTINGS IN THE LINER STAGE.

PAGES 121-129 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

THE EFFECTS OF VARIOUS TYPES AND AMOUNTS OF SLOW-RELEASE FERTILIZERS INTO THE ROOTING MEDIA OF JOJOBA STEM CUTTINGS WERE INVESTIGATED. TISSUE NUTRIENT LEVELS OF N, P, KA AND MICRONUTRIENTS WERE DETERMINED FOR A MIXED GROUP OF CUTTINGS FROM THE UNIVERSITY OF ARIZONA'S EXPERIMENT STATION, MESA, ARIZONA, AND WERE COMPARED WITH THE LEVELS FOUND IN CUTTINGS AT LINING OUT (POTTING UP). IN AN EXPERIMENT USING SEVEN WILD CLONES ROOTED WITH AND WITHOUT SLOW-RELEASE FERTILIZERS, ROOTING PERCENTAGES WERE NOT FOUND TO DIFFER SIGNIFICANTLY, ALTHOUGH MEAN VALUES FOR FERTILIZED CUTTINGS WERE LOWER BY ABOUT 6 PERCENT. IN THE SAME STUDY, PERCENTAGES OF PLANTS DEVELOPING NEW GROWTH AS OF LINING OUT WERE SIGNIFICANTLY HIGHER WHEN FERTILIZED. NO SIGNIFICANT DIFFERENCES IN GROWTH WERE FOUND BETWEEN EITHER CONTROL OR FERTILIZED CUTTINGS LINED-OUT INTO SAND-BARK-LOAM MEDIA VERSUS PERLITE-VERMICULITE AMENDED MEDIA. IN ANOTHER STUDY, DIFFERENT LEVELS OF THREE TYPES OF SLOW-RELEASE AND ONE SOLUBLE FERTILIZER WERE USED DURING THE ROOTING STAGE. OF THE 11 TREATMENTS TESTED, ONLY ONE SHOWED A SIGNIFICANTLY LOWER ROOTING PERCENTAGE THAN THE CONTROLS; ALL TREATMENTS RESULTED IN PLANTS WITH GREATER NUMBERS OF NODES THAN THE CONTROLS. ALTHOUGH DIFFERENCES IN DRY WEIGHT BETWEEN CONTROLS AND FERTILIZED PLANTS WERE NOT SIGNIFICANT, FRESH WEIGHTS WERE SIGNIFICANTLY HIGHER THAN CONTROLS FOR A NUMBER OF THE TREATMENTS.

FERTILIZERS/ROOTS/ARIZONA/PROGENY/PROPAGATION/VEGETATIVE PROPAGATION  
0125

FISHER, G.L.

1980

JOJOBA PLANTATION MAINTENANCE.

JOJOBA HAPPENINGS 31:1-5.

MAINTENANCE OF JOJOBA PLANTATIONS IS LARGELY A MATTER OF TRIAL AND ERROR. WHILE NURSERY-GROWN SEEDLINGS RESPOND TO FERTILIZERS, FIELD-GROWN SEEDLINGS DO NOT. ULTIMATE HARVESTING TECHNIQUES MUST BE CONSIDERED WHEN PLANTATIONS ARE BEING DESIGNED.

FERTILIZERS/ECONOMICS/COST ANALYSIS/HERBICIDES/POLLINATION/PRUNING/  
PLANTATION ESTABLISHMENT

0126

FISHER, G.L.

1982

JOJOBA DEVELOPMENT PROGRAMS.

PAGES 418-424 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

SUCCESS IN FOREIGN DEVELOPMENT WILL DEPEND ON ADVANCE PLANNING AND THE EXPERTISE OF ON-SITE MANAGEMENT. SOILS, CLIMATE AND WATER SUPPLIES ALSO SHOULD BE CONSIDERED.

PLANTATION ESTABLISHMENT/PLANTATION MANAGEMENT/ECONOMIC DEVELOPMENT/PARAGUAY/  
AUSTRALIA

0127

FISHER, G.L.

1982

JOJOBA PRODUCTS MARKETING.

PAGES 425-426 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA.

THE MARKET FOR JOJOBA WILL BECOME PROFITABLE WHEN NEW PRODUCTS, RATHER THAN REPLACEMENT PRODUCTS, CAN BE DEVELOPED.

PRODUCT DEVELOPMENT/MARKET DEMAND

0128

FISHER, G.L./BOYD, R.M.

1979

ESTABLISHING A COMMERCIAL JOJOBA PLANTATION.

PAGES 5-12 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE APPROACH TO SUCCESSFULLY ESTABLISHING A COMMERCIAL JOJOBA OPERATION SHOULD BE TO SATISFY, TO THE GREATEST EXTENT POSSIBLE, THOSE INGREDIENTS THAT ARE REQUIRED FOR A SUCCESSFUL JOJOBA PLANTING RATHER THAN FITTING JOJOBA TO WHATEVER RESOURCES MIGHT BE AVAILABLE. CRITERIA FOR IDEAL PLANTINGS COMPARED TO ACTUAL SITE SELECTION AND PREPARATORY COSTS ARE OUTLINED.

PLANTATION ESTABLISHMENT/SITE SELECTION/ECONOMICS/COST ANALYSIS

0129

FOERSTNER, L.W.

1981

ROOT ROT IN JOJOBA.

JOJOBA HAPPENINGS 36:1-2.

ALTHOUGH NATIVE JOJOBA HAS FEW INSECT OR DISEASE PROBLEMS, PLANTS UNDER CULTIVATION ARE MORE SUSCEPTIBLE TO ROOT ROT. IRRIGATION WATER MAY ALLOW SPORE GERMINATION AND INFECTION TO PASS FROM ONE PLANT ORGANISM TO ANOTHER. DRIP-IRRIGATION MAY BE A SOLUTION.

ROOT ROT/DISEASES/IRRIGATION

0130

FORE, S.P. ET AL

1960

DERIVATIVES OF JOJOBA OIL AS PLASTICIZERS FOR VINYL POLYMERS AND BUNA-N RUBBER.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 37(8):387-390.



TEN MALEINATED JOJOBA OIL DERIVATIVES WERE SCREENED AS PLASTICIZERS IN A STANDARD OLYVINYL RESIN FORMULATION AND AS SOFTENERS FOR BUNA-N RUBBER. THE METHYL AND BUTYL ESTERS AND HYDROGENATED METHYL ESTERS OF MALEINATED JOJOBA ACIDS WERE COMPARABLE TO THE REFERENCE STANDARD DI-2-ETHYLHEXYL PHTHALATE (DOP) AS PRIMARY PLASTICIZERS FOR THE VINYL RESIN. THREE OTHER DERIVATIVES WERE SATISFACTORY ONLY AS SECONDARY PLASTICIZERS. SIX OF THE DERIVATIVES WERE COMPARABLE TO THE REFERENCE SOFTENER, DIBUTYL SEBACATE, AS SOFTENERS, IN A BUNA-N FORMULATION AND YIELDED RUBBERS MEETING THE LOW TEMPERATURE FLEXIBILITY REQUIREMENTS (-40 C) OF THE AUTOMOBILE INDUSTRY. TWO OF THE SIX DERIVATIVES, MADE WITH THE BUTYL AND HYDROGENATED BUTYL ESTERS OF MALEINATED JOJOBA ACIDS, MET THE MORE STRINGENT REQUIREMENTS OF THE AIRCRAFT INDUSTRY (-55 C).

TEMPERATURE/OIL/ORGANIC COMPOUNDS/PRODUCT DEVELOPMENT

0131

FORE, S.P./MAGNE, F.C./BICKFORD, W.G.

1958

EPOXIDIZED JOJOBA OIL AS A STABILIZER FOR VINYL CHLORIDE CONTAINING PLASTICS.

AMERICAN OIL CHEMISTS SOCIETY, JOURNAL 35(9):469-472.

EPOXIDIZED JOJOBA OIL WAS EVALUATED AS A LIGHT AND HEAT STABILIZER FOR VINYL CHLORIDE CONTAINING PLASTICS AND ITS PROPERTIES. IT ALSO WAS COMPARED WITH THOSE OF OTHER EPOXIDES REPRESENTATIVE OF THREE MAJOR CLASSES OF OXIRANE STABILIZERS. EPOXIDIZED JOJOBA OIL IS A SATISFACTORY THERMAL AND ULTRAVIOLET STABILIZER FOR BOTH TRICRESYL PHOSPHATE (TOP) AND DI-2-ETHYLHEXYL PHTHALATE (DOP) PLASTICIZED STOCKS AND HAS NO ADVERSE EFFECT ON THE PLASTICIZER PROPERTIES OF THESE MATERIALS. IN GENERAL, EPOXIDIZED JOJOBA OIL WAS EQUIVALENT TO OR, IN SOME INSTANCES, SUPERIOR TO THE OTHER EPOXIDES TESTED.

EPOXIDATION/OIL/PRODUCT DEVELOPMENT

0132

FORTI, M. COMP.

1978

EXPERIMENTS IN JOJOBA CULTIVATION IN 1977.

RESEARCH AND DEVELOPMENT AUTHORITY, BEN-GURION UNIVERSITY OF THE NEGEV, BEER-SHEVA, ISRAEL. VARIOUS PAGINGS.

JOJOBA RESEARCH CONDUCTED BY THE RESEARCH AND DEVELOPMENT AUTHORITY, BEN-GURION UNIVERSITY OF THE NEGEV.

AGRONOMY/PROPAGATION/ISRAEL/CHEMICAL STRUCTURE

0133

FORTI, M. COMP.

1979

SIMMONDSIA WAX PRODUCTION IN ISRAEL: CONDENSED ANNUAL REPORT FOR THE PERIOD 1.1.78-31.12.78.

NEGEV JOJOBA COMPANY, TEL AVIV, ISRAEL. 30 P.

SCIENTIFIC ACTIVITIES CARRIED OUT DURING 1978 BY THE SIMMONDSIA RESEARCH PROJECT, RESEARCH AND DEVELOPMENT AUTHORITY, BEN-GURION UNIVERSITY OF THE NEGEV.

AGRONOMY/PROPAGATION/CHEMICAL STRUCTURE/ISRAEL

0134

FORTI, M.

1978

INITIAL RESPONSE OF JOJOBA TO VARIOUS ENVIRONMENTAL AND CULTIVATION CONDITIONS.

PAGES 73-83 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

TO OBTAIN BASIC INFORMATION ON JOJOBA'S RESPONSE TO ENVIRONMENTAL CONDITIONS OF POTENTIAL CULTIVATION AREAS, SEVERAL EXPERIMENTAL PLOTS WERE ESTABLISHED IN DISPERSED LOCATIONS OF THE NEGEV DESERT. NO IRRIGATION WAS APPLIED IN HIGHER RAINFALL AREAS. ESTABLISHMENT WAS EXCELLENT IN HEAVIER SOILS AND IN SAND DUNES. BRACKISH WATER HAD NO DETRIMENTAL EFFECTS WHEN PROPERLY APPLIED. IN THE HOT CLIMATE OF THE DEAD SEA, GROWTH WAS STIMULATED AND PLANTS REACHED EARLY SEXUAL MATURITY.

CLIMATE/CULTIVATION/ISRAEL/WATER USE/SOILS

0135

FORTI, M.

1978

TRENDS IN JOJOBA DOMESTICATION IN ISRAEL.

PAGES 95-96 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA; MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

AN INTERDISCIPLINARY APPROACH WAS ADOPTED FOR INTRODUCING JOJOBA IN ISRAEL. SIMULTANEOUS EFFORTS ARE BEING DIRECTED AT AGRICULTURAL DEVELOPMENT OF THE PLANT AND INVESTIGATING POSSIBLE USES OF ITS WAX.

ISRAEL/CULTIVATION/PRODUCT DEVELOPMENT

0136

FORTI, M.

1973

SIMMONDSIA STUDIES IN ISRAEL.

PAGES 13-25 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

SIMMONDSIA INVESTIGATIONS BEGAN IN 1958 IN ISRAEL. EXPERIMENTS WERE CONDUCTED IN THE NORTHERN NEGEV. SEVEN PLOTS WERE ESTABLISHED, FIVE ARE GROWING SATISFACTORILY. SEED YIELD WAS INFLUENCED BY FACTORS SUCH AS IRRIGATION PRACTICES. THE LARGE AMOUNT OF VARIABILITY IN SIMMONDSIA PROVIDES MATERIAL FOR SELECTION, BUT COULD CAUSE CONFUSION IF CHARACTERISTICS ARE NOT CHECKED. HYBRIDIZATION EXPERIMENTS ARE UNDERWAY; F1 PROGENY HAVE BEEN CROSSED. ROOTING OF UP TO 30 PERCENT WAS OBTAINED IN VEGETATIVE PROPAGATION. PLANTS HAVE BEEN GROWN HYDROPONICALLY IN SALINE WATER TO DETERMINE IF THIS WATER COULD BE USED FOR IRRIGATION. PRELIMINARY CONCLUSIONS FROM 10 YEARS OF EXPERIMENTAL CULTIVATION OF SIMMONDSIA ARE PRESENTED.

ISRAEL/NEGEV DESERT/CULTIVATION/INTRODUCED SPECIES/SEED/IRRIGATION/  
SOIL-WATER-PLANT RELATIONSHIPS/SALINE WATER/SALT TOLERANCE/PLANTING MANAGEMENT/  
GERMINATION/PHENOLOGY/FRUITING/FLOWERING/PLANT GROWTH/ENVIRONMENTAL EFFECTS/  
REPRODUCTION/GENETIC VARIABILITY/GENETICS/BREEDING/SEED YIELD

0137

FOSTER, K.E.

1980

ENVIRONMENTAL EFFECTS OF HARVESTING THE WILD DESERT SHRUB JOJOBA.

DESERT PLANTS 2(2):81-86.

POTENTIAL ENVIRONMENTAL CONSEQUENCES OF REMOVING SEEDS FROM NATIVE STANDS OF JOJOBA INCLUDE: A) A REDUCTION IN NATURAL PLANT PROPAGATION; AND B) REDUCED RESOURCES FOR SEED-EATING RODENTS SUCH AS BAILEY'S POCKET MOUSE (PEROGNATHUS BAILEYI). OVER A FEW YEARS, LITTLE SIGNIFICANT IMPACT ON JOJOBA'S NATURAL REPLACEMENT WILL OCCUR AS A RESULT OF SEED HARVESTS; HOWEVER, SEED HARVESTS BEYOND OR DURING A 20-YEAR PERIOD COULD BE DAMAGING. IT IS NOT LIKELY THAT SOME JOJOBA SEED REMOVAL WOULD RESULT IN LOCAL EXTINCTION OF BAILEY'S POCKET MOUSE.

SEED YIELD/ENVIRONMENTAL EFFECTS/RODENTS/SEED HARVEST

0138

FOSTER, K.E. ET AL

1980

THE DEVELOPMENT OF AN INDIAN RESERVATION-BASED JOJOBA INDUSTRY: FINAL REPORT.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON, AND MIDWEST RESEARCH INSTITUTE, KANSAS CITY, MISSOURI. VARIOUS PAGINGS.

AN EVALUATION WAS MADE OF THE POTENTIAL COMMERCIALIZATION OF JOJOBA AS AN INDIAN RESERVATION-BASED INDUSTRY. THE ECONOMIC, SOCIAL AND ENVIRONMENTAL ASPECTS OF JOJOBA COMMERCIALIZATION WERE ANALYZED.

INDIAN RESERVATIONS/PLANTATION ESTABLISHMENT/ECONOMICS/ENVIRONMENTAL EFFECTS/  
COST ANALYSIS/MARKET DEMAND

0139

FOSTER, K.E. ET AL

1979

IDENTIFICATION OF INDUSTRIAL INCENTIVES TO DEVELOP INDIAN JOJOBA-BASED AGRO-INDUSTRIES AS INFLUENCED BY SOCIOECONOMIC AND TECHNOLOGICAL IMPACTS: ANNUAL REPORT.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON, AND MIDWEST RESEARCH INSTITUTE, KANSAS CITY, MISSOURI. 315 P.

AN ECONOMIC ANALYSIS OF THE COSTS, SEED SUPPLY, EMPLOYMENT AND REVENUE ASSOCIATED WITH CULTIVATING AND HARVESTING JOJOBA SEED. THE ENVIRONMENTAL IMPACTS RESULTING FROM INDIAN JOJOBA INDUSTRY DEVELOPMENT WERE EXAMINED. DEVELOPMENT SCENARIOS INCLUDE HARVESTING NATURAL STANDS AND HARVESTING MANIPULATED NATURAL STANDS. THE REPORT IS BASED ON INFORMATION COMPILED BY THE OFFICE OF ARID LANDS STUDIES, UNIVERSITY OF ARIZONA, TUCSON, AND THE MIDWEST RESEARCH INSTITUTE, KANSAS CITY, MISSOURI.

INDIAN RESERVATIONS/ECONOMICS/COST ANALYSIS

0140

FOSTER, K.E.

1980

ENVIRONMENTAL CONSEQUENCES OF AN INDUSTRY BASED ON HARVESTING THE WILD DESERT SHRUB JOJOBA.

BIOSCIENCE 30 (4):255-258.

THE IMPACTS OF HARVESTING JOJOBA SEEDS FROM WILD POPULATIONS MAY BE UNNOTICED FOR SOME TIME BECAUSE JOJOBA IS A LONG-LIVED SHRUB. BECAUSE OF THE VARIABILITY OF CLIMATIC CONDITIONS THAT FAVOR GERMINATION AND SEEDLING SURVIVAL, IMPACTS COULD BE SERIOUS ONE YEAR AND OF NO CONSEQUENCE ANOTHER YEAR. IT IS IMPOSSIBLE TO PREDICT WHETHER SEED HARVESTS WILL REDUCE THE GERMINATION CAPABILITY OR SEEDLING SURVIVAL OF NATIVE JOJOBA POPULATIONS.

SEED HARVEST/NATIVE POPULATIONS/CLIMATE

0141

FOSTER, K.E./ANDERSON, N.

1979

THE SAN CARLOS JOJOBA PROJECT.

PAGES 51-62 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE EXTRAORDINARY INTEREST GENERATED BY THE ECONOMIC POTENTIAL OF JOJOBA CAN BE TRACED TO THE SAN CARLOS APACHE INDIAN TRIBE OF ARIZONA, AND THEIR ENDEAVORS TO CREATE A SUCCESSFUL JOJOBA AGRO-INDUSTRY. JOJOBA ACTIVITIES, SUPPORTED BY VARIOUS FEDERAL AGENCIES SINCE 1972, ARE REVIEWED CHRONOLOGICALLY.

INDIAN RESERVATIONS/ECONOMICS

0142

FOSTER, K.E./WRIGHT, N.G.

1980

JOJOBA: AN ALTERNATIVE TO THE CONFLICT BETWEEN AGRICULTURAL AND MUNICIPAL GROUND-WATER REQUIREMENTS IN THE TUCSON AREA, ARIZONA.

GROUND WATER 18(1):31-36.

A POSSIBLE ALTERNATIVE TO RETIRING FARMLANDS AND TO CULTIVATING CROPS THAT REQUIRE HEAVY IRRIGATION IS CULTIVATING ARID-ADAPTED VEGETATION THAT HAS ECONOMIC POTENTIAL. IF FARMERS IN THE TUCSON BASIN, ARIZONA, CULTIVATED JOJOBA, WATER USE COULD BE REDUCED BY ABOUT 2.5 ACRE FEET PER YEAR (AFY) PER ACRE, FROM 4 AFY PER ACRE FOR TRADITIONAL CROPS TO 1.5 AFY FOR JOJOBA. EVEN IF THE CITY OF TUCSON SUBSIDIZED FARMERS AT A RATE OF 40 DOLLARS PER ACRE FOR THE 10 YEARS IT TAKES JOJOBA TO PRODUCE ECONOMICALLY FEASIBLE YIELDS, TUCSON WOULD SAVE MORE THAN 50 PERCENT OF THE COST TO PURCHASE AND RETIRE FARMLANDS AND COULD STILL DRAW WATER FROM THE BASIN FOR MUNICIPAL USES.

LAND USE/ARIZONA/WATER USE

0143

FOSTER, K.E./WRIGHT, N.G.

1980

CONSTRAINTS TO ARIZONA AGRICULTURE AND POSSIBLE ALTERNATIVES.

JOURNAL OF ARID ENVIRONMENTS 3:85-94.

GROUNDWATER IN ARIZONA BELONGS TO THE OWNER OF THE LAND OVERLYING THE AQUIFER. TO ENSURE ADEQUATE MUNICIPAL GROUNDWATER SUPPLIES, THE CITY OF TUCSON HAS BEEN PURCHASING AND RETIRING FARMLANDS. WHILE THIS IS AN EFFECTIVE TECHNIQUE FOR OBTAINING WATER RIGHTS, IT HAS A SIGNIFICANT IMPACT ON THE ECONOMY OF THE AREA. A POSSIBLE ALTERNATIVE TO RETIRING FARMLANDS AND TO CULTIVATING HIGH-WATER-USE CROPS IS THE CULTIVATION OF ARID-ADAPTED VEGETATION WITH ECONOMIC POTENTIAL SUCH AS JOJOBA. WATER REQUIREMENTS FOR JOJOBA PRODUCTION ARE APPROXIMATELY 4,600 SQUARE METERS PER HECTARE COMPARED WITH AVERAGE REQUIREMENTS OF 12,315 SQUARE METERS PER HECTARE OR MORE.

ARIZONA/LAND USE/WATER USE/COST ANALYSIS

0144

FURONITO SANGYO, K.K.

1982

IMPROVED BIOAVAILABILITY OF UBIDECARENONE ANALOGS.

JAPAN KOKAI TOKYO KOHO JP 82 04,916, JANUARY 11, 1982.

DRUGS WITH ISOPRENOID SIDE CHAINS, SUCH AS UBIDECARENONE, MENATETRENONE, AND TOCOPHEROL NICOTINATE, ARE DISSOLVED IN NONHYDROPHILIC ORGANIC SOLVENTS AND ARE EMULSIFIED IN WATER IN THE PRESENCE OF SOLVENTS WITH HIGH-MOLECULAR-WEIGHT SUBSTANCES, SUCH AS GUM ARABIC. THE PRODUCT IS SOLVENT IN WATER AND IS EASILY ABSORBED BY THE DIGESTIVE TRACT. TEN GRAMS OF UBIDECARENONE WERE DISSOLVED IN 10 GRAMS OF JOJOBA OIL AND WERE ADDED TO 300 MILLILITERS OF WATER CONTAINING 30 GRAMS OF GUM ARABIC AND 15 GRAMS OF LACTOSE TO FORM AN EMULSION.

PATENTS/OIL/DIGESTION/PRODUCT DEVELOPMENT

0145

GAIL, P.A.

1964

SIMMONDSIA CHINENSIS (LINK) SCHNEIDER: ANATOMY AND MORPHOLOGY OF FLOWERS.

CLAREMONT COLLEGE, CLAREMONT, CALIFORNIA. M.A. THESIS, 40 P.

FLORAL ORGANOGRAPHY, VASCULAR ANATOMY AND HISTOLOGY ARE DESCRIBED FROM OBSERVATIONS ON TRANSVERSE AND LONGITUDINAL SECTIONS AND ALSO CLEARED RECEPTACLES AND TEPALS. JOJOBA IS A RELATIVELY HIGHLY SPECIALIZED TAXON WITH MANY SIMILARITIES, ANATOMICALLY AND MORPHOLOGICALLY, TO BUXACEAE. THOSE TRAITS IN WHICH DIFFERENCES ARE NOTED CAN BE LARGELY ATTRIBUTED TO SPECIALIZATION OF THE GENUS EITHER FOR ITS XERIC HABITAT OR FOR ITS RECENTLY ACQUIRED WIND-POLLINATED HABIT. SIMMONDSIA SEEMS EVOLUTIONARILY YOUNG, JUDGING FROM ITS LARGE DEGREE OF HETEROZYGOSITY AND VARIATION BETWEEN POPULATIONS. IT IS PROBABLY UNDERGOING INTENSIVE SPECIATION AND RANGE EXTENSION. FOR NOW, SIMILARITIES TO CENTROSPERMAE MUST BE ATTRIBUTED TO CONVERGENCE.

EVOLUTION/SYSTEMATICS/PLANT MORPHOLOGY/POLLEN/POLLINATION/FLOWERING/INSECTS/  
REPRODUCTION/PHENOLOGY/SEED/SEED YIELD/ADAPTATION/GENETICS/BUXACEAE/  
GENETIC VARIABILITY

0146

GENTRY, H.S.

1955

APOMIXIS IN BLACK PEPPER AND JOJOBA.

JOURNAL OF HEREDITY 46(1):8.

NO POLLINATING AGENTS, SUCH AS INSECTS OR BIRDS, ARE KNOWN FOR SIMMONDSIA CHINENSIS. THE POLLEN IS COARSE AND HEAVY, NOT OF THE WIND-BORNE TYPE. ISOLATE PISTILLATE PLANTS FRUIT FREELY EVEN WITH THE NEAREST STAMINATE PLANTS AS MUCH AS 2 OR 3 MILES AWAY. UNISEXUAL FLOWERS MIGHT DEVELOP NORMAL FRUITS QUITE IRRESPECTIVE OF POLLINATION.

FLOWERING/POLLINATION/SEED YIELD/REPRODUCTION/PHENOLOGY

0147

GENTRY, H.S.

1958

THE NATURAL HISTORY OF JOJOBA (SIMMONDSIA CHINENSIS) AND ITS CULTURAL ASPECTS.

ECONOMIC BOTANY 12(3):261-295.

JOJOBA IS AN ENDEMIC PLANT OF THE SONORAN DESERT. IT PREFERS WELL-DRAINED, COARSE, DESERT SOILS AND ANNUAL PRECIPITATION OF 12 INCHES OR MORE. PLANT ASSOCIATES AND GROWTH FORM VARY WITH CONDITIONS. A MICROLEPIDOPTERON IS THE ONLY SERIOUS PEST KNOWN. SEEDS ARE UTILIZED BY RODENTS. THE SEASONAL CYCLE OF GROWTH, FLOWERING AND FRUITING CHANGES SLIGHTLY FROM LOCATION TO LOCATION AND FROM YEAR TO YEAR. GROWTH IS ALMOST ENTIRELY IN RESPONSE TO WINTER AND SPRING RAINS. VARIABLE CHARACTERS ARE DISCUSSED IN RELATION TO CULTIVATION PRACTICES FOR SEED OIL PRODUCTION. CHARACTERISTICS OF HABIT, ROOTS, LEAVES, FLOWERS, CAPSULES, AND SEEDS COULD BE SUBJECTED TO SELECTION. THE SEED YIELD PER PLANT IS COMPARED IN WILD AND CULTIVATED POPULATIONS OF KNOWN AGES. JOJOBA'S FUTURE AS A CULTIVATE IS CONSIDERED IN RELATION TO PROPAGATION, FIELD PRACTICES, SPACING, PRUNING AND HARVESTING.

SONORAN DESERT/ADAPTATION/PLANT ECOLOGY/NATURAL HISTORY/PHENOLOGY/ROOTS/  
FLOWERING/SEED/REPRODUCTION/LEAVES/COMPETITION/PESTS/INSECTS/RODENTS/  
PRECIPITATION/BREEDING/PLANT GROWTH/PLANT MORPHOLOGY/SEED YIELD/WILDLIFE/  
CULTIVATION/MICROENVIRONMENT/PLANTING MANAGEMENT/BURNING/GENETIC VARIABILITY/  
DISEASES/MAPS

0148

GENTRY, H.S.

1965

A DESERT BOXWOOD STILL IN THE DESERT.

BOXWOOD JOURNAL 5:32-36.

THE CONSENSUS OF MODERN OPINION RETAINS THE GENUS SIMMONDSIA IN THE FAMILY BUXACEAE, INSTEAD OF CREATING A MONOTYPIC FAMILY SIMMONDSIACEAE. A PREVIOUS CONCLUSION THAT JOJOBA WAS APOMIC TIC WAS REVISED; POLLEN IS PROBABLY WIND-BORNE. AS A PROSPECTIVE ORNAMENTAL, SOME OF ITS FEATURES AND VARIABLE CHARACTERS ARE DESCRIBED: POPULATIONS AT ARIZONA (CAMP CREEK, TUCSON MOUNTAINS) AND BAJA CALIFORNIA (SANTA MARGA, SANTO TOMAS, SAN TELMO, UPPER SAN TELMO VALLEY). NOTES ARE GIVEN FOR GERMINATION, CUTTINGS AND SEEDLING CARE.

BAJA CALIFORNIA/ARIZONA/PLANTING MANAGEMENT/TEMPERATURE/PLANT INJURY/  
REPRODUCTION/POLLINATION/GERMINATION/CULTIVATION/SYSTEMATICS/GENETICS/  
SEEDLINGS/ORNAMENTAL USE/GENETIC VARIABILITY/BUXACEAE/MEXICO/NATIVE POPULATIONS

0149

GENTRY, H.S.

1972

PLANT A SEED AND SAVE A WHALE.

SAGUAROLAND BULLETIN 26:44-47.

THE ENDANGERED SPECIES STATUS OF SPERM WHALES HAS FORCED INDUSTRY TO SEARCH FOR ANOTHER SOURCE TO SUBSTITUTE FOR THE 55 MILLION POUNDS OF WHALE OIL ANNUALLY USED IN THE UNITED STATES. THREE POSSIBILITIES ARE JOJOBA (SIMMONDSIA CHINENSIS), MEADOWFOAMS (LYMANANTHES SP.), AND CRAMBE ABYSSINICA. RECENT DEVELOPMENTS WITH JOJOBA IN ISRAEL AND THE U.S. SOUTHWEST ARE DISCUSSED. ONE PROGRAM IN ARIZONA COULD HELP MEET THE NEEDS OF INDUSTRY, OF WHALE CONSERVATION, AND OF INDIAN WELFARE. HORTICULTURAL DEVELOPMENT IS PRESENTLY IN AN EXPERIMENTAL STAGE.

PLANT USES/OIL/ECONOMIC DEVELOPMENT/CONSERVATION/MAMMALS/CULTIVATION/ARIZONA/  
SOCIAL ASPECTS/SPERM WHALE OIL/ISRAEL/INDIANS OF NORTH AMERICA

0150

GENTRY, H.S.

1973

SUPPLEMENT TO THE NATURAL HISTORY OF JOJOBA.

PAGES 11-12 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES:  
AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID  
LANDS STUDIES, TUCSON. 81 P.

JOJOBA, FAMILY BUXACEAE, IS A REGIONAL ENDEMIC OF THE SONORAN DESERT CAPABLE OF RESISTING DROUGHTS OF ONE TO TWO YEARS BY RELAPSING INTO LEAFLESS DORMANCY. JOJOBA HAS PREVIOUSLY BEEN LABELED A PALECEMIC, BUT IS ABSENT IN COAHUILA. JOJOBA IS AN IMPORTANT BROWSE FOR HERBIVOROUS MAMMALS. GRAZING PRESSURE DURING THE PLEISTOCENE MAY HAVE SOMETHING TO DO WITH THE PRESENT DAY DISTRIBUTION OF THE SHRUB. JOJOBA COULD HAVE SURVIVED IN AREAS TOO DRY FOR MOST LARGE MAMMALS. JOJOBA COULD BECOME A SUCCESSFUL CULTIVATE.

NATURAL HISTORY/PHYTOGEOGRAPHY/PLANT DISTRIBUTION/SONORAN DESERT/RELICT VEGETATION/PLEISTOCENE EPOCH/DROUGHT TOLERANCE/WILDLIFE/MAMMALS/CULTIVATION/GENETICS/FORAGE/GENETIC VARIABILITY

0151

GENTRY, H.S./MCGILL, L.A.

1979

JOJOBA SURVEY AND GERM PLASM COLLECTION -- 1977.

PAGES 63-70 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

A LIMITED BUT DETAILED SURVEY OF NATIVE JOJOBA POPULATIONS WAS CONDUCTED THROUGH CENTRAL ARIZONA BY THE BUREAU OF INDIAN AFFAIRS FROM APRIL TO SEPTEMBER 1977. SPECIAL ATTENTION WAS GIVEN TO LOCATING POPULATIONS ON SITES AMENABLE TO IMPROVEMENTS BY CLEARING, INCREASED RAIN WATER FEEDING AND ACCESSIBILITY. IN CONJUNCTION WITH THE SURVEY, A GERM PLASM COLLECTION OF SEEDS WAS MADE. OF 194 DOCUMENTED COLLECTIONS, 136 WERE SEED SELECTIONS OF INDIVIDUAL SHRUBS, 58 WERE COMPOSITE POPULATION SEED SAMPLES. THESE COLLECTIONS ARE REGARDED AS GENETIC MATERIALS TO BE USED BY PLANT BREEDERS ENGAGED IN THE INDIAN JOJOBA DEVELOPMENT PROGRAM. A DUPLICATE SET OF THESE SEEDS WILL BE DEPOSITED IN THE USDA NATIONAL SEED BANK FOR FUTURE RESEARCH NEEDS. THE 1977 SEED PRODUCTION OF THE WILD PLANTS WAS SEVERELY LIMITED IN DEVELOPMENT BY THE DRY CONDITIONS PREVAILING DURING THE 12 MONTHS PRECEDING SEED MATURATION.

NATIVE POPULATIONS/SEED/GERM PLASM/USDA NATIONAL SEED BANK

0152

GIBSON, F.

1938

SIMMONDSIA CALIFORNICA NUTTAL IS DIOECIOUS.

BOYCE THOMPSON INSTITUTE, CONTRIBUTIONS 10:45-46.

THE SEX RATIO OF JOJOBA IN NATURE APPEARED BALANCED. CONFUSION ABOUT THE STRICT DIOECIOUS HABIT MIGHT HAVE RESULTED FROM TWO OPPOSITE SEXED PLANTS GROWING TOGETHER. THIS EVIDENCE OF DIOECISM WOULD BE IMPORTANT TO THOSE CONTEMPLATING SEED PRODUCTION ON PLANTATIONS.

SEED/FLOWERING/PHENOLOGY/REPRODUCTION/PLANTING MANAGEMENT/DIOECISM



0153

GISSER, H./MESSINA, J./CHASAN, D.

1975

JOJOBA OIL AS A SPERM OIL SUBSTITUTE.

WEAR 34(1):53-63.

LABORATORY EVALUATIONS OF THE EXTREME PRESSURE AND ANTIWEAR PROPERTIES OF SULFURIZED JOJOBA AND SPERM WHALE OILS INDICATE ALMOST EQUIVALENT PERFORMANCE CAPABILITIES. SHOP DRILLING AND TAPPING OPERATIONS CONFIRM THAT SULFURIZED JOJOBA OIL WILL PERFORM AS WELL AS SULFURIZED SPERM WHALE OIL IN PRACTICAL APPLICATIONS. SULFURIZED JOJOBA OIL COULD SERVE AS AN ADEQUATE REPLACEMENT FOR SULFURIZED SPERM WHALE OIL IN MANY LUBRICATION APPLICATIONS.

OIL/LUBRICANTS/SULFURIZED JOJOBA OIL/SPERM WHALE OIL/PRODUCT DEVELOPMENT

0154

GLAT, D./DOBRENZ, A.K./PALZKILL, D.A.

1981

STOMATAL CHARACTERISTICS OF JOJOBA, SIMMONDSIA CHINENSIS (LINK) SCHNEIDER.

DESERT PLANTS 3(3):153-155.

JOJOBA STOMATA POSSESS CHARACTERISTICS THAT FAVOR WATER CONSERVATION. GUARD CELLS ARE SUNKEN BELOW THE EPIDERMAL LAYER AND CAN HAVE A PROTECTIVE COLLAR OF WAX. SIGNIFICANT DIFFERENCES IN STOMATA DENSITIES EXIST BETWEEN JOJOBA CLONES AND INDIVIDUAL SEEDLINGS. FURTHER STUDIES ARE NECESSARY TO DETERMINE IF A DECREASE IN STOMATA WOULD INCREASE YIELDS OR WATER USE EFFICIENCY. IF SO, USE OF JOJOBA CLONES WITH STOMATA DENSITY COULD RESULT IN PLANTS BETTER ADAPTED TO LOW-WATER-USING AGRICULTURE.

STOMATA/WATER USE/PROGENY

0155

GOBIERNO DEL ESTADO DE BAJA CALIFORNIA

1978

LA JOJOBA EN BAJA CALIFORNIA NORTE (JOJOBA IN BAJA CALIFORNIA NORTE, IN SPANISH).

PAGES 11-23 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

MAIN ASPECTS OF JOJOBA COMMERCIALIZING BY THE GOVERNMENT OF THE STATE OF BAJA CALIFORNIA NORTE, MEXICO, LA COMISION NACIONAL DE LAS ZONAS ARIDAS AND EL PROGRAMA DE INVESTIGACIONES PUBLICAS PARA EL DESARROLLO RURAL ARE REPORTED. RESEARCH UNDERTAKEN BY EL PROGRAMA DE APROVECHAMIENTO DEL RECURSO SILVESTRE IN 'LA HUERTA' EXPERIMENTAL JOJOBA FIELD ARE DESCRIBED.

BAJA CALIFORNIA/PLANTATION ESTABLISHMENT/CULTIVATION/MEXICO

0156

GONZALEZ G., V./CAMPOS L., E.

1979

THERMAL PROPERTIES OF JOJOBA WAX. II. OXIDATION BEHAVIOR BY DIFFERENTIAL SCANNING CALORIMETRY.

JOURNAL OF THERMAL ANALYSIS 17(1):151-158.

THE EXOTHERM CORRESPONDING TO THE OXIDATION OF JOJOBA WAX BEGINS AT 433 K AND HAS A MAXIMUM AT 533 K. TWO THERMOOXIDATION STEPS ARE INDICATED BY THE EXOTHERM. THE THERMOOXIDATION ENTHALPY IS 1,434 TO 1,456 CALORIES/GRAM. THE OXIDATION BEGINS AT 156.6 DEGREES AND 198.3 DEGREES AT HEATING RATES OF 2 DEGREES/MINUTE AND 50 DEGREES/MINUTE, RESPECTIVELY. THE THERMO-OXIDATION ACTIVATION ENERGY IS 21.84 KILOCALORIES/MOLE. THE OXIDATION ENTHALPIES ARE CALCULATED AND A LINEAR RELATION IS OBSERVED BETWEEN THE SQUARE ROOT OF THE HEATING RATE AND THE INITIAL OXIDATION REACTION TEMPERATURE.

THERMIC BEHAVIOR/CHEMICAL REACTIONS/OXIDATION/OIL

0157

GONZALEZ G., V./VALERO D., R.O./CAMPOS L., E.

1979

THERMAL PROPERTIES OF JOJOBA WAX. I. CRYSTALLIZATION BEHAVIOR.

JOURNAL OF THERMAL ANALYSIS 15(2):315-323.

THE THERMAL BEHAVIOR OF JOJOBA WAX WAS DETERMINED BY DIFFERENTIAL SCANNING CALORIMETRY. THE WAX PRESENTS FOUR ENDOTHERMAL TRANSITIONS AT LOW HEATING RATES IN ANNEALING TIMES. ACTIVATION ENERGIES ARE 64.8 AND 51.1 KCAL/MOL, RESPECTIVELY, FOR THE GAMMA AND ALPHA TRANSITIONS.

CHEMICAL STRUCTURE/THERMAL PROPERTIES/OIL/TEMPERATURE

0158

GONZALEZ V., F.J.

1982

IDENTIFICACION DE LA POBLACION DE INSECTOS ASOCIADOS EN PLANTAS DE JOJOBA BAJO CONDICIONES DE CULTIVO EN LA COSTA DE HERMOSILLO, SONORA, 1979 (3ER ANO) (IDENTIFICATION OF INSECTS ASSOCIATED WITH CULTIVATED JOJOBA PLANTS ON THE COAST OF HERMOSILLO, SONORA, 1979 (3RD YEAR)).

PAGES 385-388 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

INSECT POPULATIONS ASSOCIATED WITH JOJOBA WERE EXAMINED. THIRTEEN FAMILIES AND 23 GENERA WERE IDENTIFIED. HEMIPTERA, COLEOPTERA, HOMOPTERA, NEUROPTERA AND ARANEIDA WERE THE MAJOR ORDERS FOUND. THE MOST DAMAGING SPECIES WAS THE CICADA, HOMALODISCA LACERTA, WHICH IN CERTAIN SEASONS REQUIRED CHEMICAL CONTROL. BENEFICIAL ENTOMOFAUNA ORDERS INCLUDED HEMIPTERA, COLEOPTERA, NEUROPTERA AND ARANEIDA. PARASITIC WASPS FROM THE PTEROMALIDAE, CHALCIDIDAE AND PERILAMPIDAE FAMILIES ALSO WERE COLLECTED.

MEXICO/PESTS/INSECTS/SONORA

0159

GONZALEZ, V./AREGULLIN, M./GARCIA, J.

1978

ESTUDIO CALORIMETRICO DEL COMPORTAMIENTO TERMICO DE LA CERA DE JOJOBA  
(CALORIMETRIC STUDY OF THE THERMAL BEHAVIOR OF JOJOBA OIL, IN SPANISH).

PAGES 103-111 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS  
DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO,  
ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO  
NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS,  
CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

THROUGH CALORIMETRY SWEEPING DIFFERENTIAL, THE THERMIC BEHAVIOR OF  
JOJOBA OIL WAS STUDIED AND THERMODYNAMIC PARAMETERS SUCH AS THERMAL CAPACITY,  
THE ENTHALPIC CONTENTS OF ITS TRANSITIONS AND THERMAL AND THERMO-OXIDATIVE  
STABILITY WERE DETERMINED.

OIL/CHEMICAL REACTIONS/THERMIC BEHAVIOR/CALORIMETRY

0160

GREEN, T.G./HILDITCH, T.P./STAINSBY, W.J.

1936

THE SEED WAX OF SIMMONDSIA CALIFORNICA.

CHEMICAL SOCIETY, JOURNAL (2):1750-1755.

THE FATTY MATTER PRESENT IN JOJOBA SEEDS IS A MIXTURE OF WAX ESTERS, AND NOT  
GLYCERIDES. THE ACID AND ALCOHOL COMPONENTS OF THE SEED-WAX ARE UNUSUAL. THE  
CHIEF ACID IS DELTA 11:12-EICOSENOIC, PROBABLY ACCOMPANIED BY SMALL QUANTITIES  
OF A HIGHER (POSSIBLY DOCOSENOIC) ACID AND OF OLEIC AND PALMITIC ACIDS. THE  
AMOUNT OF THE LATTER TWO ACIDS IS UNUSUALLY SMALL. A MIXTURE OF CARBON SUB 20  
AND CARBON SUB 22 UNSATURATED ALCOHOLS FORMS THE ALKYL PORTION OF THE WAX  
ESTERS. JOJOBA PRESENTS CERTAIN MORPHOLOGICAL ANOMALIES IN THE SEED. ALSO,  
THE CHEMICAL NATURE OF THE FATTY MATTER IS ABNORMAL BOTH IN ITS GENERAL  
CHARACTER OF A WAX-ESTER AND IN THE CONSTITUTION OF THE COMPONENT ACIDS AND  
ALCOHOLS OF THE SEED WAX.

OIL/SEED/LIPIDS/ALCOHOLS/ORGANIC COMPOUNDS/ACIDS/ESTERS/CHEMICAL STRUCTURE

0161

GREENE, R.A./FOSTER, E.O.

1933

THE LIQUID WAX OF SEEDS OF SIMMONDSIA CALIFORNICA.

BOTANICAL GAZETTE 94(4):826-828.

WITH THE EXCEPTION OF THE SAPONIFICATION VALUE, THE CONSTANTS OF JOJOBA OIL  
ARE PRACTICALLY IDENTICAL WITH THOSE OF SPERM WHALE AND ARCTIC SPERM WHALE  
OILS. JOJOBA OIL SOLIDIFIES AT 10 C TO 12 C. QUALITATIVE TESTS INDICATE THAT  
THE WAX MIGHT CONSIST PRINCIPALLY OF FATTY ACID ESTERS OF DECYL ALCOHOL.

OIL/SPERM WHALE OIL/ESTERS/ALCOHOLS/CHEMICAL STRUCTURE

0162

HAAG, W.O./RODEWALD, P.G./WEISZ, P.B.

1980

CATALYTIC PRODUCTION OF AROMATICS AND OLEFINS FROM PLANT MATERIALS.

AMERICAN CHEMICAL SOCIETY, PREPRINT 25(3):650-656.

AROMATIC HYDROCARBONS AND OLEFINS ARE PREPARED BY CATALYTIC PROCESSING OF CORN, CASTOR, JOJOBA AND COPAIBA OILS, NATURAL RUBBER LATEX, A CH SUB 2 CL SUB 2 EXTRACT OF GRINDELIA SQUARROSA, AND AN ACETONE EXTRACT OF EUPHORBIA LATHYRIS.

EXTRACTS/CHEMICAL STRUCTURE/OIL/HYDROCARBONS/OLEFINS

0163

HAASE, E.F.

1975

JOJOBA -- A NATIVE PLANT OF THE SONORAN DESERT.

UNIVERSITY OF ARIZONA, TUCSON. ARIZONA EXECUTIVE OFFICE TECHNICAL BRIEFING NOTE 75-9. 2 P.

INDUSTRIES BASED ON JOJOBA ARE BEING ESTABLISHED BY THE FEDERAL GOVERNMENT ON INDIAN RESERVATIONS.

INDIAN RESERVATIONS/ARIZONA

0164

HAASE, E.F.

1978

PHENOLOGY OF SOME NATIVE JOJOBA POPULATIONS IN ARIZONA.

PAGES 39-47 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

PHENOLOGICAL DATA, INCLUDING VEGETATIVE GROWTH, FLORAL BUD DEVELOPMENT, FLOWERING, FRUITING AND SEED PRODUCTION, WERE OBTAINED FROM THREE JOJOBA POPULATION SITES IN SOUTHERN ARIZONA. SEED PRODUCTION, VEGETATIVE GROWTH AND DEVELOPMENT WERE RELATED TO PERIODS OF SIGNIFICANT RAINFALL.

PHENOLOGY/ARIZONA/SEED/WATER USE/FLOWERING/PLANT GROWTH/PRECIPITATION

0165

HAASE, E.F.

1973

RESEARCH NEEDS FOR NATIVE PLANTS.

PAGES 37-38 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

THREE GENERAL GOALS ARE SUGGESTED FOR A COMPREHENSIVE FIELD RESEARCH PROGRAM:  
1) TO IDENTIFY, MONITOR AND DOCUMENT CLIMATIC PHENOMENA IN JOJOBA THROUGHOUT  
ITS DISTRIBUTIONAL RANGE; 2) TO ESTABLISH A JOJOBA PLANT MATERIAL AND  
INFORMATION BANK; AND 3) TO MANIPULATE NATIVE POPULATIONS TO ENHANCE SEED  
PRODUCTION.

NATURAL HISTORY/PHEENOLOGY/GENETIC VARIABILITY/ENVIRONMENTAL EFFECTS/  
MICROENVIRONMENT/GENETICS/IRRIGATION/CULTIVATION/PLANTING MANAGEMENT

0166

HAASE, E.F./MCGINNIES, W.G., EDS.

1973

JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972.

OFFICE OF ARID LANDS STUDIES, UNIVERSITY OF ARIZONA, TUCSON. 81 P.

PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE AND ITS USES HELD JUNE 1-  
3, 1972, IN TUCSON, ARIZONA.

INDIANS OF NORTH AMERICA/ECONOMIC DEVELOPMENT/OIL/SEED/NATURAL HISTORY

0167

HAGEMANN, J.W./ROTHFUS, J.A.

1979

OXIDATIVE STABILITY OF WAX ESTERS BY THERMOGRAVIMETRIC ANALYSIS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 56(6):629-631.

RELATIVE OXIDATIVE STABILITIES OF SPERM WHALE OIL AND EIGHT WAX ESTER  
PREPARATIONS (FROM CRAMBE ABYSSINICA, LIMNANTHES DOUGLASSI, JOJOBA AND OTHERS)  
WERE DETERMINED BY COMPARING OXYGEN UPTAKE PROFILES THAT HAD BEEN CORRECTED  
FOR ESTER VOLATILITY. WAX ESTERS WITH UNSATURATION NEAR THE ESTER BOND, EVEN  
THOUGH MORE VOLATILE, ARE AS STABLE TOWARD OXIDATION AS THOSE WITH DOUBLE BONDS  
NEAR THE CENTER OF EACH ALIPHATIC CHAIN.

SPERM WHALE OIL/ESTERS/CHEMICAL STRUCTURE

0168

HAMILTON, R.J. ET AL

1978

COMPARISON OF SPERM-WHALE OIL AND JOJOBA WAX.

PAGES 171-186 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS  
DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO,  
ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO  
NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS,  
CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

THE MATERIAL REMAINING AFTER JOJOBA WAX HAS BEEN COOLED TO 7 C HAS  
BEEN SEPARATED AND ITS COMPOSITION COMPARED WITH THAT OBTAINED BY SIMILAR  
TREATMENT OF SPERM WHALE OIL. THE FOUR FRACTIONS HAVE BEEN ANALYZED BY GAS  
LIQUID CHROMATOGRAPHY FOR INTACT WAX ESTER AND TRIGLYCERIDES AND THE  
DERIVED FATTY ACID AND ALCOHOLS. PRELIMINARY RESULTS CONFIRMED THAT THE  
MAJOR CONSTITUENTS OF JOJOBA WAX ARE SIMILAR TO SPERM WHALE OIL.

ESTERS/FATTY ACIDS/ALCOHOLS/GAS LIQUID CHROMATOGRAPHY/OIL/SPERM WHALE OIL

0169

HAMILTON, R.J./RAIE, M.Y./MIWA, T.K.

1975

STRUCTURE OF THE ALCOHOLS DERIVED FROM WAX ESTERS IN JOJOBA OIL.

CHEMISTRY AND PHYSICS OF LIPIDS 14(1):92-96.

THE MONOUNSATURATED C SUB 18-C SUB 24 ALCOHOLS OBTAINED BY SAPONIFICATION OF THE WAX ESTERS OF JOJOBA OIL WERE SEPARATED AND THE DOUBLE BOND POSITIONAL ISOMERS WERE DETERMINED BY A MODIFIED VON RUDLOFF OXIDATION TECHNIQUE. THE MAJOR HOMOLOGUE OF EACH CHAIN LENGTH HAS THE DOUBLE BOND AT THE OMEGA-9 POSITION SUGGESTING A CLOSE BIOGENETIC RELATIONSHIP BETWEEN THESE MAJOR COMPONENTS. THE RELATIONSHIP IS MUCH LESS APPARENT IN THE MINOR COMPONENTS.

CHEMICAL STRUCTURE/ESTERS/OIL

0170

HINDS, W.E.

1949

PENICILLIN PRODUCT.

U.S. PATENT 2,487,336, NOVEMBER 8, 1949.

A STABLE, NON-TOXIC, PROTECTIVE CARRIER FOR PENICILLIN, WHICH CAN BE ADMINISTERED EITHER ORALLY OR HYPODERMICALLY, SHOULD PROTECT THE PENICILLIN FROM THE DESTRUCTIVE AND INACTIVATING ACTION OF THE STOMACH FLUIDS. IT SHOULD ALSO FACILITATE THE TRANSMISSION OF THE PENICILLIN TO THE SMALL INTESTINE WHERE IT CAN BE MORE READILY ASSIMILATED INTO THE SYSTEM, UPON HYPODERMIC INJECTION THE PRODUCT SHOULD BE READILY ABSORBED INTO THE BLOODSTREAM WITHOUT UNDUE DAMAGE TO THE TISSUE. JOJOBA OIL, EITHER IN ITS LIQUID WAX STATE OR HYDROGENATED FORM, PROVIDES A SUITABLE CARRIER OF PENICILLIN AND MAY BE COMBINED WITH OTHER COMPOUNDS. THE PATENT COVERS OTHER NATURAL OR SYNTHETIC LIQUID WAXES.

PATENTS/MEDICINAL USES/OIL/PRODUCT DEVELOPMENT

0171

HIRANO, S. ET AL

1977

BATH PREPARATIONS CONTAINING JOJOBA OIL OR HYDROGENATED JOJOBA OIL

JAPAN KOKAI 77 64,415, MAY 27, 1977.

THIS JAPANESE PATENT DESCRIBES BATH PREPARATIONS CONTAINING JOJOBA OIL OR HYDROGENATED OIL.

PATENTS/COSMETICS/PRODUCT DEVELOPMENT/HYDROGENATED OIL

0172

HODGE, W.H.

1961

JOJOBA--AN OVERLOOKED ORNAMENTAL SHRUB OF THE ARID SOUTHWEST.

AMERICAN HORTICULTURAL MAGAZINE 40(4):346-347.

JOJOBA HAS GREAT POTENTIAL AS AN ORNAMENTAL PLANT. THE LOW GROWTH FORM SHOULD FIT IN WELL WITH RANCH-TYPE HOMES THAT ARE SO WIDESPREAD IN THE SOUTHWEST. THE DROUGHT-RESISTANT NATURE OF THE PLANT INDICATES THAT IT SHOULD THRIVE WITH A MINIMUM OF WATERING.

ORNAMENTAL USE/DROUGHT TOLERANCE

0173

HOGAN, L.

1979

SITE SELECTION FOR JOJOBA.

JOJOBA HAPPENINGS 29:1-5.

TEMPERATURE, MOISTURE, SOIL AND PREVAILING WIND DIRECTION SHOULD BE CONSIDERED WHEN SELECTING A PLANTING SITE FOR JOJOBA.

SITE SELECTION/TEMPERATURE/WATER USE/IRRIGATION/SOILS/POLLINATION

0174

HOGAN, L.

1979

JOJOBA: A NEW CROP FOR ARID REGIONS.

PAGES 177-205 IN G.A. RITCHIE, ED., NEW AGRICULTURAL CROPS: AAAS SELECTED SYMPOSIUM. WESTVIEW PRESS, BOULDER. 259 P.

DATA COMPILED BY THE UNIVERSITY OF ARIZONA'S COLLEGE OF AGRICULTURE.

CHEMICAL STRUCTURE/CLIMATE/SOILS/GERM PLASM/NATIVE POPULATIONS/FERTILIZERS/PLANTATION ESTABLISHMENT/DISEASES/PESTS/WEED CONTROL/SEED YIELD/SEED HARVEST

0175

HOGAN, L. ET AL

1979

RECENT PROGRAMS IN THE PROPAGATION OF JOJOBA BY STEM CUTTINGS.

PAGES 1-4 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

IF JOJOBA IS TO BECOME AN IMPORTANT CULTIVATED CROP, METHODS OF VEGETATIVE PROPAGATION ARE DESIRABLE TO OBTAIN MAXIMUM SEED YIELDS AND TO REDUCE THE NUMBER OF PLANTS THAT MUST BE GROWN TO OBTAIN A SUITABLE SEX RATIO. PROBLEMS

IN VEGETATIVE PROPAGATION INCLUDE: 1) DIFFERENCES IN ROOTING PERCENTAGES AMONG WILD PLANTS; 2) FOLIAR AND STEM DISEASES; 3) PLAGIOTROPISM IN CUTTINGS TAKEN FROM SIDE SHOOTS; 4) POOR QUALITY AND QUANTITIES OF CUTTING MATERIAL FROM HEAVIEST BEARING FEMALE PLANTS; AND 5) STORING AND TRANSPORTING CUTTINGS FROM NATIVE STANDS TO PROPAGATING HOUSES.

PROPAGATION/ROOTS/DISEASES/SEX RATIOS/VEGETATIVE PROPAGATION

0176

HOLLINSHEAD, C.

1974

FRICITION-REDUCING PETROLEUM MIXTURES AND METHOD OF MAKING SAME.

UNITED STATES PATENT 3,849,323, NOVEMBER 19, 1974.

THIS LUBRICANT OR FUEL ADDITIVE, ESSENTIALLY CONSISTS OF A HYDROCARBON LUBRICANT, A DISPERSED WAX CONSTITUENT AND AN EMULSIFIER. THE EMULSIFIER IS IN AN AMOUNT SUFFICIENT TO MAINTAIN THE WAX CONSTITUENT UNIFORMLY DISPERSED IN THE HYDROCARBON LUBRICANT. THE WAX CONSTITUENT IS SELECTED FROM A GROUP CONSISTING OF CANDELLILA, CARNAUBA, CHINESE, JOJOBA, BEETLE, MYRTLE, AND SUGAR CANE WAXES, BEESWAX, A SYNTHETIC VERSION OF ONE OF THE FOREGOING NATURAL WAXES, AND MIXTURES OF THE AFORESAID WAXES. THE WAX CONSTITUENT IS PRESENT IN AN AMOUNT RANGING FROM NOT MORE THAN ONE UP TO 10 PARTS PER 120 PARTS OF THE HYDROCARBON.

OIL/LUBRICANTS/PATENTS/PRODUCT DEVELOPMENT

0177

HOLLINSHEAD, C.

1979

THE ROLE OF JOJOBA IN THE FIELD OF MODERN LUBRICATION.

PAGES 237-241 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE EFFECT OF JOJOBA-BASED LUBRICATING OILS ON MOTOR ENGINES, TRANSMISSIONS AND DIFFERENTIALS ARE DISCUSSED. INFORMATION IS GIVEN REGARDING THE FOLLOWING TOPICS: REDUCING FLUID DRAINAGE IN AUTOMOTIVE ENGINE OILS, AUTOMATIC AND STANDARD TRANSMISSIONS, AND DIFFERENTIALS; REDUCING WEAR FACTORS TO PROLONG THE LIFE OF MECHANICAL PARTS; REDUCING FRICTION IN ENGINES, TRANSMISSIONS AND DIFFERENTIALS; REDUCING HEAT; SHEAR FACTOR; VISCOSITY DEGRADATION INDEX IMPROVERS; AND BETTER PERFORMANCE AND GASOLINE MILEAGE THROUGH BETTER LUBRICATION.

OIL/LUBRICANTS

0178

HOPKINS, C.Y./CHISHOLM, M.J./HARRIS, J.

1949

N-EICOS-11-ENOIC ACID.

CANADIAN JOURNAL OF RESEARCH B(27):35-41.



NATURAL SOURCES OF CIS:N:EICOS-11-ENOIC ACID, A CONVENIENT METHOD OF ISOLATING THE ACID, AND ITS CONVERSION TO THE TRANS-FORM ARE DESCRIBED. SPECIMENS OF EICOSOIC ACID WERE PREPARED FROM JOJOBA, HARE'S-EAR MUSTARD SEED, AND COD LIVER OIL. JOJOBA SEED IS THE MOST CONVENIENT SOURCE. CARE MUST BE TAKEN TO COMPLETELY REMOVE THE LONG-CHAIN ALCOHOLS, WHICH ARE NOT EASY TO SEPARATE FROM THE FATTY ACIDS BY THE ORDINARY PROCEDURES.

ACIDS/ALCOHOLS/ESTERS/OIL

0179

HUANG, A.H.C./MOREAU, R.A.

1977

METABOLISM OF WAX IN THE COTYLEDON OF JOJOBA DURING GERMINATION.

JOJOBA HAPPENINGS 21:2-3.

THE WAX STORED IN COTYLEDONS OF GERMINATED JOJOBA SEEDS IS GRADUALLY DECREASED DURING SEEDLING GROWTH, SUGGESTING A FOOD RESERVE ROLE FOR THE WAX. WAX IN SUBCELLULAR ORGANELLES, SPHEROSOMES, IS INITIALLY METABOLIZED BY WAX ESTER HYDROLASE, FATTY ALCOHOL DEHYDROGENASE, AND FATTY ALDEHYDE DEHYDROGENASE TO GIVE FATTY ACID. THE FATTY ACID LEAVES THE SPHEROSOMES AND ENTERS A LONG METABOLIC PATHWAY LOCATED IN SEVERAL CELLULAR COMPARTMENTS; THIS LATTER PATHWAY IS NOT UNIQUE TO JOJOBA.

AMINO ACIDS/ESTERS/FATTY ACIDS/GERMINATION/OIL/PLANT CHEMISTRY/SEED

0180

HUANG, A.H.C./MOREAU, R.A./LIU, K.D.F.

1978

DEVELOPMENT AND PROPERTIES OF A WAX ESTER HYDROLASE IN THE COTYLEDONS OF JOJOBA SEEDLINGS.

PLANT PHYSIOLOGY 61(3):339-341.

THE ACTIVITY OF A WAX ESTER HYDROLASE IN THE COTYLEDONS OF JOJOBA SEEDLINGS INCREASED DRASTICALLY DURING GERMINATION, PARALLEL TO THE DEVELOPMENT OF THE GLUCONEOGENIC PROCESS. THE ENZYME AT ITS PEAK OF DEVELOPMENT WAS OBTAINED IN ASSOCIATION WITH THE WAX BODY MEMBRANE. IT HAD AN OPTIMAL ACTIVITY AT ALKALINE PH (8.5-9.0). THE APPARENT KM VALUE FOR N-METHYLINDOXYLMYRISTATE WAS  $9.3 \times 10^{-5}$  M. IT WAS STABLE AT 40 C FOR 30 MINUTES BUT WAS INACTIVATED AT HIGHER TEMPERATURES. VARIOUS DIVALENT CATIONS AND ETHYLENEDIAMINETETRAACETATE (EDTA) HAD LITTLE EFFECT ON THE ACTIVITY. P-CHLOROMERCURIBENZOATE WAS A STRONG INHIBITOR OF THE ENZYME ACTIVITY, AND ITS EFFECT WAS REVERSED BY SUBSEQUENT ADDITION OF DITHIOHREITOL. IT HAS A BROAD SUBSTRATE SPECIFICITY WITH HIGHEST ACTIVITIES ON MONOGLYCERIDES, WAX ESTERS, AND THE NATIVE SUBSTRATE.

ESTERS/ENZYMES/COTYLEDONS/PLANT PHYSIOLOGY

0181

INOV, Y.

1979

CULTIVATED JOJOBA IN ISRAEL.

PAGES 133-135 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

A PARTNERSHIP OF PRIVATE INVESTORS AND DELEK - THE ISRAEL FUEL CORPORATION LTD., WAS FORMED WITH ASSISTANCE FROM THE ISRAEL MINISTRY OF INDUSTRY, COMMERCE AND TOURISM TO RESEARCH AND DEVELOP JOJOBA AS A FINANCIALLY COMPETITIVE CROP. A COMPREHENSIVE CONCEPT TO ACHIEVE THIS GOAL INCORPORATES AGRICULTURAL TECHNOLOGY, PRODUCT DEVELOPMENT AND PROFITABILITY.

ISRAEL/PLANTATION ESTABLISHMENT

0182

INSTITUTO NACIONAL DE INVESTIGACIONES FORESTALES (INIF)

1980

UNA CONTRIBUCION AL CONOCIMIENTO DE LA JOJOBA, SIMMONDSIA CHINENSIS, (LINK), SCHNEIDER (A CONTRIBUTION TO THE UNDERSTANDING OF JOJOBA, IN SPANISH).

INIF, LA PAZ, BAJA CALIFORNIA SUR, SPECIAL PUBLICATION NO. 20. 550 P.

TRANSCRIPTS OF 25 SCIENTIFIC PAPERS, A PLAY TITLED LA JOJOBA Y LA BALLENA (JOJOBA AND THE WHALE), A COMPREHENSIVE BIBLIOGRAPHY, A DIRECTORY OF INDIVIDUALS, COMPANIES AND INSTITUTIONS INVOLVED IN JOJOBA RESEARCH AND A LIST OF PARTICIPANTS AT THE FIRST INIF-SPONSORED NATIONAL JOJOBA CONFERENCE HELD JUNE 25-28, 1980, IN LA PAZ, BAJA CALIFORNIA SUR.

AGRONOMY/CHEMICAL STRUCTURE/BIBLIOGRAPHIES

0183

IVANOV, S.

1929

THE SOLID VEGETABLE OILS.

MASLOBCINO-ZHIROVOE DELO 1:32-34.

JOJOBA SEEDS FROM MEXICO CONTAIN 6.9 PERCENT MOISTURE AND 44.5 PERCENT SOLID OIL, ACIDITY 5.4, SAPONIFICATION NUMBER 165.7, IODINE NUMBER 79.3-80.2, D SUB 25 0.8990.

SEED/OIL/CHEMICAL STRUCTURE

0184

JAHUAR, P.P./YERMANOS, D.M.

1982

CYTOLOGICAL AND AGRO-BOTANICAL STUDIES OF HERMAPHRODITIC PLANTS AND THEIR POSSIBLE USE IN GENETIC IMPROVEMENT OF JOJOBA.

PAGES 371-376 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

THE DEVELOPMENT OF HERMAPHRODITIC JOJOBA PLANTS MAY AID IN PRODUCING COMMERCIAL HYBRIDS. HOWEVER, USING TRADITIONAL BREEDING METHODS WITH HERMAPHRODITIC PLANTS MAY TAKE 30 YEARS. USING A HAPLOID METHOD, BREEDING MAY REDUCE THE DEVELOPMENT TIME.

HERMAPHRODITISM/HYBRIDS/GENETICS/PLANT BREEDING

0185

JAHUAR, P.P./YERMANOS, D.M.

1982

AGRONOMIC AND TAXONOMIC SIGNIFICANCE OF GLANDULAR TRICHOMES IN JOJOBA.

PAGES 367-370 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA'S GLANDULAR TRICHOMES MAY FUNCTION AS A CHEMICAL DEFENSE AGAINST INSECTS. SOME INSECTS ARE POISONED BY THE EXCRETIONS AND OTHERS ARE IMMOBILIZED. SINCE JOJOBA IS CURRENTLY CLASSIFIED IN THE BUXACEAE FAMILY, THE CLASSIFICATION COULD BE JEOPARDIZED BECAUSE GLANDULAR TRICHOMES HAVE NOT PREVIOUSLY BEEN REPORTED IN THIS FAMILY.

BUXACEAE/INSECTS/TRICHOMES/CHEMICAL COMPOSITION/SYSTEMATICS

0186

JIMENEZ, F.G.

1982

EL PROGRAMA JOJOBA DE LA COMISION NACIONAL DE LAS ZONAS ARIDAS (JOJOBA PROGRAM OF THE NATIONAL COMMISSION ON ARID ZONES, IN SPANISH).

PAGES 26-31 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

MEXICO'S COMISION NACIONAL DE LAS ZONAS ARIDAS (CONAZA) HAS UNDERTAKEN A COMPREHENSIVE NATIONAL APPROACH TO THE DEVELOPMENT OF JOJOBA. STUDIES HAVE INCLUDED INVENTORIES OF NATURAL STANDS, AGRONOMY, REFORESTATION TECHNIQUES, IN-VITRO CULTIVATION AND TECHNOLOGY ASSESSMENTS. MOST OF THE STUDIES WERE DONE IN BAJA CALIFORNIA AND SONORA. IN 1973 CONAZA AND THE NATIONAL RURAL DEVELOPMENT AGENCY, PROGRAMA DE INVERSIONES PARA EL DESARROLLO RURAL (PIDER), ESTABLISHED AN EXTRACTION PLANT AT ENSENADA, BAJA CALIFORNIA. THE PLANT HAS A 5-TON PER DAY EXTRACTION CAPACITY WITH A 98 PERCENT EFFICIENCY RATE. THE PLANT IS TESTING BOTH MECHANICAL AND SOLVENT EXTRACTION TO DETERMINE WHICH METHOD IS BEST SUITED FOR SMALL-SCALE DEVELOPMENT.

MEXICO/CONAZA/EXTRACTION EQUIPMENT/TISSUE CULTURE

0187

JOGLEHAR, R.V.

1978

JOJOBA OIL.

PAINTINDIA 28(12):26-31.

REVIEWS THE CHEMICAL AND PHYSICAL PROPERTIES AND USES OF JOJOBA OIL.

CHEMICAL STRUCTURE/OIL

0188

JOHNSON, J.D.

1979

CULTIVATED JOJOBA: AFTER THE FROST.

JOJOBA HAPPENINGS 27:1-2.

DURING THE WINTER 1978, MANY JOJOBA PLANTATIONS IN CALIFORNIA WERE LOST DUE TO FREEZING TEMPERATURES. EXPERIENCED FARMERS LOST FEWER PLANTS TO FROST THAN INEXPERIENCED FARMERS. SUCCESS CAN BE INCREASED SIGNIFICANTLY IF SEED SOURCES ARE KNOWN. HARDENING-OFF ALSO MAY INCREASE SEEDLING SURVIVAL.

HARDENING-OFF/CALIFORNIA/TEMPERATURE/FREEZING/SEED

0189

JOHNSON, J.D.

1979

CULTIVATED JOJOBA IN THE UNITED STATES.

PAGES 121-128 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 p.

CULTIVATED JOJOBA IN THE UNITED STATES IS ESTIMATED TO BE ABOUT 3,000 ACRES. SELECTED CULTIVATIONS AND FARMING METHODS USED ARE REPORTED. CULTIVATED JOJOBA CROPS WILL DRAMATICALLY REDUCE THE WILD JOJOBA HARVEST DEMAND IN THE EARLY 1980S.

CULTIVATION/SEED HARVEST/ARIZONA/CALIFORNIA/TEXAS/FLORIDA

0190

JOHNSON, L.A./LUSAS, E.W.

1980

OPTIMIZING JOJOBA OIL RECOVERY POSSIBLE, NEW RESEARCH SUGGESTS.

PETROCULTURE (SUMMER):18-21.

PROCESSING METHODS FOR RECOVERING JOJOBA OIL ARE ALMOST EXCLUSIVELY MECHANICAL. LITTLE EFFORT HAS BEEN EXPENDED ON OPTIMIZING THE EFFICIENCY OF OIL RECOVERY. RESEARCH SHOULD BE DIRECTED TOWARD IMPROVING PRESSING EFFICIENCY AND OIL QUALITY AND DEVELOPING OPTIMUM CONDITIONS FOR PRESSING AND SOLVENT EXTRACTION IN COMMERCIAL OIL MILLS.

OIL/MECHANICAL EXTRACTION

0191

JOJOBA HAPPENINGS

1972-1982

JOJOBA HAPPENINGS, NO. 1, JULY 1972 - NO. 41, DECEMBER 1982.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES.

THIS NEWSLETTER GREW OUT OF RECOMMENDATIONS AT THE FIRST INTERNATIONAL JOJOBA CONFERENCE IN TUCSON IN 1972. ITS AIM IS TO COMMUNICATE INFORMATION AND NOTICES ON ACTIVITIES RELATING TO JOJOBA AND ITS ECONOMIC DEVELOPMENT.

ECONOMIC DEVELOPMENT

0192

JOJOBA WORLD TRADE ASSOCIATION, FULLERTON, CALIFORNIA

1980

PROCEEDINGS: FIRST ANNUAL JOJOBA CONVENTION SYMPOSIUM, JAN. 4-6, 1980.

SAME AS AUTHOR. 234 P.

NO ABSTRACT.

NATIVE POPULATIONS/MARKET DEMAND/PRODUCT DEVELOPMENT/PLANTATION ESTABLISHMENT

0193

JONES, M.A./KNOEPFLER, N.B.

1957

WAX USES OF DESERT SHRUB, JOJOBA, SUBJECT OF PROMISING STUDY.

CHEMURGIC DIGEST 16(1):5-6, 11.

JOJOBA OIL COULD SUBSTITUTE FOR OR REPLACE IMPORTED OILS SUCH AS CARNAUBA OR WHALE OIL. IT COULD BE USED AS A LUBRICANT IN THE FOOD INDUSTRY. THE CHARACTERISTICS AND CULTIVATION PROBLEMS OF THE PLANT ARE UNDER INVESTIGATION BY THE U.S. DEPARTMENT OF AGRICULTURE.

CULTIVATION/ALCOHOLS/PLANT USES/SPERM WHALE OIL/OIL

0194

JONES, O.

1973

OUTLINES OF A RESEARCH AND TRAINING PROGRAM ON JOJOBA.

PAGES 29-32 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

FOR THE DEVELOPMENT OF JOJOBA ADDITIONAL FIELD RESEARCH IS NECESSARY TO INSURE THAT A WIDE BASE OF GERM PLASM IS AT HAND AND THAT PLANT RESPONSES TO VARIOUS CONDITIONS ARE UNDERSTOOD. A VARIETY OF LABORATORY, GREENHOUSE, AND EXPERIMENTAL GARDEN STUDIES WILL BE NEEDED. ALL AVENUES OF PROCESSING AND END-USE RESEARCH MUST BE FOLLOWED IF JOJOBA IS TO BECOME A COMMERCIALY CULTIVATED PLANT. BY-PRODUCTS, SUCH AS THE LEAVES AND TWIGS, WHICH CONTAIN AN ANTICANCER COMPOUND, MUST BE EXPERIMENTED WITH.

MEDICINAL USES/ CULTIVATION/NATURAL HISTORY/ECONOMIC DEVELOPMENT/GENETIC VARIABILITY/GENETICS/PLANTING MANAGEMENT

0195

JONES, W.D.

1977

JOJOBA AND THE LANDSCAPE.

JOJOBA HAPPENINGS 21:4-6.

INTEREST IN JOJOBA AS AN ORNAMENTAL PLANT IS INCREASING AMONG PROFESSIONAL NURSERYMEN AND LANDSCAPERS IN SOUTHERN ARIZONA AND CALIFORNIA. JOJOBA IS VALUABLE FOR LANDSCAPING BECAUSE OF ITS DENSE GROWTH HABIT AND BECAUSE IT RETAINS ITS LEAVES IN HEAT AND DROUGHT. THE FOLIAGE ALSO IS DURABLE AND OF GOOD COLOR. JOJOBA CAN UNIFY ASSORTED DESERT PLANTS IN A LANDSCAPE COMPOSITION. JOJOBA COULD BE GENETICALLY IMPROVED FOR LANDSCAPING.

GROWTH FORM/ORNAMENTAL USE

0196

KADISH, R.

1982

DIOECY AND HERMAPHRODITISM IN JOJOBA.

JOJOBA HAPPENINGS 39:5-7.

ALTHOUGH JOJOBA IS A DIOECIOUS SPECIES, HERMAPHRODITIC PLANTS OCCASIONALLY OCCUR IN NATURE. THE USE OF HERMAPHRODITIC STRAINS WILL REMOVE DANGERS ASSOCIATED WITH CLIMATIC AND WEATHER FLUCTUATIONS DURING POLLINATION. THE REPLACEMENT OF NON-BEARING MALES WITH FRUITFUL HERMAPHRODITES WOULD BE ECONOMICALLY ADVANTAGEOUS.

DIOECISM/HERMAPHRODITISM/FLOWERING/POLLINATION/GENETICS

0197

KASSANDER, H.A.

1979

A JOJOBA-BASED AGRO-INDUSTRY ON INDIAN LANDS: ORGANIZATIONAL AND INSTITUTIONAL FACTORS IN PROJECT PLANNING.

PAGES 319-324 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

AN EXAMINATION OF AMERICAN INDIAN ENTERPRISE EXPERIENCE OUTLINES POSSIBLE CONSTRAINTS TO RESERVATION-BASED JOJOBA INDUSTRY DEVELOPMENT. IN ADDITION TO TECHNICAL AND ECONOMIC FEASIBILITY, THE PROJECTS MUST HAVE POLITICAL ACCEPTABILITY, MANAGEABILITY, ADMINISTRATIVE PRACTICALITY AND SOCIOCULTURAL ADAPTABILITY. PEOPLE NOT ONLY PROVIDE THE MAJOR INPUT, BUT RECEIVE THE BENEFITS. THEREFORE, PROJECT PLANNING MUST CONCENTRATE ON THE HUMAN ELEMENT; TECHNICAL ASSISTANCE MUST BE ADAPTED TO THE STRUCTURE, CAPABILITIES, NEEDS AND VALUES PRESENT IN EACH UNDERTAKING. THE MOST VITAL CONSTRAINTS TO RESERVATION PROJECT DEVELOPMENT INCLUDE LACK OF MANAGEMENT SKILLS AND APPROPRIATE TARGET-SPECIFIC INCENTIVES, AND INCOMPATIBLE ADMINISTRATIVE AND CULTURAL INSTITUTIONS.

INDIAN RESERVATIONS/ECONOMICS/PLANTATION MANAGEMENT

0198

KENNEDY, A.P.

1979

SUCCESSFULLY GROWING JOJOBA.

ALLEN P. KENNEDY, APACHE JUNCTION. 8 P.

BASIC THEORIES REGARDING JOJOBA PROPAGATION.

PROPAGATION/PLANTATION ESTABLISHMENT

0199

KHAIRI, M.M.A.

1979

INITIATION AND PRESENT STATUS OF JOJOBA DEVELOPMENT IN THE SUDAN.

PAGES 137-140 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA WAS FIRST INTRODUCED INTO THE SUDAN IN 1974. THE CURRENT PROGRAM IS AIMED TO HAVE 200 ACRES ESTABLISHED IN THE MOST PROMISING POTENTIAL SITES OF WESTERN AND EASTERN SUDAN. FOUR EXPERIMENTAL PLOTS OF ABOUT 3 TO 5 ACRES EACH ARE BEING ESTABLISHED IN THE SEMIARID AREAS OF CENTRAL SUDAN. ALL THE INITIAL PLANTINGS WILL BE IRRIGATED, BUT IRRIGATION AND OTHER CULTURAL TREATMENTS WILL BE APPLIED AFTER ESTABLISHMENT OF THE YOUNG PLANTS. TWO-YEAR-OLD PLANTS MEASURE ABOUT 2 FEET AND START FLOWERING AT ABOUT THIS AGE OR SIX MONTHS EARLIER. SCALE INSECTS HAVE BEEN A MAJOR PEST. APHIDS ARE MINOR PESTS DURING LATE WINTER AND EARLY SPRING. AS A SOIL CONSERVATION PLANT, A BROWSE PLANT, AND A SOURCE OF UNIQUE LIQUID WAX, JOJOBA IS RECEIVING SPECIAL ATTENTION FROM THE SUDANESE GOVERNMENT AND THE INTERNATIONAL ORGANIZATION OPERATING INSIDE THE COUNTRY.

SUDAN/PLANTATION ESTABLISHMENT/IRRIGATION/PESTS/INSECTS

0200

KHAIRI, M.M.A./YERMANOS, D.M./EL MARDI, M.O.

1982

EARLY PERFORMANCE OF JOJOBA IN THE SUDAN.

PAGES 477-481 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

IN THE RED SEA HILL AREA OF THE SUDAN, JOJOBA GROWTH RATES WERE HIGH. PLANTS SURVIVED SOLELY ON RAINFALL; HOWEVER, IRRIGATION GREATLY IMPROVED GROWTH. LOCUSTS, GRASSHOPPERS, TERMITES AND CATERPILLARS WERE A PROBLEM.

SUDAN/CLIMATE/INSECTS/IRRIGATION/SEED YIELD

0201

KITSUWA, G.T.

1978

IDENTIFICATION OF STEROLS AND PHENOLS IN JOJOBA OIL.

JOJOBA HAPPENINGS 25:3.

NO TOCOPHEROL HAS BEEN FOUND IN JOJOBA OIL; HOWEVER, THREE STEROLS WERE IDENTIFIED. A PROCEDURE IS BEING DEVELOPED TO EXTRACT THESE STEROLS IN MEASURABLE QUANTITIES.

GAS LIQUID CHROMATOGRAPHY/TOCOPHEROLS/STEROLS/CHEMICAL COMPOSITION

0202

KITSUWA, G.T./STEELINK, C./PRICE, R.L.

1980

IDENTIFICATION OF THE TRACE COMPONENTS OF JOJOBA OIL.

JOJOBA HAPPENINGS 33:7-11.

STEROLS IN JOJOBA HAVE BEEN REPORTED AND CONFIRMED AS CAMPESTEROL, STIGMASTEROL AND B-SITOSTEROL. OIL PHENOLICS AND OIL AND SEED-COAT PIGMENTS WERE ISOLATED, BUT NOT IDENTIFIED. UNIDENTIFIED PHENOLIC COMPOUNDS MAY HAVE ORIGINATED IN THE SEED MEAL.

CHEMICAL COMPOSITION/STEROLS/TOCOPHEROLS/PIGMENTS/FLAVONOIDS/  
GAS LIQUID CHROMATOGRAPHY

0203

KNIGHT, H.G.

1937

OIL, FAT, AND WAX INVESTIGATION, LIQUID WAX FROM JOJOBA SEEDS.

U.S. DEPARTMENT OF AGRICULTURE, BUREAU OF CHEMISTRY AND SOILS, ANNUAL REPORT. 54 P.

JOJOBA OIL IS A LIQUID WAX, LIKE THE OIL OBTAINED FROM THE SPERM WHALE. IT CONSISTS ESSENTIALLY OF ESTERS OF UNSATURATED ALCOHOLS AND UNSATURATED FATTY ACIDS. USES OF THIS UNIQUE PRODUCT REMAIN TO BE DISCOVERED.

ESTERS/ALCOHOLS/ACIDS/OIL/PRODUCT DEVELOPMENT

0204

KNOEPFLER, N.B. ET AL

1959

A COMPARISON OF SIX SOLVENTS FOR THE EXTRACTION OF JOJOBA SEED.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 36(12):644-648.



THE EFFECT OF SOLVENTS ON THE YIELD AND PROPERTIES OF JOJOBA OIL AND THE SUBSEQUENT EFFECT OF EACH SOLVENT UPON THE CHARACTERISTICS OF THE HYDROGENATED OILS WERE STUDIED. SOXHLET TYPE EXTRACTIONS WERE COMPARED TO COLD-HYDRAULIC PRESSING. CARBON TETRACHLORIDE, BENZENE, HEPTANE AND HEXANE EXTRACTED SUBSTANTIALLY THE SAME AMOUNTS. ISOPROPYL ALCOHOL EXTRACTED MORE MATERIAL, BUT UNDESIRABLE PRECIPITATES FORMED ON COOLING. THE OILS FROM THE TETRACHLOROETHYLENE AND HEXANE EXTRACTIONS HAD THE LOWEST DENSITY VALUE; THE OIL FROM THE ISOPROPYL ALCOHOL EXTRACTION HAD THE HIGHEST DENSITY VALUE. ALL WAXES DEVELOPED A PRECIPITATE AFTER SEVEN TO TEN DAYS. HYDROGENATION OF CLEAR FRACTIONS AND PRECIPITATES CONTAINING FRACTIONS OF THESE OILS SHOWED THAT THE PRECIPITATE HAD NO APPARENT EFFECT UPON THE MELTING POINT OR HARDNESS OF THE RESULTING WAX.

ORGANIC COMPOUNDS/SOLVENT EXTRACTION/HYDROGENATION/MECHANICAL EXTRACTION/OIL

0205

KNOEPFLER, N.B./VIX, H.L.E.

1958

REVIEW OF CHEMISTRY AND RESEARCH POTENTIAL OF SIMMONDSIA CHINENSIS (JOJOBA) OIL.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY 6(2):118-121.

CURRENT INTEREST IN JOJOBA STEMS FROM THE FACT THAT THE UNITED STATES IS DEPENDENT ON FOREIGN SOURCES OF PLANT WAX. PRELIMINARY INDUSTRIAL EVALUATIONS OF JOJOBA OIL AND THE HYDROGENATED WAX ARE DISCUSSED. RESULTS OF EVALUATIONS BY 11 COMPANIES POINT OUT PROPERTIES THE WAX POSSESSES FOR USE IN A WIDE VARIETY OF PRODUCTS.

SEED/ORGANIC COMPOUNDS/PRODUCT DEVELOPMENT/OIL

0206

KOEBNER, A./MELLOH, W.

1979

SULFOSUCCINATE HEMIESTER MIXTURE.

GER. OFFEN. 2,750,732, MAY 17, 1979.

JOJOBA OIL IS TREATED WITH HOCH SUB 2 CH SUB 2 NH SUB 2 AND CATALYTIC NAOME AT 140 C, WHICH GIVES RCONHCH SUB 2 CH SUB 2 OH AND R SUP 1 OH. TREATING THIS MIXTURE WITH MALEIC ANHYDRIDE AND THEN SULFONATING IT WITH NA SUB 2 SO SUB 3 GAVE A MIXTURE OF WAXY SULFOSUCCINATE HALF-ESTER NA SALTS, USEFUL IN WASHING TEXTILES, ESPECIALLY COTTON.

OIL/CHEMICAL STRUCTURE/PRODUCT DEVELOPMENT/SULFURIZATION/ESTERS/PATENTS

0207

KONO, Y. ET AL

1982

ANTIOXIDANT IN JOJOBA CRUDE OIL.

PAGES 239-256 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

CRUDE AND PURIFIED JOJOBA OILS HAVE OXIDATION STABILITY BECAUSE THEY CONTAIN TOCOPHEROLS. IN GENERAL, JOJOBA CRUDE OIL CONTAINS ABOUT 50 PPM OF TOCOPHEROLS, WHICH ARE SIMILAR TO THOSE FOUND IN SOYBEAN AND CORN OILS.

CHEMICAL COMPOSITION/OXIDATION STABILITY/TOCOPHEROLS/SOYBEAN OIL/CORN OIL

0208

KUNIMOTO, T.

1979

INDUSTRIAL UTILIZATION OF JOJOBA OIL IN JAPAN.

PAGES 161-169 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE CONTINUED DEPENDENCE UPON NATIVE STANDS ALONE FOR JOJOBA OIL HAS LEFT JOJOBA WITH MANY ELEMENTS OF UNCERTAINTY IN ITS SUPPLY AND PRICE. THEREFORE, IT HAS NOT BEEN POSSIBLE TO ENERGETICALLY INTRODUCE JOJOBA INTO THE JAPANESE INDUSTRIAL AND CONSUMER MARKETS. TO ENCOURAGE JOJOBA CULTIVATION, IT HAS BEEN NECESSARY TO USE THE HIGH-PRICED, UNSTEADY SUPPLY OF OIL AND TO INTRODUCE IT INTO THE CONSUMER MARKET VIA COSMETICS. CRITERIA FOR POTENTIAL COSMETIC MATERIALS ARE AS FOLLOWS: 1) THE MATERIAL MUST BE NEW OR EYE-CATCHING; 2) THE FINISHED PRODUCTS USING SUCH MATERIAL MUST BE APPEALING TO THE HUMAN SENSES; AND 3) THE MATERIAL MUST BE SAFE TO USE ON THE HUMAN BODY. MATERIAL SPECIFICATIONS FOR JOJOBA OIL AND COSMETIC AND NON-COSMETIC USES ARE DISCUSSED.

JAPAN/OIL/COSMETICS/ECONOMICS/NATIVE POPULATIONS/MARKET DEMAND

0209

LABORIN N., M.

1982

EXPERIENCIAS DE NUESTRA SIEMBRA COMERCIAL DE JOJOBA EN EL CAMPO SACRAMENTO, DE LA COSTA DE HERMOSILLO: AREA PLANTADO 100 HECTAREAS (EXPERIENCES OF OUR COMMERCIAL JOJOBA PLANTING AT EL CAMPO SACRAMENTO, ON THE COAST OF HERMOSILLO: 100 HECTARES PLANTED, IN SPANISH).

PAGES 455-459 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

ONE HUNDRED HECTARES OF JOJOBA WERE ESTABLISHED AT EL CAMPO SACRAMENTO. SEEDING, IRRIGATION, WEED CONTROL, FERTILIZERS, SEXUAL DISTRIBUTION, FLOWERING PRODUCTIVITY, COSTS AND YIELDS WERE STUDIED.

MEXICO/SONORA/PLANTATION ESTABLISHMENT/IRRIGATION/WEED CONTROL/PROPAGATION/FERTILIZERS/SEX RATIOS/FLOWERING/ECONOMICS/SEED YIELD

0210

LAYTON, R.G./CAPLE, G./MCCURDY, S.N.

1980

ICE NUCLEATION AND ANTIFREEZE ACTIVITY DUE TO BIOLOGICAL MATERIALS.

JOURNAL DE RECHERCHES ATMOSPHERIQUES 3-4:275-290.

ICE NUCLEATION STUDIES HAVE BEEN CONDUCTED USING JOJOBA, PEACH AND APRICOT SEED MEALS. THE ANTINUCLEATION BEHAVIOR IS A NONCOLLIGATIVE PHENOMENON AND REQUIRES FAR SMALLER AMOUNTS OF MATERIAL TO PRODUCE A NOTICEABLE EFFECT THAN THE USUAL SUBSTANCES CONSIDERED IN CLOUD PHYSICS CALCULATIONS. SOME OF THE COMPLEX BEHAVIOR OBSERVED IN NATURAL ICE NUCLEUS MEASUREMENT MAY BE EXPLAINED BY THE EXISTENCE OF SUBSTANCES THAT, UNDER SIMPLE CHEMICAL MANIPULATIONS, CAN CHANGE FROM AN ICE NUCLEATOR TO A NUCLEATION INHIBITOR.

CLOUD SEEDING/ICE NUCLEATION/CLOUD PHYSICS/CLIMATE/SEED MEAL

0211

LEE, C.W. ET AL

1982

IN VITRO GERMINATION AND CRYOGENIC STORAGE OF JOJOBA POLLEN.

PAGES 347-351 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

CRYOGENIC STORAGE OF JOJOBA POLLEN SHOWS PROMISE FOR PRACTICAL USE. HOWEVER, IT IS NOT KNOWN WHETHER CRYOGENICALLY STORED JOJOBA WILL FUNCTION NORMALLY IN POLLINATION.

CRYOGENICS/POLLINATION

0212

LEOCI, B.

1975

L'OLIO DI JOJOBA (JOJOBA OIL, IN ITALIAN).

RASSEGNA CHIMICA 27(5):242-244.

JOJOBA IS A POTENTIAL CROP FOR CERTAIN AREAS IN ITALY.

ITALY/ECONOMIC DEVELOPMENT/OIL

0213

LEON P., G./GONZALES A., M.

1979

OBTENCION DE ALCOHOLES GRASOS CIS MONOINSATURADOS POR SAPONIFICACION ACUOSA DE NAOH A PARTIR DEL ACEITE DE JOJOBA (OBTAINING CIS MONOUNSATURATED FATTY ALCOHOLS FROM JOJOBA OIL BY SAPONIFICATION WITH AQUEOUS NAOH, IN SPANISH).

PAGES 107-111 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

A NEW TECHNIQUE TO OBTAIN FATTY ALCOHOLS FROM JOJOBA OIL INVOLVES SAPONIFYING THE OIL USING A NAOH 76 PERCENT AQUEOUS SOLUTION. THE TREATMENT YIELDS A PRODUCT WITH AN IODINE NUMBER OF 83, HYDROXYL NUMBER OF 5.6 PERCENT, UNSAPONIFIABLE MATTER OF 98 PERCENT AND FREE FATTY ACIDS OF 0.07 PERCENT. THE INFRARED SPECTROPHOTOMETRIC ANALYSIS CORRELATES ALMOST IDENTICALLY WITH THE RESULTS OBTAINED BY OTHER AUTHORS USING MORE SOPHISTICATED METHODS.

ALCOHOLS/OIL/CHEMICAL REACTIONS/FATTY ACIDS

0214

LIBBY, H.

1982

JOJOBA OIL: OVERVIEW AS A SIGNIFICANT COMPONENT IN COSMETIC FORMULATIONS.

PAGES 266-271 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

COSMETIC PRODUCTS THAT CAN UTILIZE JOJOBA OIL CAN BE CLASSIFIED INTO THREE CATEGORIES: 1) SINGLE-PHASE NON-POLAR SYSTEMS; 2) SINGLE-PHASE POLAR SYSTEMS; AND 3) MULTI-PHASE SYSTEMS. PRELIMINARY TESTS INDICATE THAT JOJOBA OIL MAY BE A SUPERIOR SUBSTITUTE FOR MINERAL OIL IN HAIR CONDITIONERS.

COSMETICS/POLARITY/SOLUBILITY

0215

LILIA, A.M.

1982

PROPAGACION ASEXUAL DE JOJOBA (SIMMONDSIA CHINENSIS) POR EL METODO DE ACODO (ASEXUAL PROPAGATION OF JOJOBA BY AIR LAYERING, IN SPANISH).

PAGES 130-136 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

ASEXUAL PROPAGATION OF JOJOBA BY AIR LAYERING INDUCED ADVENTITIOUS ROOTS IN THE STEMS. THREE-YEAR-OLD PLANTS, CULTIVATED IN BAJA CALIFORNIA, WERE AIR LAYERED AND THEN TREATED WITH INDOLE-3-BUTYRIC ACID (IBA) MIXED WITH LANOLINE. AIR LAYERINGS THEN WERE COVERED WITH BLACK POLYETHYLENE SHEETS CONTAINING A 50/50 COMBINATION OF SOIL AND VERMICULITE. IBA INCREASED THE DEVELOPMENT OF ROOTS. SOIL ANALYSES SHOWED PRINCIPALLY LOW VALUES OF TOTAL CATIONIC EXCHANGE CAPACITY, ORGANIC MATTER AND NITROGEN.

MEXICO/PROPAGATION/BAJA CALIFORNIA/ROOTS/AIR LAYERING

0216

LINDEN, J.L./HAVILAND, M.L.

1975

JOJOBA BEAN EXTRACT AS AN AUTOMATIC TRANSMISSION FLUID ADDITIVE.

GENERAL MOTORS CORPORATION, WARREN, MICHIGAN, RESEARCH PUBLICATION GMR-1920. 16 P.

JOJOBA OIL CAN IMPROVE AUTOMATIC TRANSMISSION FLUID BASE STOCK FRICTION CHARACTERISTICS; HOWEVER, EXTENSIVE DEVELOPMENT AND TESTING WOULD BE REQUIRED TO IMPROVE ITS OXIDATIVE STABILITY. IF SUCH DEVELOPMENTS WERE SUCCESSFUL, IF COST CONSIDERATIONS WERE FAVORABLE, IF A PLENTIFUL SUPPLY FOR COMMERCIAL USE WERE ASSURED, JOJOBA OIL MIGHT ATTRACT FAVORABLE ATTENTION FROM THE OIL AND ADDITIVE INDUSTRY THAT SUPPLIES AUTOMATIC TRANSMISSION FLUIDS TO THE AUTOMOTIVE INDUSTRY.

OIL/LUBRICANTS/PRODUCT DEVELOPMENT

0217

LIZARRAGA C., A.

1980

PROPAGACION DE JOJOBA (SIMMONDSIA CHINENSIS) POR MEDIO DE CULTIVO DE TEJIDOS IN VITRO (PROPAGATION OF JOJOBA BY TISSUE CULTURE, IN SPANISH).

REVISTA UNIVERSITARIA DE CIENCIA Y TECNOLOGIA 2:25-27.

SINCE 1979, THE CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS DE LA UNIVERSIDAD DE SONORA (CICTUS) HAS STUDIED METHODS OF REPRODUCING JOJOBA BY TISSUE CULTURE. TO DATE CICTUS HAS BEEN SUCCESSFUL IN REPRODUCING CALLUS WITH LEAVES, WITH ROOTS, AND WITH STEMS AND LEAVES. METHODS ARE EXPLAINED BRIEFLY.

PROPAGATION/TISSUE CULTURE

0218

LIZARRAGA, L.A./AYALA, G.I.

1982

CULTIVO DE TEJIDOS DE JOJOBA IN VITRO (IN VITRO TISSUE CULTURE OF JOJOBA, IN SPANISH).

PAGES 149-157 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

ASEXUAL PROPAGATION OF JOJOBA BY TISSUE CULTURE REPRODUCED DESIRED PLANTS WITHOUT CHANGING THEIR PHENOTYPES. DIFFERENT PARTS OF THE PLANT REGENERATED CONSISTENTLY WHEN CULTIVATED IN A COMPLETE NUTRITIVE COMPOUND AND WHEN ADEQUATE HORMONAL STIMULATION WAS AVAILABLE. ALL TISSUE SAMPLES, TAKEN FROM VARIOUS MATURE, CULTIVATED PLANTS, MAINTAINED THE EXACT CELLULAR AND ORGANIC IDENTITY OF THE PARENT PLANT.

MEXICO/TISSUE CULTURE/ASEXUAL REPRODUCTION/PROPAGATION/PLANT BREEDING

0219

LOW, C.G./HACKETT, W.P.

1981

RESEARCHERS EXPLAIN JOJOBA PROPAGATION.

PETROCULTURE 2(1):6-7.

CUTTINGS WERE OBTAINED FROM THREE SOUTHERN SAN DIEGO COUNTY, CALIFORNIA, JOJOBA PLANTS. BASAL ENDS OF CUTTINGS, TREATED WITH AUXIN, WERE DIPPED FOR 5 SECONDS IN A PH NEUTRALIZED, 4,000 PPM INDOLEBUTYRIC ACID (IBA) SOLUTION IN 47.5 PERCENT ETHANOL. CUTTINGS WERE ROOTED IN PREMOISTENED PERLITE, AND WERE LACED ON AN INTERMITTENT MIST (5 SECONDS PER 2.5 MINUTES) BENCH WITH BOTTOM HEAT (75 F) IN A GREENHOUSE. THE MINIMUM NIGHT TEMPERATURE WAS 60 F. AN ANALYSIS OF VARIANCE AT THE END OF THE EXPERIMENT EVALUATED THE STATISTICAL SIGNIFICANCE OF TREATMENT EFFECTS. ROOTING POTENTIAL WAS GREATLY INFLUENCED BY SEASON COLLECTED AS WELL AS BY VARIABILITY AMONG PARENT PLANTS. USING AUXIN ON CUTTINGS DURING PERIODS OF HIGH ROOTING POTENTIAL PROMOTED ADVENTITIOUS ROOT FORMATION, BUT HAD NO EFFECT, OR WAS EVEN SLIGHTLY INHIBITORY, DURING PERIODS OF LOW ROOTING POTENTIAL. CUTTING-GROWN PLANTS MATURED REPRODUCTIVELY SOONER THAN THOSE GROWN FROM SEED.

PROPAGATION/VEGETATIVE PROPAGATION

0220

LUBBERT, F.

1981

CAMPO SANTA ZARINA.

JOJOBA HAPPENINGS 37:3-4.

AT CAMPO SANTA ZARINA, SONORA, MEXICO, 6 HECTARES PLANTED WITH JOJOBA PRODUCED 1,042 KILOGRAMS OF CLEAN-DRY SEED. SEEDS ON CULLED ROWS WERE SLIGHTLY MORE MATURE AT HARVEST THAN THOSE ON UNCULLED ROWS.

MEXICO/SONORA/SEED HARVEST/CULLING/SEX RATIOS

0221

LUBBERT, F.

1982

EXPERENCIAS OBTENIDAS EN LA SIEMBRA DE JOJOBA EN EL 'CAMPO SANTA ZARINA' DE LA COSTA DE HERMOSILLO (EXPERIENCES OBTAINED IN SOWING JOJOBA AT CAMPO SANTA ZARINA ON THE COAST OF HERMOSILLO, IN SPANISH).

PAGES 460-461 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

EXPERIENCES AT THE SANTA ZARINA JOJOBA PLANTATION ARE DESCRIBED. PLANTS WATERED AT 15 MONTHS OF AGE SHOWED NO DIFFERENCES WITH PLANTS THAT WERE NOT WATERED UNTIL 23 MONTHS OF AGE. THE NUMBER OF WEEDS DECLINED WITH LESS FREQUENT WATERINGS.

MEXICO/SONORA/PLANTATION ESTABLISHMENT/IRRIGATION

0222

LUCAS, K.

1978

JOJOBA USED BY UA TO STABILIZE FARMLAND.

ARIZONA FARMER-RANCHMAN 57(8):52-54.

A WATER-HARVESTING SYSTEM USING JOJOBA TO REHABILITATE ABANDONED FARMLAND IN ARIZONA'S AVRA VALLEY WAS DEVELOPED BY THE UNIVERSITY OF ARIZONA. THE SYSTEM USES RUNOFF RAINWATER IN A PUMPBACK RESERVOIR RECHARGE SYSTEM AND A COMPARTMENTED RESERVOIR. PROJECT PLANTING COSTS ARE 142 DOLLARS PER ACRE. SUPERVISION AND MANAGEMENT COSTS OF 365 DOLLARS PER ACRE INCLUDE ALL SALARY AND FRINGE BENEFITS.

WATER USE/WATER HARVESTING/COST ANALYSIS/IRRIGATION

0223

MAISARI, A.A.

1966

FACTORS AFFECTING THE ROOTING AND TRANSPLANTING OF JOJOBA, SIMMONDSIA CHINENSIS (LINK) SCHNEID.

UNIVERSITY OF ARIZONA, TUCSON. M.S. THESIS, 33 P.

CUTTINGS OF JOJOBA WERE TREATED WITH 5,000, 4,000 AND 3,000 PPM INDOLEBUTYRIC ACID (IBA) AND ROOTED IN SAND, VERMICULITE, AND A MIXTURE OF SAND AND VERMICULITE, IN A GREENHOUSE. IBA TREATMENTS GAVE BETTER ROOTING PERCENTAGES THAN UNTREATED CUTTINGS, EXCEPT IN SAND. HIGH SURVIVAL WAS OBTAINED WITH PLANTS GROWING IN THE GREENHOUSE, WHERE THE MINIMUM NIGHT TEMPERATURE WAS MAINTAINED AT 70 F. IN THE LATHHOUSE, WHERE TEMPERATURE DROPPED TO A MINIMUM 34 F, POOR SURVIVAL WAS THE RESULT OF COLD INJURY. ROOT QUALITY (HEAVY, MEDIUM OR POOR ROOT SYSTEM) DID NOT INFLUENCE POTTED CUTTING SURVIVAL EXCEPT IN THE LATHHOUSE WHERE MEDIUM ROOTED CUTTINGS SURVIVED BEST. TRANSPLANTING SURVIVAL WAS TESTED UNDER FIELD CONDITIONS. IRRIGATION RATES AND ROOT QUALITY DID NOT RESULT IN SIGNIFICANT INCREASES IN SURVIVAL.

ROOTS/SURVIVAL/CLIMATIC-VEGETAL RELATIONSHIPS/IRRIGATION/AGRONOMY/  
TEMPERATURE/PLANTING MANAGEMENT/PROPAGATION

0224

MANDELS, M.

1976

EVALUATION OF JOJOBA OIL AS ANTIFOAM AGENT FOR USE IN CELLULASE FERMENTATION.

JOJOBA HAPPENINGS 17:9.

JOJOBA OIL GAVE FAIRLY GOOD RESULTS AS AN ANTIFOAM AGENT IN CELLULASE FERMENTATION.

ANTIFOAM AGENT/OIL/PRODUCT DEVELOPMENT

0225

MARKWOOD, L.N.

1942

JOJOBA, AN OIL THAT'S DIFFERENT.

DOMESTIC COMMERCE (U.S. DEPARTMENT OF COMMERCE) 30(11):20/CHEMURGIC DIGEST  
1(22):174-175.

A REVIEW OF JOJOBA, ITS OIL, AND POSSIBLE INDUSTRIAL USES.

OIL/PRODUCT DEVELOPMENT

0226

MARVEL, C.S. ET AL

1960

POLYMERIZATION REACTIONS OF THE ACRYLATE AND METHACRYLATE ESTERS OF ALCOHOLS FROM JOJOBA OIL.

JOURNAL OF POLYMER SCIENCE 44:289-294.

SEVERAL HOMOPOLYMERS OF JOJOBA ALCOHOL METHACRYLATES WERE PREPARED. THE POLYMERS ARE CLEAR, VISCOUS, STICKY, SOMEWHAT RUBBERY MATERIALS THAT ARE THOUGHT TO HAVE SOME POTENTIAL USE AS ADHESIVES. THE ESTERS POLYMERIZE AND COPOLYMERIZE IN THE PATTERN OF OTHER ACRYLATE AND METHACRYLATE ESTERS.

ORGANIC COMPOUNDS/ALCOHOLS/PLANT SUBSTANCES/OIL/POLYMERIZATION/ESTERS/  
PRODUCT DEVELOPMENT

0227

MATSUDA, K.

1962

THE BIOSYNTHESIS OF WAX IN PLANTS.

UNIVERSITY OF ARIZONA, TUCSON. PH.D. DISSERTATION, 113 P.

TWO WAX PRODUCING PLANTS, CANDELILLA (EUPHORBIA ANTISYPHILITICA ZUCC.) AND JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) WERE USED IN STUDIES ON WAX BIOSYNTHESIS. THE COMPOSITION OF WAXES FROM CANDELILLA STEMS OF DIFFERENT AGES WERE DETERMINED AND IN-VITRO CULTURE STUDIES WERE MADE USING CANDELILLA STEM SEGMENTS AND JOJOBA EMBRYO SLICES. THE RATE OF METABOLISM OF THE DIFFERENT FRACTIONS MAY VARY BUT THE MECHANISM OF PARAFFIN FORMATION WAS CONSTANT THROUGHOUT THE LIFE OF THE PLANT. IN-VITRO CULTURE STUDIES SHOWED RADIO CARBON FROM ACETATE-1-C SUPER 14 WAS INCORPORATED EASILY INTO ALL WAXES. THIS SUPPORTED AND EXTENDED PREVIOUS SUGGESTIONS THAT ACETATE IS PROBABLY THE NATURAL SUBSTRATE FOR WAX SYNTHESIS. THE INCORPORATION OF RADIO CARBON FROM ACETATE-1-C SUPER 14 INTO WAXES WAS ALTERED BY A NUMBER OF FACTORS. IN-VITRO CULTURE STUDIES ALSO INDICATED THAT ATP IS THE HIGH ENERGY SOURCE INVOLVED IN WAX SYNTHESIS IN BOTH JOJOBA AND CANDELILLA.

PHOTOSYNTHESIS/PLANT PHYSIOLOGY/RADIOISOTOPES/EUPHORBIACEAE/BIOSYNTHESIS/OIL/  
CHEMICAL STRUCTURE

0228

MAUGH, T.H., II

1977

GUAYULE AND JOJOBA: AGRICULTURE IN SEMIARID REGIONS.

SCIENCE 196(4295):1189-1190.

POTENTIAL INDUSTRIAL APPLICATIONS OF JOJOBA OIL AND CURRENT AND FUTURE ECONOMIC TRENDS OF LUBRICANTS AND WAXES ARE DISCUSSED. RESEARCH ACTIVITIES IN CALIFORNIA AND ISRAEL ARE MENTIONED, AND A PLAN FOR JOJOBA PLANTATION DEVELOPMENT ON INDIAN RESERVATIONS IN THE U.S. SOUTHWEST IS DETAILED.

INDIAN RESERVATIONS/CALIFORNIA/ARIZONA/ISRAEL/OIL/PRODUCT DEVELOPMENT

0229

MCCLATCHEY, K.D./FERRELL, W.J./PIERSON, C.L.

1982

PERCUTANEOUS ABSORPTION OF JOJOBA OIL.

PAGES 278-288 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

THE RATE OF PERCUTANEOUS ABSORPTION OF JOJOBA OIL IS INVERSELY RELATED TO THE MOLECULAR WEIGHT OF THE ESTERS. THE ABSORPTION MECHANISM IS PROBABLY TRANS APPENDAGEAL.

OIL/RODENTS/CHEMICAL STRUCTURE/PERCUTANEOUS ABSORPTION



0230

MCCLATCHEY, K.D./PIERSON, C.L./FERRELL, W.J.

1982

IN VITRO ANTIMICROBIAL EFFECTS OF JOJOBA OIL.

PAGES 289-298 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA OIL'S EFFECT ON THE GROWTH OF SKIN PATHOGENS IS LARGELY UNKNOWN. FIVE SPECIES OF BACTERIA AND FOUR SPECIES OF FUNGI WERE TESTED FOR THE ABILITY TO GROW IN JOJOBA OIL PREPARATIONS. EACH ORGANISM WAS TESTED IN AT LEAST ONE OF FOUR DIFFERENT CULTURE METHODS: AGAR WELL DIFFUSION, AGAR SURFACE PLATING, MICROSCOPE SLIDE CULTURE, AND MS-2 SYSTEM GROWTH ANALYSIS. NO METHOD SHOWED EVIDENCE OF BACTERIAL OR FUNGAL GROWTH IN JOJOBA OIL; THE OIL DID NOT APPEAR TO BE DIRECTLY TOXIC TO THE ORGANISMS TESTED. DEATH OF THE CELLS APPEARED TO BE CAUSED BY THEIR INABILITY TO USE THE OIL AS A PRIMARY SOURCE OF ENERGY AND/OR NUTRIENT.

OIL/BACTERIA/FUNGI/ANTIMICROBIAL EFFECTS

0231

MCCLEERY, D.R.

1974

EFFECTS OF TEMPERATURE ON GERMINATION OF SELECTED BROWSE SPECIES.

UNIVERSITY OF ARIZONA, TUCSON. M.S. THESIS, 98 P.

SEED GERMINATION RATE (DAYS TO GERMINATION) AND GERMINATION EFFICIENCY (DEGREE-DAYS TO GERMINATION) WERE ANALYZED FROM CONSTANT TEMPERATURE LABORATORY STUDIES AND ALTERNATING TEMPERATURE FIELD STUDIES. THE COMPARISON BETWEEN LABORATORY AND FIELD STUDIES INDICATED THAT HIGHER TEMPERATURES WERE MORE LIMITING IN THE FIELD.

MAXIMUM SEED GERMINATION IN JOJOBA WAS 100 PERCENT IN THE CONTROLLED LABORATORY TEMPERATURES OF 21C AND 28C AFTER 17 AND NINE DAYS, RESPECTIVELY. FIELD STUDIES WERE NOT CONDUCTED WITH THIS SPECIES.

THE HIGHEST JOJOBA GERMINATION RATE, 3.5 DAYS TO 5 PERCENT GERMINATION, OCCURRED AT 28C. FIVE PERCENT GERMINATION AT 14C WAS THE HIGHEST LEVEL OF GERMINATION ACHIEVED.

THE RELATIONSHIPS BETWEEN TEMPERATURE AND DAYS AND TEMPERATURE AND DEGREE-DAYS WERE SIMILAR. GERMINATION EFFICIENCY WAS HIGHEST AT 28C WITH 98 DEGREE-DAYS. EXTREMELY LOW EFFICIENCIES OF GERMINATION AT 34C AND 14C WERE INDICATED BY HIGH 275 AND 504 DEGREE-DAY LEVELS, RESPECTIVELY. THE HIGHER RATE AND EFFICIENCY OF GERMINATION OBSERVED AT 28C INDICATED THAT THIS TEMPERATURE WAS OPTIMUM FOR JOJOBA SEED GERMINATION.

THERE WERE NO DIFFERENCES IN JOJOBA SEED GERMINATION FROM AGING, FROM MOLD INFESTATION, OR FROM DARK AND DIMLY LIT LIGHT CONDITIONS. WHEN GERMINATION RESULTS WERE COMPARED AMONG THE SIX STUDY SPECIES, JOJOBA SEED GERMINATION OCCURRED IN THE NARROWEST TEMPERATURE RANGE. THE NARROW RANGE OF WARM TEMPERATURES FOR SEED GERMINATION REFLECTED THE RELATIVELY RESTRICTED WARM CLIMATE DISTRIBUTION OF JOJOBA.

TEMPERATURE/GERMINATION/CLIMATE

0232

MCKINNEY, R.S./JAMIESON, G.S.

1936

A NON-FATTY OIL FROM JOJOBA SEED.

OIL AND SOAP 13:289-292.

JOJOBA OIL IS NOT A GLYCERIDE FAT BUT A LIQUID WAX, COMPOSED ALMOST ENTIRELY OF ESTERS OF HIGH MOLECULAR WEIGHT, MONO-ETHYLENIC ACIDS AND ALCOHOLS. THE UNSATURATED ACIDS CONSIST OF A MIXTURE OF EICOSANOIC AND DICOSANOIC ACIDS, WITH SMALL QUANTITIES OF PALMITOLEIC AND OLEIC ACIDS. THE UNSATURATED ALCOHOLS ARE A MIXTURE OF EICOSANOL AND DICOSANOL, ALONG WITH A LITTLE HEXACOSANOL AND A SMALL QUANTITY OF ALCOHOLS OF LOWER MOLECULAR WEIGHT. ITS COMPOSITION INDICATES THAT IT IS SOMEWHAT SIMILAR TO SPERM WHALE OIL. WHEN HEATED TO ABOUT 30 C FOR A SHORT TIME THE OIL BECOMES COLORLESS.

ORGANIC COMPOUNDS/LIPIDS/ALCOHOLS/OIL/ESTERS/ACIDS/CHEMICAL COMPOSITION

0233

MEDINA, J.L./YEOMANS, H.

1982

DESTOXIFICACION DE LA PASTA DE JOJOBA (DETOXIFICATION OF JOJOBA MEAL, IN SPANISH).

PAGES 336-344 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

SIMMONDSIN AND SIMMONDSIN-2' FERULATE WERE ISOLATED AND PURIFIED FOR SECONDARY STANDARDS. SOLVENTS, TEMPERATURE, EXTRACTION METHOD AND MEAL PARTICLE SIZE WERE TESTED. FINAL DETOXIFICATION LEVELS WERE FROM 4.6 TO 0.23 PERCENT SIMMONDSIN AND FROM 1.8 TO 0.08 PERCENT SIMMONDSIN-2' FERULATE. WATER WAS THE MOST EFFECTIVE DETOXIFICATION AGENT. AFTER DETOXIFICATION, 71.2 PERCENT OF THE MEAL WAS RECOVERED WITH 20 PERCENT PROTEIN, 33 PERCENT CARBOHYDRATE, 1.6 PERCENT ASH, AND 11 PERCENT CRUDE FIBER.

DETOXIFICATION/MEXICO/SEED MEAL/PROTEINS/CHEMICAL STRUCTURE

0234

MELIKYAN, A.P.

1968

POLOZHENIE SEMEISTV BUXACEAE I SIMMONDSIACEAE V SISTEME (SYSTEMATIC POSITION OF THE FAMILIES BUXACEAE AND SIMMONDSIACEAE, IN RUSSIAN).

BOTANICHESKII ZHURNAL 53(8):1043-1047.

BASED ON ANATOMICAL STUDIES OF 12 SPECIES OF BUXACEAE (BELONGING TO FOUR GENERA), IT IS JUSTIFIED TO DISTINGUISH SIMMONDSIA IN A SEPARATE MONOTYPIC FAMILY, SIMMONDSIACEAE. THIS SUPPORTS THE EARLIER EXPRESSED CONTENTION OF VAN TIEGHEM (1897).

SYSTEMATICS/PLANT MORPHOLOGY/BUXACEAE

0235

MENDIVIL, A.

1982

VARIACION ESTACIONAL DE LOS NUTRIENTES EN LOS DIFERENTES COMPONENTES DE JOJOBA SILVESTRE Y CULTIVADA (SEASONAL VARIATION OF NUTRIENTS IN VARIOUS COMPONENTS OF NATIVE AND CULTIVATED JOJOBA, IN SPANISH).

PAGES 377-384 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

SEASONAL VARIATIONS OF PLANT NUTRIENTS IN JOJOBA'S ROOTS, LEAVES, STEM AND FRUIT WERE EXAMINED DURING VARIOUS GROWTH STAGES. NITROGEN, PHOSPHORUS, CALCIUM, SODIUM AND POTASSIUM WERE ANALYZED IN NATIVE AND CULTIVATED PLANTS UNDER DIFFERENT HYDROLOGIC STRESS CONDITIONS.

MEXICO/STRESS/PLANT CHEMISTRY/SEASONAL VARIATION/PLANT GROWTH/PLANT NUTRIENTS/  
PLANT PHYSIOLOGY/WATER STRESS

0236

MENDOZA A., A.C.

1975

JOJOBA: ESTADO DE BAJA CALIFORNIA SUR (JOJOBA: SOUTHERN BAJA CALIFORNIA, IN SPANISH).

COMITE EJECUTIVO DEL CONSEJO INTERNACIONAL SOBRE JOJOBA. 2 A. REUNION DE TRABAJO DE LOS COMITES MIXTOS MEXICO - E.U.A. SEPTIEMBRE 11 Y 12 DE 1975, LA PAZ, BAJA CALIFORNIA SUR, MEXICO. 66 P.

A REVIEW OF PAST, PRESENT AND FUTURE JOJOBA RESEARCH IN SOUTHERN BAJA CALIFORNIA, MEXICO.

MEXICO/BIBLIOGRAPHIES/BAJA CALIFORNIA/OIL/ECONOMIC DEVELOPMENT

0237

MENELEY, T.J.

1975

THE EFFECTS OF NITROGEN ON JOJOBA, SIMMONDSIA CHINENSIS (LINK) SCHNEIDER.

UNIVERSITY OF ARIZONA, TUCSON. M.S. THESIS, 39 P.

THE GROWTH RESPONSE OF JOJOBA TO DIFFERENT NITROGEN CONCENTRATIONS IN A NUTRIENT FEEDING SOLUTION WAS TESTED. TWO EXPERIMENTS WERE CONDUCTED, ONE IN THE SUMMER-FALL 1974, FOR 124 DAYS, AND ONE IN WINTER-SPRING 1975, FOR 71 DAYS. PLANTS GROWING IN SILICA SAND WERE PERIODICALLY FED SIX DIFFERENT TREATMENTS, RANGING FROM 0 TO 400 PPM AMMONIUM NITRATE. GROWTH RESPONSE WAS DETERMINED BY MEASURING STEM LENGTHS, FRESH AND DRY WEIGHTS, AND PERCENT NITROGEN PER GRAM OF DRIED LEAF TISSUE.

ALTHOUGH NO SIGNIFICANT DIFFERENCE BETWEEN TREATMENTS IN HEIGHT AND WEIGHT WAS FOUND, PLANTS THAT RECEIVED 100 PPM IN THE SUMMER-FALL EXPERIMENT WERE 18.9 PERCENT GREATER IN HEIGHT AND 4.7 PERCENT GREATER IN FRESH WEIGHT THAN THE NEXT BEST TREATMENT OF 50 PPM. A SIGNIFICANT DIFFERENCE WAS FOUND AT THE .01 CONFIDENCE LEVEL BETWEEN TREATMENTS IN PERCENT NITROGEN PER GRAM OF DRIED LEAF TISSUE. COTYLEDON REMOVAL RESULTED IN DEATH.

GERMINATION/PLANT NUTRIENTS/PLANT GROWTH/PLANT PHYSIOLOGY/SEEDLINGS

0238

MERY M., P./SAINT-JEAN B., G.

1982

PLANTACION DE SIMMONDSIA CHINENSIS EN LA HACIENDA CAMARONES EN CHILE (A JOJOBA PLANTATION AT LA HACIENDA CAMARONES IN CHILE, IN SPANISH).

PAGES 471-476 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

SITE SELECTION CRITERIA AND METHODS USED TO ESTABLISH THE HACIENDA CAMARONES JOJOBA PLANTATION IN CHILE ARE SUMMARIZED.

CHILE/PLANTATION ESTABLISHMENT/SITE SELECTION/COST ANALYSIS/  
ECONOMIC DEVELOPMENT

0239

MEZA V., J./ESPERICUETA B., M.

1982

DISTRIBUCION Y PROPORCION SEXUAL, DENSIDAD Y ALTURA DE PLANTAS DE JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) EN TRES LOTES DE SIEMBRA COMERCIAL, DIRECTA Y EN DIFERENTES FECHAS, EN LA COSTA DE HERMOSILLO (DISTRIBUTION, SEX RATIOS, DENSITY AND HEIGHT OF DIRECT-SEEDED JOJOBA PLANTS SOWN IN THREE PLOTS ON DIFFERENT DATES, ON THE COAST OF HERMOSILLO, IN SPANISH).

PAGES 172-181 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

THREE DIRECT-SEEDED COMMERCIAL PLOTS ON THE COAST OF HERMOSILLO WERE STUDIED TO DETERMINE THE AVERAGE DISTRIBUTION, MALE TO FEMALE RATIO AND HEIGHT AND DENSITY OF ESTABLISHED PLANTS. VARIATIONS IN THE THREE PLOTS WERE ATTRIBUTED TO THE DATE THEY WERE SEEDED, GRADING DIFFERENCES, WEED CONTROL AND WATERING SCHEDULES.

MEXICO/PLANT DISTRIBUTION/SEX RATIOS/PLANT GROWTH

0240

MILLER, R.E./EDWARDS, R.H./KOHLE, G.O.

1979

PILOT-PLANT SCALE GRINDING AND PRESSING OF JOJOBA SEEDS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 56(5):556-558.

JOJOBA SEEDS WERE SUCCESSFULLY MILLED AT AMBIENT TEMPERATURE USING A MODIFIED, 8-INCH SINGLE-DISK ATTRITION MILL. OIL WAS EXPRESSED WITH A LABORATORY SCREW PRESS AT YIELDS FROM 27 PERCENT TO 33.6 PERCENT. THE OIL YIELD WAS A FUNCTION OF THE MOTOR AMPERAGE AND SEED MOISTURE CONTENT. THE PRESS THROUGHPUT RATE WAS A FUNCTION OF THE MOTOR AMPERAGE AND THE AMOUNT OF FINE AND COARSE PARTICLES IN THE MILLED SEED.

MECHANICAL EXTRACTION/OIL/SEED

0241

MILLER, W.P.

1979

MARKETS, ECONOMICS AND FUTURE GROWTH OF A JOJOBA AGRO-INDUSTRY -- AN OVERVIEW.

PAGES 269-278 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE CURRENT AND ESTIMATED FUTURE MARKETS AND PRICES OF JOJOBA SEED, LIQUID/SOLID WAX, THE ESTIMATED COSTS OF PRODUCING SEED USING CURRENT JOJOBA HORTICULTURAL METHODS, GERM PLASM, HARVESTING AND PROCESSING SYSTEMS ARE REVIEWED. PLANTATION DEVELOPMENT CAN BE PURSUED ON A LIMITED BASIS USING EXISTING TECHNOLOGY, BUT ONLY BY USING GOOD GERM PLASM THAT WOULD YIELD AT LEAST 2 TO 3 POUNDS PER PLANT IN EIGHT YEARS AND 3 TO 5 POUNDS OF SEED PER PLANT IN 10 YEARS.

ECONOMICS/PLANTATION ESTABLISHMENT/GERM PLASM/SEED HARVEST/PROCESSING

0242

MILLER, W.P./ANDERSON, N.

1979

THE NATIVE AMERICAN JOJOBA PROJECT.

PAGES 129-132 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

A CHRONOLOGY OF THE NATIVE AMERICAN JOJOBA PROJECT IS GIVEN AND ITS FINANCIAL BENEFITS ARE ANALYZED. A COMPARISON OF THE PROJECT RESULTS AND THE PRIVATE SECTOR DEVELOPMENT RESULTS BETWEEN 1976 AND 1978, INDICATES THAT, IN TERMS OF THE NUMBER OF ACRES PLANTED AND ENTERPRISES ESTABLISHED, THE NATIVE AMERICAN PROJECT HAS BENEFITED ONLY marginally.

ECONOMICS/INDIAN RESERVATIONS/INDIANS OF NORTH AMERICA

0243

MILLS, J.L./FOSTER, K.E.

1982

JOJOBA WILD STANDS: NATURAL HISTORY AND USE IMPACTS.

FINAL REPORT TO ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION, U.S. DEPARTMENT OF AGRICULTURE, TEMPE, ARIZONA. UNIVERSITY OF ARIZONA, COLLEGE OF AGRICULTURE, OFFICE OF ARID LANDS STUDIES, TUCSON. 71 P.

JOJOBA IS CHARACTERIZED BY TREMENDOUS VARIABILITY, DUE TO BOTH GENETIC AND ENVIRONMENTAL FACTORS. MUCH OF THE RESEARCH ON WILD STANDS IN THE UNITED STATES HAS BEEN SHORT-TERM AND CONFINED TO A SMALL NUMBER OF SITES. MANY OF THE FINDINGS NEED FURTHER STUDY FOR VERIFICATION OR CLARIFICATION. NOT ENOUGH IS KNOWN ABOUT JOJOBA'S ECOLOGICAL LIFE HISTORY AND THE EXTENT OF THE GENETIC AND ENVIRONMENTAL VARIABILITY IN VARIOUS POPULATIONS. A BASIS FOR ANALYZING SEED HARVESTING AND/OR CATTLE BROWSING IN NATIVE STANDS COULD BE OBTAINED THROUGH QUANTITATIVE AND QUALITATIVE RESEARCH ON THE FOLLOWING TOPICS:

SEASONAL INFLUENCES OF CLIMATE; PLANT COMMUNITY CHARACTERISTICS; TOPOGRAPHY AND HYDROLOGY; CHEMICAL AND PHYSICAL CHARACTERISTICS OF ASSOCIATED SOILS; COMPOSITION OF ASSOCIATED WILDLIFE COMMUNITIES; IMPACTS ASSOCIATED WITH CATTLE GRAZING; AND NATURE OF IMPACTS ASSOCIATED WITH SEED HARVESTING.

NATIVE POPULATIONS/GENETICS/ENVIRONMENTAL EFFECTS/CLIMATE/SOILS/WILDLIFE/  
GRAZING/SEED HARVEST

0244

MIROV, N.T.

1950

SIMMONDSIA--DESERT SHRUB OFFERS NEW USES, FROM COVER CROP TO WAX.

CHEMURGIC DIGEST 9(7):7-9.

REVIEWS THE DISCOVERY OF JOJOBA AND THE NATURE OF THE SEED OIL. CULTIVATION AND MANAGEMENT OF WILD PLANTS FOR PRODUCTION SHOULD BE TRIED.

CULTIVATION/OIL/PRODUCT DEVELOPMENT

0245

MIROV, N.T.

1952

SIMMONDSIA OF JOJOBA, A PROBLEM IN ECONOMIC BOTANY.

ECONOMIC BOTANY 6(1):41-47.

THE HISTORY OF THE DISCOVERY OF SIMMONDSIA AND ATTEMPTS AT HORTICULTURAL USES ARE TRACED. INVESTIGATIONS INTO THE CHEMICAL AND PHYSICAL PROPERTIES OF THE SEED OIL ARE DESCRIBED. POSSIBILITIES OF ECONOMIC EXPLOITATION ARE CONSIDERED. THE DEVELOPMENT OF AN OIL INDUSTRY HINGES ON THE PROSPECTS OF GROWING THE BUSH UNDER CULTIVATION. RESULTS AT AN 11-YEAR-OLD PLANTATION IN RIVERSIDE, CALIFORNIA, ARE PRESENTED.

CULTIVATION/SYSTEMATICS/BREEDING/FORAGE/ARIZONA/SEED/CALIFORNIA/MEXICO/  
SONORAN DESERT/SEED YIELD/OIL/PRODUCT DEVELOPMENT

0246

MIROV, N.T.

1955

THE PROCESS OF OIL FORMATION IN RIPENING SEEDS AND OF OIL DISINTEGRATION IN GERMINATING SEEDS OF SIMMONDSIA.

(UNPUBLISHED). 11 P.

DURING SEED MATURATION THE WEIGHT OF THE OIL INCREASED, BUT THE DIFFERENCE IN PERCENTAGE OF OIL AT THE TIME OF THE SEED MATURITY AND AT THE TIME OF THEIR DROPPING FROM THE CAPSULE, TWO MONTHS LATER, WAS NEGLIGIBLE. DURING RIPENING THE IODINE NUMBER OF THE OIL WAS ALMOST THE SAME. IN THIS RESPECT THE PROCESS OF OIL FORMATION IN SIMMONDSIA DIFFERS FROM THAT OF ALL OTHER PLANTS (IN WHICH THE OIL IS NOT A WAX BUT A TRIGLYCERIDE). IN TRIGLYCERIDE PLANTS SATURATED ACIDS ARE FORMED FIRST AND THE UNSATURATED ACIDS APPEAR LATER. THIS IS NOT THE CASE IN THE RIPENING SEEDS OF SIMMONDSIA. THE OIL CONTENT OF

STORED SEEDS WAS COMPARED TO THAT OF THE COTYLEDONS OF 11-MONTH-OLD AND TWO AND A HALF-MONTH-OLD SEEDLINGS. AFTER ONE MONTH CONSIDERABLE WAX WAS FOUND IN THE COTYLEDONS, AND AFTER TWO AND A HALF MONTHS SOME STILL REMAINED. APPARENTLY THE SEEDLINGS DO NOT UTILIZE THE WAX UNTIL LATE IN DEVELOPMENT.

GERMINATION/SEED/SEEDLINGS/PLANT PHYSIOLOGY/ESTERS/PLANT GROWTH/  
PLANT NUTRIENTS/COTYLEDONS/ACIDS/FRUITING/OIL/CHEMICAL STRUCTURE

0247

MIROV, N.T.

1973

EXPERIMENTS WITH PLANTING JOJOBA.

PAGES 1-3 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

IN 1940 A ONE-HALF ACRE PLANTATION WAS ESTABLISHED IN ARLINGTON, CALIFORNIA. ONE HUNDRED AND SEVENTY FIVE HILLS WERE PLANTED WITH THREE SEEDS THAT WERE CULLED LATER TO ADJUST THE SEX RATIO. SEEDS WERE PRODUCED AFTER SIX YEARS, AND WERE AT FULL PRODUCTION AFTER 10 YEARS. TEN-YEAR-OLD BUSHES WERE SELECTED FOR SEED YIELD AND OIL YIELD, UP TO 56 PERCENT OIL IN DRY SEEDS. THE PLANTATION WAS DESTROYED IN 1953. ANOTHER PLANTATION OF 640 ACRES IN FLORENCE JUNCTION, ARIZONA, WAS STARTED, 1943, AND THEN ABANDONED IN FAVOR OF CROWING VEGETABLES FOR MILITARY NEEDS.

OIL/SEED/CULTIVATION/IRRIGATION/GERMINATION/POLLINATION/ARIZONA/  
CALIFORNIA/PLANTING MANAGEMENT/SEED YIELD/FREEZING/TEMPERATURE

0248

MIWA, T.K.

1982

SOME CHEMICAL CONSIDERATIONS FOR USE OF JOJOBA OIL IN COSMETICS.

PAGES 272-277 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA OIL IS MISCIBLE WITH PARAFFINS AND WITH MINERAL OIL IN ALL PROPORTIONS. ALTHOUGH NONPOLAR IN NATURE, STABLE EMULSIONS WITH JOJOBA OIL CAN BE FORMED. ALKENOIC ALKALI SALTS AND ALKENYL PRIMARY ALCOHOLS ARE MOST EFFECTIVE IN FORMATION. JOJOBA OIL IS MORE RAPIDLY ABSORBED BY THE SKIN THAN MINERAL OIL BECAUSE OF ITS GREATER POLARITY AND PERHAPS BECAUSE OF ITS LINEAR CHEMICAL STRUCTURE.

CHEMICAL COMPOSITION/COSMETICS/CHEMICAL STABILITY

0249

MIWA, T.K.

1982

JOJOBA OIL AS A SUPERIOR LUBRICANT.

PAGES 299-301 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

SULFURIZED JOJOBA OIL, WHEN TESTED UNDER IDENTICAL CONDITIONS AS SULFURIZED SPERM WHALE OIL, PROVES TO BE A SUPERIOR EXTREME-PRESSURE/EXTREME TEMPERATURE LUBRICANT. DUE TO A RISE IN VISCOSITY, JOJOBA OIL NEEDS TO BE REFINED BEFORE SULFURIZATION. JOJOBA OIL PROVIDES AN UNUSUALLY STABLE LUBRICATING BOUNDARY LAYER BETWEEN RUBBING METALLIC SURFACES, THUS PREVENTING EXCESSIVE HEAT BUILD-UP. JOJOBA OIL SHOWS PROMISE AS A SUPERIOR AUTOMOTIVE LUBRICANT.

OIL/LUBRICANTS/REFINEMENT/SULFURIZED JOJOBA OIL

0250

MIWA, T.K.

1982

CHEMICAL STRUCTURE AND PROPERTIES OF JOJOBA OIL.

PAGES 227-235 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

JOJOBA OIL UNDERGOES RANDOMIZATION WHEN BOILED AT 420 C AT 760 MM UNDER NITROGEN FOR 15 MINUTES. THE SECOND SMOKING POINT AND FLASHPOINT OCCUR AT 300 C. TESTS INDICATE THAT THE OIL HAS NEWTONIAN FLOW CHARACTERISTICS.

CHEMICAL STRUCTURE/OIL/TEMPERATURE

0251

MIWA, T.K.

1978

HARDNESS TEST FOR WAX FORMULATIONS FROM JOJOBA WAX, PARAFFIN, POLYETHYLENE AND POLYPROPYLENE.

PAGES 265-274 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

THE WIDE RANGE IN HARDNESS OF VARIOUS BLENDS PREPARED FROM HYDROGENATED JOJOBA WAX WITH PARAFFIN, LOW- AND HIGH-DENSITY POLYETHYLENES, AND POLYPROPYLENE NECESSITATED DEVELOPING A NEW METHOD FOR COMPARING HARDNESS OF DIFFERENT SURFACES BY USING MEASUREMENTS LEAST AFFECTED BY EXPERIMENTAL VARIABLES. INITIALLY, WAX SAMPLES WERE TESTED WITH DIFFERENT LOADS AND THEIR HARDNESS VALUES, EXPRESSED IN MILLIMETERS OF PENETRATION ALLOWED PER KILOGRAM OF WEIGHT, WERE PLOTTED AGAINST WEIGHT IN KILOGRAMS. TOTAL WEIGHT DIVIDED BY TOTAL DEPTH (KG/MM) ALSO WAS PLOTTED AGAINST SLOPES VERY CLOSE TO ZERO, UNTIL PENETRATION EXCEEDED 1.5 MM TO 2.0 MM. FROM THIS PRELIMINARY OBSERVATION, THE DEPTH OF 1.00 MM PENETRATION WAS CHOSEN AS THE STANDARD DEPTH TO WHICH EACH DETERMINATION MUST BE SETTLED AT 60 SECONDS, AND ALL WAXES WERE COMPARED IN SURFACE HARDNESS BY THE GRAVITATIONAL FORCE, IN KILOGRAM WEIGHT, NECESSARY TO PENETRATE 1.00 MM INTO A FLAT SURFACE BY A 30-DEGREE CONICAL POINT DURING A PERIOD OF 60 SECONDS. THE HIGH SENSITIVITY OF THIS METHOD HAS REFLECTED ACCURATELY THE SYNERGISTIC BEHAVIOR OF JOJOBA SOLID WAX WITH POLYETHYLENE.

HARDNESS/CHEMICAL REACTIONS/HYDROGENATED OIL



0252

MIWA, T.K.

1972

GAS CHROMATOGRAMS OF SYNTHETIC LIQUID WAXES PREPARED FROM SEED TRIGLYCERIDES OF LIMNANTHES, CRAMBE AND LUNARIA.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 49(11):672-673.

THE GAS LIQUID CHROMATOGRAPHY (GLC) PROCEDURE DEVELOPED TO ANALYZE THE NATURAL LIQUID WAX ESTER COMPOSITION OF JOJOBA WAS APPLIED TO SYNTHETIC WAX ESTERS DERIVED FROM ERUCIC-CONTAINING SEED OILS EXTRACTED FROM LIMNANTHES DOUGLASII, CRAMBE ABYSSINICA AND LUNARIA ANNUA. DIFFERENCES IN SYNTHETIC LIQUID WAX COMPOSITIONS, WHEN DETERMINED BY GLC, ALLOW FINGERPRINT IDENTIFICATION OF THE OIL SOURCE.

OIL/ESTERS/CHEMICAL COMPOSITION/GAS LIQUID CHROMATOGRAPHY

0253

MIWA, T.K.

1971

JOJOBA OIL WAX ESTERS AND DERIVED FATTY ACIDS AND ALCOHOLS: GAS CHROMATOGRAPHIC ANALYSIS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 48:259-264.

THE COMPOSITIONS OF JOJOBA OIL FROM TWO ADJACENT REGIONS IN ARIZONA WERE ESSENTIALLY IDENTICAL EVEN THOUGH ONE SAMPLE HAD BEEN STORED FOR FIVE YEARS. THE SAME PHENOTYPE SHRUBS THAT HAD ADAPTED TO THE HOT AND DRY ENVIRONMENT OF THE CALIFORNIA DESERT HAD INCREASED MARKEDLY IN SEED SIZE, BUT HAVE CHANGED ONLY SLIGHTLY IN CHEMICAL COMPOSITION. CONVERSELY, THE DIFFERENT PHENOTYPE GROWING PROSTRATE ALONG THE OCEAN NEAR SAN DIEGO HAD SEEDS SIMILAR IN SIZE TO THE ARIZONA TYPE BUT HAD A DISTINCT SHIFT IN OIL COMPOSITION TOWARD LARGE MOLECULAR SIZE. THE WAX ESTERS ARE MADE UP OF A DISPROPORTIONATELY LARGE AMOUNT OF DOCOSENYL EICOSENOATE AND ARE NOT A RANDOM COMBINATION OF CONSTITUENT ACIDS AND ALCOHOLS. LUNARIA ANNUA SYNTHETIC WAX ESTER OIL WAS USED AS A MODEL.

ALCOHOLS/ORGANIC COMPOUNDS/SEED/CALIFORNIA/ARIZONA/PHTOGEOGRAPHY/ADAPTATION/ECOTYPES/EVOLUTION/ACIDS/ESTERS/GENETIC VARIABILITY/BIOSYNTHESIS/OIL/NATIVE POPULATIONS

0254

MIWA, T.K.

1973

SAPONIFICATION AND GAS CHROMATOGRAPHIC ANALYSIS OF JOJOBA WAX ESTERS.

PAGES 61-72 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

TECHNIQUES ARE DESCRIBED FOR THE SAPONIFICATION OF THE OIL AND FOR THE GAS CHROMATOGRAPHIC ANALYSIS OF JOJOBA WAX ESTERS, INCLUDING INFORMATION ON THE PREVENTION OF EMULSIFICATION AND THE COMPLETE SEPARATION OF ACIDS FROM ALCOHOLS. IMPORTANT STEPS FOR THE GAS CHROMATOGRAPHY ANALYSIS ARE DESCRIBED IN DETAIL. OIL COMPOSITION OF ARIZONA DESERT AND CALIFORNIA DESERT PLANTS IS SIMILAR, BUT CALIFORNIA OCEANSIDE PLANTS HAVE OIL WITH A TENDENCY TOWARD HIGHER MOLECULAR

WEIGHTS. INITIAL STUDIES INDICATE THAT JOJOBA OIL COULD BE USED IN TREATING AGNE VULGARIS, SUPPRESSING SEBACEOUS SECRETION. LACK OF A DEPENDABLE SOURCE OF THE OIL HAS STOPPED EFFORTS IN THIS AREA. ANOTHER USE SUGGESTED FOR JOJOBA OIL IS AS A RETARDANT TO EVAPORATION OF WATER FROM THE SURFACES OF LAKES AND RESERVOIRS.

ORGANIC COMPOUNDS/ANALYTICAL TECHNIQUES/MEDICINAL USES/EVAPORATION CONTROL/  
ALCOHOLS/ESTERS/OIL/PRODUCT DEVELOPMENT

0255

MIWA, T.K./HAGEMANN, J.W.

1978

PHYSICAL AND CHEMICAL PROPERTIES OF JOJOBA LIQUID AND SOLID WAXES.

PAGES 245-252 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

JOJOBA OIL AND SOLID WAX PROPERTIES SUCH AS FREEZING AND MELTING POINTS, SMOKE AND FLASH POINTS, BOILING POINT, VISCOSITY, DIFFERENTIAL SCANNING CALORIMETRY, MICROENCAPSULATION AND DIFFUSION OF JOJOBA OIL IN POLYETHYLENE, CHEMICAL CONSTANTS AND FATTY ACID, FATTY ALCOHOL, AND WAX ESTER COMPOSITIONS ARE REPORTED.

OIL/CHEMICAL COMPOSITION/CALORIMETRY

0256

MIWA, T.K./ROTHFUS, J.A.

1978

SULFURIZED JOJOBA OIL AS EXTREME-PRESSURE LUBRICANT.

PAGES 253-264 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

EXPPELLER-PRESSED AND SOLVENT-EXTRACTED JOJOBA OIL WERE SULFURIZED AND SUBJECTED TO VARIOUS TESTS. JOJOBA OIL, WHEN HEATED FOR A FEW MINUTES AT 300 C WITH ACTIVATED CHARCOAL AND THEN FILTERED, SHOWED MARKED IMPROVEMENTS IN LOWERING EXCESSIVE FOAMING CHARACTERISTICS AND HIGH-TEMPERATURE VISCOSITY CHANGES OBSERVED WITH NON-HEAT-TREATED JOJOBA OIL. JOJOBA PERFORMED WELL AS AN EXTREME-PRESSURE LUBRICANT AND WAS CONFIRMED AS A SUITABLE POTENTIAL SPERM WHALE OIL REPLACEMENT.

OIL/SULFURIZATION/LUBRICANTS/REFINEMENT/SPERM WHALE OIL

0257

MIWA, T.K./ROTHFUS, J.A.

1979

IN-DEPTH COMPARISON OF SULFURIZED JOJOBA AND SPERM WHALE OILS AS EXTREME-PRESSURE/EXTREME-TEMPERATURE LUBRICANTS.

PAGES 243-267 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

REFINED JOJOBA OIL AND SPERM WHALE OIL WERE COMPARED IN SIMULATED IN-USE LUBRICANT TESTS. SULFURIZED JOJOBA OIL WAS COMPARABLE, AND IN SOME INSTANCES SUPERIOR, TO SULFURIZED SPERM WHALE OIL AS MATERIAL FOR EXTREME-PRESSURE LUBRICANT ADDITIVES. THE FOLLOWING TESTS WERE PERFORMED: L-37D HIGH-TORQUE AXLE TEST; L-42 HIGH-SPEED AXLE TEST; TURBO HYDRAMATIC TRANSMISSION CYCLING TEST; HIGH-ENERGY, FRICTION CHARACTERISTICS AND DURABILITY TEST; AND 1970 OLDSMOBILE REFERENCE SEQUENCE IIIC TEST.

OIL/LUBRICANTS/SPERM WHALE OIL/SULFURIZED JOJOBA OIL

0258

MIWA, T.K./ROTHFUS, J.A./DIMITROFF, E.

1979

EXTREME-PRESSURE LUBRICANT TESTS ON JOJOBA AND SPERM WHALE OILS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 56(8):765-770.

LABORATORY AND SIMULATED IN-USE LUBRICANT TESTS WERE PERFORMED ON SULFURIZED SPERM WHALE OIL. DATA FROM THESE COMPREHENSIVE TESTS INDICATED SULFURIZED JOJOBA OIL PREPARED FROM HEAT-TREATED FILTERED OIL TO BE COMPARABLE OR SUPERIOR TO SULFURIZED SPERM WHALE OIL AS AN EXTREME-PRESSURE ADDITIVE FOR MOTOR OILS, GEAR LUBRICANTS, AND AUTOMOTIVE TRANSMISSION FLUIDS.

LUBRICANTS/OIL/SPERM WHALE OIL/SULFURIZED JOJOBA OIL

0259

MIWA, T.K./SPENCER, G.F.

1978

COMPOSITION OF JOJOBA OIL FROM NUTS HARVESTED AT DIFFERENT GEOGRAPHICAL REGIONS.

PAGES 229-243 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO, 340 P.

VARIATIONS IN COMPOSITION OF JOJOBA OIL FROM SEEDS HARVESTED IN ARIZONA, SOUTHERN CALIFORNIA, ISRAEL AND SONORA AND BAJA CALIFORNIA, MEXICO, WERE DETERMINED BY GAS-LIQUID CHROMATOGRAPHY (GLC). WHEN COMPARED TO SEED FROM OTHER REGIONS, A CLEAR TREND TOWARD HIGHER MOLECULAR SIZE WAS SEEN FOR SEEDS HARVESTED IN SONORA. ONE UNUSUAL SEED WITH A TREND TOWARD LOWER MOLECULAR SIZE WAS FOUND, SUPPORTING THE CONTENTION THAT GENETIC DEVIANTS CAN BE FOUND AND BRED FOR SELECTIVE COMMERCIAL USE.

OIL/CHEMICAL COMPOSITION/GENETICS/GAS LIQUID CHROMATOGRAPHY/SEED

0260

MIWA, T.K./SPENCER, G.F./PLATTNER, R.D.

1978

SEPARATION AND STRUCTURE DETERMINATION OF JOJOBA OIL COMPONENTS BY HIGH-PRESSURE LIQUID CHROMATOGRAPHY AND GAS CHROMATOGRAPHY/MASS SPECTROMETRY.

PAGES 187-197 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

HIGH-PRESSURE LIQUID CHROMATOGRAPHY (HPLC) FOLLOWED BY SAPONIFICATION AND GAS CHROMATOGRAPHY (GC) ANALYSIS CAN DETERMINE WAX ESTER CHAIN LENGTHS INDIVIDUALLY. IN CONTRAST, GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS) OF THE HYDROGENATED OIL PROVIDES A FAST, COMPUTERIZED METHOD OF DISCERNING THE COMBINATIONS OF ALCOHOLS AND ACIDS THAT MAKE UP EACH CHAIN LENGTH. OZONOLYSIS GC SHOWS THAT 98 PERCENT OF THE WAX ESTERS ARE OMEGA-9 UNSATURATED. NEW POLAR LIPID COMPONENTS, PRESENT IN THE OIL IN MINOR AMOUNTS, WERE ISOLATED. THEIR CHROMATOGRAPHIC BEHAVIOR IS DESCRIBED.

ESTERS/CHEMICAL COMPOSITION/HIGH PRESSURE LIQUID CHROMATOGRAPHY/ALCOHOLS/ACIDS/GAS CHROMATOGRAPHY/MASS SPECTROMETRY/ANALYTICAL TECHNIQUES

0261

MIWA, T.K./THOMSON, P.H.

1978

CORRELATION BETWEEN DENSITY AND OIL CONTENT IN JOJOBA NUTS HARVESTED AT DIFFERENT GEOGRAPHICAL REGIONS.

PAGES 219-228 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

THE OIL PERCENTAGE OF JOJOBA SEEDS CAN BE ESTIMATED RAPIDLY BY TIMING THEIR FLOATING AND SINKING VELOCITIES IN DISTILLED WATER. A PRECALIBRATED CURVE ON A TABLE CAN BE PREPARED FOR ANY PARTICULAR GEOGRAPHICAL REGION TO ESTIMATE THE GROSS MOISTURE CONTENT AND DEGREE OF MATURATION OF THE SEEDS. RELATIONSHIPS BETWEEN OIL CONTENT AND DENSITY FOR SEEDS FROM THREE DIFFERENT PLANTS, EACH FROM A DIFFERENT REGION WERE STUDIED. ALTHOUGH CURVES WERE ESSENTIALLY LINEAR, OIL PERCENTAGE AT A GIVEN DENSITY VARIED SOMEWHAT FROM ONE PLANT TO ANOTHER EVEN WITHIN THE SAME REGION (PLUS OR MINUS 2 PERCENT) AND DIFFERED MARKEDLY FROM ONE GEOGRAPHICAL REGION TO ANOTHER (PLUS OR MINUS 4 PERCENT).

OIL/SEED

0262

MIWA, T.K./WOLFE, I.A.

1965

WAX ESTER SUBSTITUTE FOR JOJOBA OIL FROM THE SEED OF LIMANTHES DOUGLASII.

U.S. PATENT 3,226,438, DECEMBER 28, 1965.

A LIQUID WAX ESTER WAS PRODUCED BY SOLVENT EXTRACTION OF THE GLYCERIDE OIL PRESENT IN GROUND SEED OF LIMANTHES DOUGLASSI, REMOVING THE SOLVENT AND SEPARATELY PREPARING THE MIXED CONSTITUENT FATTY ACIDS BY SAPONIFICATION AND THE MIXED CORRESPONDING FATTY ALCOHOLS FROM SEPARATE PORTIONS OF THE GLYCERIDE OIL BY REDUCTION. THE FATTY ACIDS AND ALCOHOLS WERE REACTED IN THE PRESENCE OF XYLENE AND P-TOLUENE SULFONIC ACID MONOHYDRATE TO FORM THE LIQUID WAX ESTER PRODUCT.

ORGANIC COMPOUNDS/PLANT USES/ALCOHOLS/SEED/PATENTS/OIL/ESTERS

0263

MOLAISON, L.J./O'CONNOR, R.T./SPADARO, J.J.

1959

LONG-CHAIN UNSATURATED ALCOHOLS FROM JOJOBA OIL BY SODIUM REDUCTION.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 36(9):379-382.

JOJOBA OIL IS A LIQUID WAX COMPOSED ESSENTIALLY OF C SUB 20 AND C SUB 22 STRAIGHT-CHAIN MONOETHYLENIC ACIDS AND ALCOHOLS IN THE FORM OF ESTERS. SODIUM REDUCTION OF THE WAX FATTY ESTERS IN JOJOBA OIL YIELDED QUANTITATIVELY A MIXTURE OF UNSATURATED, LONG-CHAIN ALCOHOLS FROM THE ACID MOIETY OF THE JOJOBA OIL. YIELDS OF ABOUT 91 PERCENT WERE OBTAINED IN THE LABORATORY-SCALE EXPERIMENTS AND 82 TO 86 PERCENT FOR THE PILOT-PLANT EXPERIMENTS. ANALYTICAL DATA, INCLUDING DETAILED INFRARED SPECTRA INFORMATION, ARE GIVEN FOR THE RESULTING PRODUCT ALCOHOLS.

ALCOHOLS/OIL/PLANT SUBSTANCES/ORGANIC COMPOUNDS/ESTERS

0264

MOLINA F., F.E.

1981

SEMILLAS Y PLANTULAS DE JOJOBA (JOJOBA SEEDS AND PLANTS, IN SPANISH).

REVISTA UNIVERSITARIA DE CIENCIA Y TECNOLOGIA 4:2-4.

JOJOBA, AFTER CENTURIES OF ADAPTATION TO THE DESERT, NOW FACES TWO NEW PHASES OF ACTIVITY: 1) GRAZING BY CATTLE, AND 2) THE MASSIVE SEED HARVEST OF NATIVE STANDS. LONG-TERM HARVESTING EFFECTS WERE EXAMINED. THE CONTINUED SEED HARVEST FROM NATIVE POPULATIONS REDUCES NATURAL SEXUAL REGENERATION AND WILL PROBABLY AFFECT THE AGE DISTRIBUTION OF NATURAL STANDS.

MEXICO/SEED/SEEDLINGS/SEED HARVEST/RODENTS/SURVIVAL/NATIVE POPULATIONS

0265

MOLINA F., F.E./CASTELLANOS V., A.

1979

ASPECTOS DEMOGRAFICOS DE SEMILLA Y PLANTULAS DE JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) (DEMOGRAPHIC ASPECTS OF JOJOBA SEEDS AND PLANTS, IN SPANISH).

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS, UNIVERSIDAD DE SONORA, HERMOSILLO. 117 P.

FACTORS THAT REDUCE JOJOBA'S SEED YIELD AND SEEDLING ESTABLISHMENT WERE IDENTIFIED. ONLY 1.1 PERCENT OF THE SEEDS INITIALLY INTRODUCED SURVIVED; 98.8 PERCENT WERE LOST TO RODENTS. DEPREDATION, GERMINATION AND MORTALITY VARIED AT DIFFERENT SITES. GERMINATION AND GROWTH WERE RELATED TO WINTER CONDITIONS; MORTALITY DIFFERENCES CORRESPONDED TO AMOUNT OF EXPOSURE TO BIOTIC AGENTS. CLIMATE AND RODENTS WERE RESPONSIBLE FOR A 40 TO 60 PERCENT MORTALITY RATE. THE HYPOTHETICAL PROBABILITY FOR SEED GERMINATION WAS .07 PERCENT.

MEXICO/SONORA/SEEDLINGS/SEED/SURVIVAL/RODENTS/GERMINATION/PLANT GROWTH

0266

MOLINA F., F.E./CASTELLANOS V., A.

1982

ECOLOGIA DE JOJOBA: I. SOBREVIVENCIA DE SEMILLAS Y DE PLANTULAS BAJO DIFERENTE INTENSIDAD DE DEPREDACION (ECOLOGY OF JOJOBA: I. SURVIVAL OF SEEDS AND PLANTS UNDER VARYING DEGREES OF STRESS, IN SPANISH).

PAGES 193-210 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

NATURAL STANDS OF JOJOBA WERE STUDIED TO FIND NORMS FOR THEIR MANAGEMENT. SURVIVAL RATES OF JOJOBA SEEDLINGS IN PROTECTED AREAS WERE DIRECTLY RELATED TO AMOUNTS OF PRECIPITATION, AMOUNTS OF LEAVES ON PLANTS AND LEVELS OF EXPOSURE TO BIOTIC AND PHYSICAL ELEMENTS. MAINTAINING SEED BANKS CAN REDUCE THE PROBABILITY OF POPULATION DECLINES.

SEED/SURVIVAL/SHADING/SEEDLINGS/MEXICO/SONORA/GENETIC VARIABILITY/STRESS

0267

MOREAU, R.A.

1979

THE METABOLISM OF STORAGE WAX ESTERS IN THE COTYLEDONS OF GERMINATING JOJOBA (SIMMONDSIA CHINENSIS) SEEDLINGS.

UNIVERSITY OF SOUTH CAROLINA, COLUMBIA. PH.D. DISSERTATION, 139 P.

INTRACELLULAR WAX ESTERS COMPRISE MORE THAN HALF OF THE FRESH WEIGHT OF THE SEEDS OF JOJOBA. THE POSSIBLE ROLE OF WAX ESTERS AS A UNIQUE FORM OF STORAGE LIPID IN THE COTYLEDONS WAS STUDIED. THE GENERAL FEATURES OF THE GLUCONEOGENIC PATHWAY FROM WAX ESTERS IN JOJOBA SEEDLINGS ARE VERY SIMILAR TO THE PATHWAY FROM TRIACYLGLYCEROLS IN FATTY SEEDLINGS. THE UNIQUE FEATURES OF THE GLUCONEOGENIC PATHWAY FROM WAX INVOLVED THREE ENZYMES THAT ARE RESPONSIBLE FOR THE INITIAL CONVERSION OF ONE WAX ESTER MOLECULE TO TWO FATTY ACIDS: WAX ESTER HYDROLASE, FATTY ALCOHOL OXIDASE AND FATTY ALDEHYDE DEHYDROGENASE.

ESTERS/SEED/LIPIDS/COTYLEDONS/ENZYMES

0268

MOREAU, R.A./HUANG, A.H.C.

1977

GLUCONEOGENESIS FROM STORAGE WAX IN THE COTYLEDONS OF JOJOBA SEEDLINGS.

PLANT PHYSIOLOGY 60(2):329-333.

DURING GERMINATION THERE WAS A GRADUAL DECREASE IN THE WAX CONTENT OF SEEDS WITH A CONCOMITANT RISE IN SOLUBLE CARBOHYDRATES, SUGGESTING THAT THE WAX PLAYED THE ROLE OF A FOOD RESERVE. THIN LAYER CHROMATOGRAPHY REVEALED THAT BOTH THE FATTY ALCOHOL AND FATTY ACID WERE METABOLIZED. THE DISAPPEARANCE OF WAX WAS MATCHED WITH AN INCREASE OF CATALASE, A MARKER ENZYME OF THE GLUCONEOGENIC PROCESS IN OTHER FATTY SEEDLINGS. SUBCELLULAR ORGANELLES WERE ISOLATED BY SUCROSE GRADIENT CENTRIFUGATION FROM THE COTYLEDONS AT THE PEAK STAGE OF GERMINATION. THE ENZYMES OF THE BETA OXIDATION OF FATTY ACID AND OF THE GLYOXYLATE CYCLE WERE LOCALIZED IN THE GLYOXYSOMES BUT NOT IN THE MITOCHONDRIA. THE GLYOXYSOMES HAD SPECIFIC ACTIVITIES OF INDIVIDUAL ENZYMES SIMILAR TO THOSE OF THE CASTOR BEAN GLYOXYSOMES. AN ACTIVE ALKALINE LIPASE WAS DETECTED IN THE WAX BODIES AT THE PEAK STAGE OF GERMINATION BUT NOT IN THE UNGERMINATED SEEDS. NO LIPASE WAS DETECTED IN GLYOXYSOMES OR MITOCHONDRIA. AFTER THE WAX IN THE WAX BODIES HAD BEEN EXTRACTED WITH DIETHYL ETHER, THE ORGANELLE MEMBRANE WAS ISOLATED AND STILL RETAINED THE ALKALINE LIPASE. THE GLUCONEOGENESIS FROM WAX IN THE JOJOBA SEEDLINGS APPEARS TO BE SIMILAR, WITH MODIFICATION, TO THAT FROM TRIGLYCERIDE IN OTHER FATTY SEEDLINGS. A PATHWAY FOR THE METABOLISM OF STORAGE WAX MAY OCCUR IN JOJOBA COTYLEDONS. THE WAX IN THE WAX BODIES IS HYDROLYZED BY AN ALKALINE LIPASE THAT IS ASSOCIATED WITH THE MEMBRANE OF THE ORGANELLE. THE RESULTING FATTY ACID AND FATTY ALCOHOL WOULD MOVE TO THE GLYOXYSOMES WHERE THEY ARE MODIFIED AND ACTIVATED BEFORE ENTERING THE BETA OXIDATION SEQUENCE. THE REACTIONS OF BETA OXIDATION AND THE REST OF THE GLUCONEOGENIC PATHWAY ARE SIMILAR TO THOSE DESCRIBED IN GREAT DETAIL IN THE CASTOR BEAN ENDOSPERM. FURTHER STUDY IS REQUIRED TO DETERMINE THE ENZYMIC REACTIONS AND SUBCELLULAR SITE OF FATTY ALCOHOL MODIFICATION.

SEEDLINGS/COTYLEDONS/CHEMICAL STRUCTURE/ALCOHOLS/GLUCONEOGENESIS/FATTY ACIDS

0269

MOREAU, R.A./HUANG, A.H.C.

1981

ENZYMES OF WAX ESTER CATABOLISM IN JOJOBA.

METHODS IN ENZYMOLOGY 71:804-813.

JOJOBA IS THE ONLY KNOWN PLANT SPECIES WHOSE SEEDS CONTAIN A LARGE AMOUNT OF INTRACELLULAR WAX ESTERS IN THE COTYLEDONS. THE CONVERSION OF A WAX ESTER TO FATTY ACIDS IN JOJOBA INVOLVES THREE ENZYMES: 1) A WAX ESTER HYDROLASE THAT CATALYZES THE HYDROLYSIS OF THE WAX ESTER; B) THE FATTY ALCOHOL IS OXIDIZED TO A FATTY ALDEHYDE BY A FATTY ALCOHOL OXIDASE THAT REQUIRES MOLECULAR OXYGEN AS THE ELECTRON ACCEPTOR; AND C) THE FATTY ALDEHYDE IS OXIDIZED TO A FATTY ACID BY FATTY ALDEHYDE DEHYDROGENASE WITH NAD PLUS AS THE ELECTRON ACCEPTOR. ALL THREE ENZYMES ARE ASSOCIATED WITH THE MEMBRANE OF THE STORAGE WAX BODIES, AND THEY SHARE MANY SIMILAR ENZYMIC PROPERTIES. ACTIVITIES OF THE THREE ENZYMES ARE ABSENT IN THE DRY SEEDS AND INCREASE AT PARALLEL RATES DURING GERMINATION.

ESTERS/FATTY ACIDS/ALCOHOLS/GERMINATION/ENZYMES/COTYLEDONS

0270

MOREAU, R.A./HUANG, A.H.C.

1979

OXIDATION OF FATTY ALCOHOL IN THE COTYLEDONS OF JOJOBA SEEDLINGS.

ARCHIVES OF BIOCHEMISTRY AND BIOPHYSICS 194(2):422-430.

DURING THE GERMINATION OF JOJOBA SEEDS, FATTY ALCOHOLS ARE FORMED FROM THE HYDROLYSIS OF STORED WAX ESTERS. THE COTYLEDON EXTRACT HAS THE ABILITY TO CONVERT FATTY ALCOHOLS TO FATTY ALDEHYDES IN THE PRESENCE OF MOLECULAR OXYGEN AND SUBSEQUENTLY TO FATTY ACIDS WHEN NAD<sup>+</sup> IS ADDED. THE TWO ENZYMES THAT CATALYZE THESE ACTIVITIES HAVE BEEN PARTIALLY CHARACTERIZED. THE FATTY ALCOHOL OXIDASE UTILIZES MOLECULAR OXYGEN AS THE ELECTRON ACCEPTOR AND DODECYL ALCOHOL AS THE PREFERRED SUBSTRATE AND HAS AN OPTIMAL PH FOR ACTIVITY AT 9.0. THE FATTY ALDEHYDE DEHYDROGENASE ALSO HAS AN OPTIMAL PH FOR ACTIVITY AT 9.0, AN APPARENT K<sub>sub</sub> M VALUE OF 4 X 10<sup>-6</sup> M FOR DECYL ALDEHYDE, AN APPARENT K<sub>sub</sub> M VALUE OF 2.5 X 10<sup>-4</sup> M FOR NAD<sup>+</sup>, AND A SUBSTRATE PREFERENCE FOR DODECYL ALDEHYDE. NAD<sup>+</sup> IS A MUCH BETTER ELECTRON ACCEPTOR THAN NADP<sup>+</sup>, FAD, OR FLAVIN MONONUCLEOTIDE FOR THE ALDEHYDE DEHYDROGENASE. BOTH ENZYME ACTIVITIES ARE INHIBITED BY P-CHLORMERCURIBENZOATE AND ITS EFFECT IS COMPLETELY REVERSED BY DITHIOTHREITOL. THE WHOLE FATTY ALCOHOL OXIDATION SYSTEM CAN OXIDIZE MONOUNSATURATED FATTY ALCOHOLS, WHICH ARE THE PHYSIOLOGICAL SUBSTRATES IN JOJOBA COTYLEDONS. THE TWO ENZYME ACTIVITIES ARE ABSENT IN THE DRY SEED AND INCREASE DRASTICALLY DURING GERMINATION. BOTH ENZYMES ARE LOCALIZED PRIMARILY ON THE MEMBRANE OF THE WAX BODIES, ALTHOUGH THEY MAY BE PRESENT IN OTHER CELLULAR MEMBRANES.

GERMINATION/ALCOHOLS/ESTERS/ENZYMES/SEED/COTYLEDONS/PLANT PHYSIOLOGY

0271

MULLER, L.L./HENSARLING, T.P./JACKS, T.P.

1975

CELLULAR ULTRASTRUCTURE OF JOJOBA SEED.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 52(5):164-165.

JOJOBA SEED, EXAMINED WITH AN ELECTRON MICROSCOPE, APPEARED ULTRASTRUCTURALLY SIMILAR TO OTHER OILSEEDS, EVEN THOUGH LIQUID WAX, RATHER THAN TRIGLYCERIDE, COMPRISES THE RESERVE LIPID OF THE SEED. THIS OBSERVATION INDICATES THAT BOTH LIQUID WAX AND TRIGLYCERIDE ARE STORED IN SPHEROSOMES WITHIN SEEDS.

OIL/PLANT MORPHOLOGY/SEED

0272

MUNOZ, I./COTA, A./CORDOBA, F.

1982

LA VARIABILIDAD SEXUAL Y MORFOLOGICA DE LA JOJOBA (SIMMONDSIA CHINENSIS) (SEXUAL VARIABILITY AND MORPHOLOGY OF JOJOBA).

PAGES 355-366 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

WILD STANDS OF JOJOBA FROM THE GULF OF CALIFORNIA EXHIBIT EXTENSIVE IRREGULAR GROWTH PATTERNS. INDIVIDUAL PLANTS VARIED IN SHAPE OF THE SHRUB, DISTRIBUTION, SHAPE AND SIZE OF LEAVES, SEED COLOR AND COMPOSITION, COLOR AND PROPERTIES OF



THE EXTRACTED OIL. SPECTROPHOTOMETRICAL ANALYSES WERE PERFORMED TO TRY TO RELATE SEX OF THE PLANT WITH A CHEMICAL INDICATOR. ALTHOUGH TWO DISTINCT SPECTROGRAMS WERE FOUND, NEITHER DETERMINED SEX TYPE. SEXUAL IDENTIFICATION MAY BE MADE BY EXAMINING THE FORM AND ARRANGEMENT OF ROOTS IN SIX-WEEK-OLD PLANTS. TWO ROOT FORMATION TYPES MAY CORRELATE TO SEX: A LONG ROOT WITH SMALL LATERAL RADICULES; AND A BRANCHED ROOT. PROTEIN ANALYSES OF JOJOBA EXTRACTS FOR SEXUAL DIFFERENTIATION PRODUCED NO IDENTIFIABLE RESULTS.

MEXICO/PLANT MORPHOLOGY/SEX DETERMINATION/ROOTS/CHEMICAL REACTIONS

0273

MURRIETA, M.S.X.

1974

EVALUACION DEL POTENCIAL ECONOMICO DEL ACEITE DE JOJOBA (SIMMONDSIA CHINENSIS) (EVALUATION OF THE ECONOMIC POTENTIAL OF JOJOBA OIL, IN SPANISH).

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS, UNIVERSIDAD DE SONORA, HERMOSILLO. 42 P. WITH APPENDIX.

SUCCESSFUL ECONOMIC DEVELOPMENT OF AN INDUSTRY BASED ON JOJOBA WILL DEPEND ON: 1) IMPROVED HARVESTING TECHNIQUES; 2) STABILIZED SEED SUPPLY THROUGH AGRONOMIC DEVELOPMENT; AND 3) DOMESTICATED PLANT VARIETIES. MEXICO HAS AN ECONOMIC ADVANTAGE IN THE JOJOBA MARKET BECAUSE OF THE LOCATION OF NATURAL STANDS WITHIN ITS BORDERS AND LOW HARVESTING COSTS. MEXICO'S PROXIMITY TO THE UNITED STATES LOWERS TRANSPORT COSTS. THE CONTINUED BAN ON SPERM WHALE OIL ASSURES A WORLD MARKET DEMAND FOR JOJOBA OIL.

MEXICO/ECONOMIC DEVELOPMENT/ECONOMICS/COST ANALYSIS

0274

MURRIETA, M.S.X.

1981

PANORAMICA GENERAL DE LA JOJOBA EN SONORA (GENERAL OVERVIEW OF JOJOBA IN SONORA, IN SPANISH).

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS, UNIVERSIDAD DE SONORA, HERMOSILLO. 10 P.

VARIOUS MEXICAN GOVERNMENT AGENCIES ARE STUDYING DOMESTICATION OF JOJOBA UNDER INTENSIVE FARMING, AND ECOLOGICAL ASPECTS, PRODUCT DEVELOPMENT AND GROWTH PATTERNS FOR MANAGEMENT OF NATIVE AND CULTIVATED STANDS.

MEXICO/SONORA/ECONOMIC DEVELOPMENT

0275

MURRIETA, M.S.X.

1982

LA JOJOBA EN SONORA (JOJOBA IN SONORA, IN SPANISH).

PAGES 446-449 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

AN OVERVIEW OF JOJOBA'S STATUS IN SONORA, MEXICO, AND ACHIEVEMENTS OF CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS DE LA UNIVERSIDAD DE SONORA (CICTUS).

MEXICO/SONORA/NATIVE POPULATIONS

0276

MURRIETA, M.S.X.

1978

COSTEO PRELIMINAR DE LA JOJOBA EN UN CULTIVO DOMESTICADO (PRELIMINARY COST OF JOJOBA UNDER CULTIVATION, IN SPANISH).

PAGES 275-283 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

BASED ON BIBLIOGRAPHIC INFORMATION, ESTIMATES OF INITIAL JOJOBA PLANTATION INVESTMENTS ARE ANALYZED. A PRELIMINARY ESTIMATE OF JOJOBA SEED PRODUCTION IS GIVEN. A 1-HECTARE PLOT IS NOT ECONOMICALLY FEASIBLE.

ECONOMICS/PLANTATION MANAGEMENT/SEED YIELD/COST ANALYSIS/MEXICO

0277

MURRIETA, M.S.X.

1978

LA JOJOBA EN SONORA (JOJOBA IN SONORA, IN SPANISH).

PAGES 31-37 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

PAST, PRESENT AND FUTURE RESEARCH ACTIVITIES IN THE STATE OF SONORA, MEXICO, BEGINNING WITH EL CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS DE LA UNIVERSIDAD DE SONORA (CICTUS) INVOLVEMENT IN 1963, ARE OUTLINED.

MEXICO/UNIVERSIDAD DE SONORA

0278

MURRIETA, M.S.X./CASTELLANOS V., A.

1978

EVALUACION Y UTILIZACION DE LA JOJOBA SILVESTRE (EVALUATION AND USE OF NATIVE JOJOBA, IN SPANISH).

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS, UNIVERSIDAD DE SONORA, HERMOSILLO. 25 P. WITH APPENDIX.

TWO TEST PLOTS OF 100 HECTARES AND 10 HECTARES, RESPECTIVELY, WERE DIVIDED AND FENCED TO STUDY PHENOLOGICAL ASPECTS OF NATIVE JOJOBA. BOTH PLOTS WERE CLEARED OF SURROUNDING VEGETATION EXCEPT JOJOBA IN ONE AND JOJOBA AND OLNEYA IN THE OTHER. SEASONAL CYCLES AND RELATIONSHIPS BETWEEN JOJOBA PLOTS WITH AND WITHOUT OLNEYA WERE OBSERVED. DENSITY AND COVER WITHIN THE TWO PLOTS WERE COMPARED TO DETERMINE CHANGES IN THE MANIPULATED NATURAL STANDS. ONLY A SLIGHT CHANGE IN VALUES WAS NOTED.

MEXICO/PHENOLOGY/SEED YIELD/FLOWERING/OLNEYA/COMPETITION/CLIMATE

0279

MURRIETA, M.S.X./ESPERICUETA, M.

1976

ESTUDIO DASONOMICO DE LA JOJOBA: PRIMER INFORME (ECOLOGICAL SURVEY OF JOJOBA: FIRST REPORT, IN SPANISH).

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS, UNIVERSIDAD DE SONORA, HERMOSILLO. 26 P. WITH APPENDIX.

IN THE BAHIA KINO, SONORA, AREA JOJOBA GROWS ON PREDOMINANTLY LAMINATED RUNOFF SLOPES WITH GRANITIC SOILS AND BEHAVES AS A RIPARIAN SPECIES TYPE. FIFTY PERCENT OF THE PLANTS GROW IN THE SHADE OF DIVERSE SPECIES FOR PROTECTION, PREFERRING BURSERA AND CERCIDIUM. THE SEXUAL RATIO WAS 1:1.

MEXICO/SHADING/SONORA/ECOSYSTEMS/CERCIDIUM/INVENTORIES/MOTHER PLANTS/  
NATIVE POPULATIONS

0280

MURRIETA, M.S.X./ESPERICUETA, M.

1976

ESTUDIO DASONOMICO DE LA JOJOBA (SIMMONDSIA CHINENSIS LINK): SEGUNDO INFORME (ECOLOGICAL SURVEY OF JOJOBA: SECOND REPORT, IN SPANISH).

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS, UNIVERSIDAD DE SONORA, HERMOSILLO. 6 P. WITH APPENDIX.

IN SONORA, MEXICO, JOJOBA PLANTS GROW ON LAMINATED RUNOFF SLOPES IN SANDY SOILS OF GRANITIC ORIGIN. MORE THAN 50 PERCENT OF THE PLANTS WERE GROWING UNDER THE PROTECTION OF VARIOUS PLANT SPECIES. THE BURSERA MICROPHYLLA ASSOCIATION WAS MOST COMMON IN ALL STUDY SITES. THE SEXUAL DISTRIBUTION VARIED FROM SITE TO SITE. THE DESEMBOQUE AREA HAD A GREATER PROPORTION OF FEMALE PLANTS. THE MOST FREQUENTLY ASSOCIATED SPECIES WERE CERCIDIUM MICROPHYLLUM, OLNEYA TESOTA AND LARREA TRIDENTATA.

MEXICO/SONORA/CERCIDIUM/ECOSYSTEMS/LARREA/OLNEYA/SHADING/INVENTORIES/  
MOTHER PLANTS/NATIVE POPULATIONS

0281

MURRIETA, M.S.X./ESPERICUETA, M.

1977

ESTUDIO DASONOMICO DE LA JOJOBA: TERCER INFORME (ECOLOGICAL SURVEY OF JOJOBA: THIRD REPORT, IN SPANISH).

CENTRO DE INVESTIGACIONES CIENTIFICAS Y TECNOLOGICAS, UNIVERSIDAD DE SONORA, HERMOSILLO. 5 P. WITH APPENDIX.

JOJOBA PLANTS GROW ALONG THE COASTAL AREAS OF SONORA, MEXICO AT ALTITUDES RANGING FROM 1.5 METERS TO 640 METERS ABOVE SEA LEVEL AND ON SLOPES WITH A 5 DEGREE TO 6 DEGREE GRADIENT. SANDY SOILS OF GRANITIC ORIGIN WERE DOMINANT. PLANTS ALSO GROW ON HILLS AT A MAXIMUM ALTITUDE OF 1,320 METERS IN ROCKY SOILS OF GRANITIC AND BASALTIC ORIGIN. JOJOBA GROWS ON SLOPES WITH NORTHEAST, SOUTHEAST AND SOUTHWEST EXPOSURES WITH 15 DEGREE TO 20 DEGREE GRADES. QUADRANTS WERE USED TO CALCULATE DENSITIES AND ASSOCIATED VEGETATION. SEXUAL DISTRIBUTION

VARIED FROM SITE TO SITE. PLANT SPECIES CONSISTENTLY FOUND GROWING IN ASSOCIATION WITH JOJOBA WERE FEROCACTUS, FOUQUIERIA SPLENDENS AND OPUNTIA. VARIOUS JOJOBA SITES WERE NOT AVAILABLE FOR HARVESTING BECAUSE OF DROUGHT AND EXCESSIVE BROWSING.

MEXICO/SONORA/SLOPES/SOILS/OPUNTIA/FOUQUIERIA SPLENDENS/FEROCACTUS/  
INVENTORIES/NATIVE POPULATIONS

0282

NACHIMIAS, A./KRIKUN, J.

1982

JOJOBA DISEASES AND THEIR CONTROL IN ISRAEL.

PAGES 166-168 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

FUNGAL INFECTIONS ON JOJOBA WERE OBSERVED IN ISRAEL FROM 1978-1980. PHYTHOPHTHORA SPP. WAS OBSERVED IN A LOESSIAL SOIL. FIRST SYMPTOMS WERE LEAF DROP AND CHLOROSIS OF THE REMAINING LEAVES. PLANTS WERE SPRAYED WITH 0.3 PERCENT BENLATE. AFTER TWO MONTHS, NEW HEALTHY BRANCHES APPEARED. THE FUNGUS WAS NOT ELIMINATED BY THE TREATMENT, BUT WAS SIGNIFICANTLY REDUCED. VERTICILLIUM DAHLIAE CAUSED THE DEATH OF A NURSERY PLANT AT THE APPLIED RESEARCH INSTITUTE; HOWEVER, THAT WAS THE ONLY CASE DETECTED IN THE FOLLOW-UP PERIOD. CLIOCLADIUM DELIQUESCENS WAS TRANSPORTED FROM THE FIELD ON THE SURFACE OF CUTTINGS THAT WERE USED IN PROPAGATION EXPERIMENTS. ROOT FORMATION WAS HINDERED, LEAVES DROPPED AND CUTTINGS DIED AFTER TWO TO THREE WEEKS. THE FOLLOWING TREATMENTS WERE SUCCESSFUL IN PREVENTING INFECTION: 1) SURFACE STERILIZATION WITH 70 PERCENT ETHANOL AND 10 PERCENT SODIUM-HYPOCHLORIDE; 2) APPLICATION OF 10 PERCENT THIABENDAZOLE MIXED WITH THE ROOTING HORMONE; AND 3) DAILY SPRAYING WITH 0.5 PERCENT CAPTAN AND 0.3 PERCENT THIABENDAZOLE. METHODS OF INTENSIFYING AGRICULTURAL PRACTICES CAN DISTURB THE BIOLOGICAL BALANCE OF THE SPECIES. WHEN SUBMITTED TO CONDITIONS AND STIMULATED TO PERFORMANCES OTHER THAN THOSE OF THE NATIVE ENVIRONMENT AND GROWTH HABIT, THE PLANT APPEARS TO BECOME SUSCEPTIBLE TO A LARGE NUMBER OF DISEASES. HOWEVER, NEW ENVIRONMENTS MAY BE FREE FROM PATHOGENS PREJUDICIAL TO JOJOBA AND MAY OFFER CONDITIONS PREFERENTIAL TO ITS CULTIVATION.

ISRAEL/DISEASES/PATHOGENS

0283

NATIONAL ACADEMY OF SCIENCES, WASHINGTON, D.C.

1975

PRODUCTS FROM JOJOBA: A PROMISING NEW CROP FOR ARID LANDS.

NATIONAL ACADEMY OF SCIENCES, WASHINGTON, D.C., NATIONAL RESEARCH COUNCIL, ASSEMBLY OF MATHEMATICAL AND PHYSICAL SCIENCES, OFFICE OF CHEMISTRY AND CHEMICAL TECHNOLOGY, COMMITTEE ON JOJOBA UTILIZAION. 30 P.

JOJOBA OIL AND ITS HYDROGENATED PRODUCTS HAVE MARKETABLE PROPERTIES. JOJOBA OIL HAS NUMEROUS POTENTIAL APPLICATIONS, BUT ITS DEVELOPMENT CAN REST RELIABLY ON ITS ABILITY TO SUBSTITUTE FOR EXISTING OILS AND WAXES SUCH AS SPERM WHALE OIL, CARNAUBA WAX, BEESWAX, AND SPERMACE TI. IF A SUFFICIENT SUPPLY OF JOJOBA OIL WERE AVAILABLE AT A COMPETITIVE PRICE, IT COULD BE USED AS A SUBSTITUTE FOR SPERM WHALE OIL. HYDROGENATED JOJOBA OIL HAS AN IMMEDIATE MARKET POTENTIAL. JOJOBA COULD BECOME THE BASIS FOR INDIAN-OWNED AND OPERATED INDUSTRIES OF CONSIDERABLE ECONOMIC AND SOCIAL BENEFIT ON RESERVATIONS IN ARIZONA AND CALIFORNIA. JOJOBA CAN BE GROWN ON LANDS UNSUITABLE FOR CONVENTIONAL CROPS.

ALCOHOLS/INDIAN RESERVATIONS/SEED MEAL/LUBRICANTS/MARKET DEMAND/  
SPERM WHALE OIL/WHALE CONSERVATION

0284

NATIONAL ACADEMY OF SCIENCES, WASHINGTON, D.C.

1977

JOJOBA: FEASIBILITY FOR CULTIVATION ON INDIAN RESERVATIONS IN THE SONORAN DESERT REGION.

NATIONAL ACADEMY OF SCIENCES, WASHINGTON, D.C., NATIONAL RESEARCH COUNCIL, COMMISSION ON NATURAL RESOURCES, BOARD ON AGRICULTURE AND RENEWABLE RESOURCES, COMMITTEE ON JOJOBA PRODUCTION SYSTEMS POTENTIAL. 64 P.

THE BOARD ON AGRICULTURE AND RENEWABLE RESOURCES OF THE NATIONAL RESEARCH COUNCIL ANALYZED THE PRODUCTION POTENTIAL OF JOJOBA SEEDS, INCLUDING ITS COMMERCIAL FEASIBILITY AND RELEVANCE TO INDIAN ECONOMIC DEVELOPMENT.

ARIZONA/CALIFORNIA/COST ANALYSIS/ECONOMIC DEVELOPMENT/INDIAN RESERVATIONS/OIL/MARKET DEMAND/SEED HARVEST

0285

NEISWANGER, E.B.

1947

SOUTH TEXAS EXPERIMENTS WITH JOJOBA, SEEDS OF SHRUBS SUPPLY VALUABLE INDUSTRIAL WAX.

TEXAS CHEMURGIC NEWS 3(4):1.

PROCESSORS OF WAX PRODUCTS ARE PROMOTING THE GROWING OF WAX-BEARING PLANTS, SUCH AS JOJOBA, IN THE U.S. SOUTHWEST TO REPLACE IMPORTS FROM AFRICA AND SOUTH AMERICA. JOJOBA SEEDS HAVE BEEN DISTRIBUTED IN 31 SOUTH TEXAS COUNTIES. MARGINAL LANDS COULD BE USED TO GROW JOJOBA EVEN IN THE LAREDO AND DEL RIO SECTIONS. PROCESSING OF SEED COULD BE DONE AT COTTONSEED OIL MILLS.

TEXAS/CULTIVATION/MECHANICAL EXTRACTION

0286

NELSON, E.A. ET AL

1979

PALATABILITY OF VARIOUS JOJOBA MEAL PREPARATIONS WITH LAMBS.

AMERICAN SOCIETY OF ANIMAL SCIENTISTS, WESTERN SECTION, ANNUAL MEETING PROCEEDINGS 30:239-240.

A PREFERENCE TRIAL EMPLOYING A PELLETTED BASAL COTTONSEED MEAL (CSM) RATION WITH 5 PERCENT MOLASSES ADDED, A 20 PERCENT METHYLENE CHLORIDE DEOILED BUT NON-DETOXIFIED JOJOBA MEAL AND A 50/50 BLEND OF THE TWO WAS CONDUCTED WITH 10 LAMBS LIMITED FED OVER A 10-DAY PERIOD. THE LAMBS CONSUMED AN AVERAGE OF .72, .29 AND .05 KG/HEAD/DAY ( $P < .05$ ) OF THE BASAL, BLEND AND 20 PERCENT MIXES, RESPECTIVELY, INDICATING A DEFINITE PREFERENCE FOR THE CSM OVER THE JOJOBA SUPPLEMENTED RATIONS. A SECOND 42-DAY TRIAL COMPARED A CSM, AN AMMONIA (A) AND PHOSPHORIC ACID (P) DETOXIFIED JOJOBA MEALS, ALL AT A 10 PERCENT LEVEL OF ADDITION. AVERAGE DAILY FEED CONSUMPTION WAS 1.11, 1.13 AND 1.04 KG PER LAMB FOR CSM, A AND P, RESPECTIVELY. CORRESPONDING NON-SIGNIFICANT ( $P > .05$ ) VALUES FOR ADG (KG) WERE .20, .13 AND .19. EITHER DETOXIFICATION METHOD PERMITTED ADEQUATE INITIAL VOLUNTARY INTAKE WITHOUT NEED FOR ADAPTION. A THIRD TRIAL EVALUATED AMMONICAL HYDROGEN PEROXIDE (HP) DETOXIFIED MEAL. FOUR 32-KG LAMBS WERE ALLOTTED TO EACH OF CSM AND HP SUPPLEMENTAL RATIONS WITH AVERAGE DAILY INTAKES (KG) DURING 35 DAYS OF 1.68 AND 1.59 ( $P > .05$ ), RESPECTIVELY.

CORRESPONDING ADG (KG) WERE .16 AND .12. IN A FOURTH TRIAL, 10 PERCENT MICROBIOLOGICALLY TREATED (MT) JOJOBA MEAL WAS EVALUATED WITH FOUR 30-KG LAMBS PER GROUP. FEED CONSUMPTION WAS 1.75 AND 1.72 KG/HEAD/DAY FOR CSM BASAL AND MT RATION, RESPECTIVELY. CORRESPONDING ADG (KG) WERE .20 AND .22. THESE DATA SUGGEST THAT VARIOUS METHODS OF DETOXIFICATION MAY ENHANCE THE PALATABILITY IF NOT THE UTILITY OF DEOILED JOJOBA MEAL. THE MICROBIOLOGICAL DETOXIFICATION METHOD YIELDED THE GREATEST PERFORMANCE RESPONSE.

PALATABILITY/SEED MEAL/LAMBS/TOXICITY/FEEDING STUDIES/DETOXIFICATION

0287

NUTTALL, T.

1844

ON SIMMONDSIA, A NEW GENUS OF PLANTS FROM CALIFORNIA.

LONDON JOURNAL OF BOTANY, W.J. HOOKER. 3:400-401.

SIMMONDSIA CALIFORNICA IS DESCRIBED IN THE MONOTYPIC GENUS SIMMONDSIA AND IN THE ORDER GARRYACEAE.

SYSTEMATICS/CALIFORNIA

0288

OFFICE OF ARID LANDS STUDIES

1972

ARIZONA JOJOBA STUDY PROGRESS REPORT 1972.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 53 P. PLUS ATTACHMENTS.

THIS DOCUMENT SUBMITTED TO THE U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C., REPORTS FIRST-YEAR GRANT ACTIVITIES TO DEVELOP JOJOBA ON INDIAN RESERVATIONS IN THE UNITED STATES.

PLANT DISTRIBUTION/NATIVE POPULATIONS/ARIZONA/INDIAN RESERVATIONS/SEED HARVEST/SOCIAL ASPECTS

0289

OFFICE OF ARID LANDS STUDIES

1973

ARIZONA JOJOBA STUDY PROGRESS REPORT 1973.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 45 P. PLUS ATTACHMENTS.

THIS GRANT REPORT SUBMITTED TO THE U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C., DESCRIBES AMERICAN INDIAN PARTICIPATION IN SEED HARVEST, SEED PROCESSING, ANALYSIS OF SEED OIL CONTENT, THE DEVELOPMENT OF RESERVATION EXPERIMENTAL AREAS, ECONOMIC FEASIBILITY, ENVIRONMENTAL IMPACTS, AND JOJOBA CANDLE DEVELOPMENT.

PRODUCT DEVELOPMENT/ARIZONA/INDIAN RESERVATIONS/ECONOMIC DEVELOPMENT/MARKET DEMAND/OIL/SEED HARVEST/SOCIAL ASPECTS

0290

OFFICE OF ARID LANDS STUDIES

1974

ARIZONA JOJOBA STUDY PROGRESS REPORT 1974.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 151 P. PLUS ATTACHMENTS.

THIS GRANT REPORT, SUBMITTED TO THE OFFICE OF NATIVE AMERICAN PROGRAMS, U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C., DESCRIBES PROGRAM COORDINATION, JOJOBA DEMAND, APACHE MARKETING COOPERATIVE ASSOCIATION, PAPAGO WATER HARVESTING AREA, RESERVATION EXPERIMENTAL AREAS, ECOLOGICAL RESEARCH AND SEED BANK, ECONOMIC FEASIBILITY, ENVIRONMENTAL IMPACTS AND JOJOBA CANDLES.

ARIZONA/INDIAN RESERVATIONS/ECONOMIC DEVELOPMENT/PRODUCT DEVELOPMENT/MARKET DEMAND/SEED HARVEST/SOCIAL ASPECTS

0291

OFFICE OF ARID LANDS STUDIES

1974

INDIAN JOJOBA INDUSTRY: ENVIRONMENTAL IMPACT STUDY.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. UNPUBLISHED MIMEOGRAPHED REPORT. 32 P.

IMPACTS OF SPECIFIC JOJOBA PROJECTS WILL REQUIRE DETAILED STUDY OF LOCAL ENVIRONMENTAL AND ECOLOGICAL FACTORS. FOUR POTENTIAL AVENUES OF DEVELOPMENT ARE CONSIDERED: 1) HARVESTING THE NATURAL SEED CROP OF WILD PLANTS; 2) HARVESTING THE SEED CROP OF MANIPULATED NATURAL POPULATIONS; 3) ESTABLISHING PLANTATIONS ON OLD AGRICULTURAL LANDS; AND 4) ESTABLISHING PLANTATIONS ON NEWLY CLEARED DESERT LANDS.

ECONOMIC DEVELOPMENT/INDIAN RESERVATIONS/SEED HARVEST

0292

OHLROGGE, J.B./POLLARD, M.R./STUMPF, P.K.

1978

STUDIES ON BIOSYNTHESIS OF WAXES BY DEVELOPING JOJOBA AND SEED TISSUE.

LIPIDS 13(3):203-210.

SLICES OF DEVELOPING JOJOBA COTYLEDONS INCORPORATED A VARIETY OF PRECURSORS INTO WAX, FREE ALCOHOLS, AND POLAR LIPIDS. SUP 14 C-DECANOIC AND SUP 14 C-LAURIC ACIDS WERE ELONGATED AND DESATURATED. SUP 14 C-MYRISTIC AND SUPER 14 C-LONGER CHAIN FATTY ACIDS, ALTHOUGH INCORPORATED INTO WAX, WERE INSIGNIFICANTLY MODIFIED. EXOGENOUSLY ADDED SUP 14 C-ACETATE CONTRIBUTED MAINLY TO CHAIN ELONGATION OF ENDOGENOUS OLEIC ACID. SUPER 14 C FROM ADDED GLUCOSE WAS UNIFORMLY DISTRIBUTED THROUGHOUT THE ACYL CHAIN OF FATTY ACIDS. THESE DATA SUGGEST THE EXISTENCE OF METABOLICALLY SEPARATED POOLS OF ACETATE AND/OR SITES FOR DE NOVO SYNTHESIS AND ELONGATION OF ACYL CHAINS.

FATTY ACIDS/COTYLEDONS/CHEMICAL COMPOSITION/PLANT PHYSIOLOGY

0293

OREAL, S.A.

1981

COSMETIC OIL AND COMPOSITIONS CONTAINING THEM.

BELGIUM 886,707, JUNE 17, 1981.

COSMETIC OILS THAT DO NOT LEAVE A STICKY AND GREASY TOUCH WHEN APPLIED TO THE SKIN ARE PREPARED USING A MIXTURE OF VEGETABLE OILS, SUCH AS JOJOBA AND TOURNESOL OILS, AND UNSAPONIFIABLES OF SOYBEAN OR AVOCADO. THE COMPOUND WAS PREPARED CONTAINING 33.3 PERCENT JOJOBA OIL, 33.3 PERCENT TOURNESOL OIL, 22.2 PERCENT SOYBEAN UNSAPONIFIABLES, AND 11.2 PERCENT AVOCADO UNSAPONIFIABLES. THE OIL WAS MIXED WITH 0.1 PERCENT BHA AND 0.1 PERCENT BHT TO GIVE A BODY OIL. SUNSCREENING AGENTS MAY BE ADDED TO THE ABOVE OIL COMPOUND.

COSMETICS/TOURNESOL/SOYBEAN OIL/AVOCADO OIL/OIL/PATENTS

0294

ORTEGA N., M.

1982

CARACTERISTICAS EDAFOLOGICAS DE SITIOS DE JOJOBA SILVERSTRE Y CULTIVADA (EDAPHIC CHARACTERISTICS OF WILD AND CULTIVATED JOJOBA SITES, IN SPANISH).

PAGES 182-192 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

NATURAL STANDS OF JOJOBA WERE STUDIED TO DETERMINE THEIR RANGE OF PHYSIOCHEMICAL PARAMETERS. BASED ON THESE DATA, RECOMMENDATIONS WILL BE MADE FOR SELECTING FUTURE SITES FOR JOJOBA CULTIVATION. SEASONAL VARIATIONS OF SOIL NUTRIENTS AND THEIR UTILIZATION BY PLANTS ALSO WERE EXAMINED TO DETERMINE BETTER SOIL MANAGEMENT AND FERTILIZER APPLICATION TECHNIQUES FOR CULTIVATED FIELDS.

MEXICO/SOIL-WATER-PLANT RELATIONSHIPS/SOILS/SOIL NUTRIENTS/NATIVE POPULATIONS/FERTILIZERS

0295

ORTIZ M., J.

1982

AVANCES DE INVESTIGACION EN LA APLICACION DE LOS RIEGOS EN JOJOBA BAJO CULTIVO EN LA COSTA DE HERMOSILLO (ADVANCES IN RESEARCH OF IRRIGATION APPLIED TO JOJOBA UNDER CULTIVATION ON THE COAST OF HERMOSILLO, IN SPANISH).

PAGES 488-490 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

IRRIGATION METHODS WERE RESEARCHED TO DETERMINE AMOUNTS AND FREQUENCY OF WATER APPLICATIONS FOR OPTIMUM PRODUCTION. IRRIGATION EFFECTS AT CRITICAL DEVELOPMENT STAGES ALSO WERE STUDIED. WITH FOUR IRRIGATION APPLICATIONS, ROOTS PENETRATED 1.85 METERS IN THE FIRST YEAR, 3.1 METERS IN THE SECOND YEAR, AND 3.7 METERS IN THE THIRD YEAR. IF THE SOIL HAS A HARD CAP, RADICALS TEND TO GROW Laterally WITH MANY FIBROUS ROOTS.

MEXICO/ROOTS/IRRIGATION/WATER USE



0296

ORUM, T.V. ET AL

1981

SUSCEPTIBILITY OF JOJOBA (SIMMONDSIA CHINENSIS) TO VERTICILLIUM DAHLIAE AND TO PHYMATOTRICHUM OMNIVORUM.

PLANT DISEASE 65(3):243-245.

UNDER GREENHOUSE CONDITIONS JOJOBA SEEDLINGS, TO 23 MONTHS OF AGE, WERE SUSCEPTIBLE TO VERTICILLIUM DAHLIAE. MAJOR SYMPTOMS ASSOCIATED WITH INFECTION BY V. DAHLIAE INCLUDED UNILATERAL, MARGINAL CHLOROSIS OF LEAVES, AND GRAY-GREEN, WRINKLED LEAF SURFACES. VASCULAR DISCOLORATION WAS FREQUENTLY ASSOCIATED AND WAS MOST OBVIOUS AT NODES BEARING LEAVES WITH SYMPTOMS. DEFOLIATION AND DEATH OCCURRED IN SOME TESTS. MINIMUM EFFECTIVE INOCULUM CONCENTRATIONS FOR SOIL DRENCHES CONTAINED 50,000 CONIDIA PER MILLILITER; CONCENTRATIONS CONTAINING AT LEAST 5 MILLION CONIDIA PER MILLILITER WERE MORE EFFECTIVE, INFECTING AS MANY AS 95 PERCENT OF THE PLANTS. JOJOBA PLANTS, AT LEAST THREE MONTHS OLD, ALSO WERE SUSCEPTIBLE TO PHYMATOTRICHUM OMNIVORUM. NUMBERS OF AFFECTED PLANTS VARIED WITH SOIL TYPE AND INOCULUM CONCENTRATION. UNDER THE MOST FAVORABLE CONDITIONS, 16 OF 24 PLANTS HAD ROTTED ROOTS AFTER 7 WEEKS, FIVE OF THOSE PLANTS DIED. STRANDS OF P. OMNIVORUM OCCURRED ON NON-ROTTED ROOTS OF SOME INOCULATED PLANTS.

DISEASES/SEEDLINGS/ROOTS

0297

PAISLEY, D.M.

1961

PART I. SOME POLYMERIZATION REACTIONS OF THE ACRYLATE AND METHACRYLATE ESTERS OF ALCOHOLS FROM SIMMONDSIA CHINENSIS SEED OIL. PART II. POLYMERIZATION REACTIONS OF SOME ORGANOPHOSPHORUS COMPOUNDS.

UNIVERSITY OF ILLINOIS, URBANA. PH.D. THESIS, 144 P.

THE ACRYLATE AND METHACRYLATE ESTERS OF THE MIXED ALCOHOLS, PRINCIPALLY EICOSENOL AND DICOSENOL, HAVE BEEN SYNTHESIZED, HOMOPOLYMERIZED AND COPOLYMERIZED IN THE PATTERN OF OTHER ACRYLATE AND METHACRYLATE ESTERS. FREE RADICAL INITIATION IN AN EMULSION SYSTEM PRODUCES SOLUBLE POLYMERS IN WHICH THE UNSATURATION OF THE ALCOHOL CHAIN HAS BEEN ALMOST COMPLETELY RETAINED. ALTHOUGH EXPOSURE TO AIR RENDERS THE POLYMERS CROSS-LINKED AND INSOLUBLE. THE POLYMERS ARE SOFT AND SHOW PROMISE FOR USE AS ADHESIVE.

ALCOHOLS/OIL/SEED/ESTERS/POLYMERIZATION/PRODUCT DEVELOPMENT  
0298

PALZKILL, D.A.

1980

ESTABLISHING JOJOBA IN FIELD PLANTINGS.

JOJOBA HAPPENINGS 30:3-8.

PLANTING STOCK AND IRRIGATION AND PLANTING PATTERNS SHOULD BE CONSIDERED WHEN ESTABLISHING JOJOBA PLANTATIONS. IRRIGATION, WEED CONTROL AND FREQUENT INSPECTION OF THE FIELD IS CRITICAL.

PLANTATION ESTABLISHMENT/IRRIGATION/PLANT DISTRIBUTION/SEEDLINGS/WEED CONTROL/  
PLANTING MANAGEMENT

0299

PALZKILL, D.A./HOGAN, L./JOHNSON, J.D.

1982

JOJOBA CULTIVATIONS IN THE SCUTHWESTERN UNITED STATES: ACREAGE, CULTURAL PRACTICES AND PROBLEMS.

PAGES 439-445 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

A SURVEY OF U.S. JOJOBA GROWERS INDICATED THAT THE MOST SERIOUS IMMEDIATE PROBLEM IS WEED CONTROL. MOST LARGE PLANTATIONS HAVE USED DIRECT-SEEDING TECHNIQUES. ALMOST ALL CULTIVATIONS ARE IRRIGATED.

HERBICIDES/PROPAGATION/IRRIGATION/CULTIVATION/PLANTATION MANAGEMENT/ARIZONA/CALIFORNIA

0300

PARRA H., H./SEPULVEDA B., J.I.

1978

AVANCES DE LA INVESTIGACION SOBRE LA JOJOBA EN EL ESTADO DE BAJA CALIFORNIA SUR (ADVANCES IN JOJOBA RESEARCH IN SOUTHERN BAJA CALIFORNIA, IN SPANISH).

PAGES 25-30 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

RESEARCH ON AGRONOMICAL AND ECONOMICAL ASPECTS OF COMMERCIAL JOJOBA CULTIVATION CONDUCTED BY THE INSTITUTO NACIONAL DE INVESTIGACIONES FORESTALES AT TODOS SANTOS, BAJA CALIFORNIA SUR, MEXICO, IS ANALYZED.

AGRONOMY/ECONOMICS/MEXICO

0301

PARRA H., H./SEPULVEDA B., J.I.

1979

LA INVESTIGACION SOBRE JOJOBA EN EL CENTRO DE INVESTIGACIONES FORESTALES DEL NOROESTE (CIFNO) (JOJOBA INVESTIGATIONS BY CENTRO DE INVESTIGACIONES FORESTALES DEL NOROESTE, IN SPANISH).

PAGES 291-303 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

ACTIVITIES OF EL CENTRO DE INVESTIGACIONES FORESTALES DEL NOROESTE, TODOS SANTOS, BAJA CALIFORNIA SUR, ARE REPORTED. REPORTS OF ECOLOGICAL STUDIES OF JOJOBA HABITAT, PRODUCTION IN WILD STANDS AND DOMESTICATION TENDENCIES, AND A SUMMARY OF MONOECIOUS PLANT POPULATIONS ARE INCLUDED. INVESTIGATIONS CONDUCTED WITH FUNDING FROM MEXICO'S PROGRAMA DE INVERSIONES PUBLICAS PARA EL DESARROLLO RURAL ARE REPORTED.

NATIVE POPULATIONS/MONOECISM/MEXICO/ECOSYSTEMS

0302

PATHAK, S.G. ET AL

1978

JOJOBA OIL AS AN ANTIFOAM AGENT IN ANTIBIOTIC FERMENTATION.

PAGES 285-290 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

JOJOBA OIL WAS AN EXCELLENT AGENT FOR CONTROLLING FOAMING IN PENICILLIN AND CEPHALOSPORIN FERMENTATIONS IN THE PILOT PLANT. THE AMOUNT OF JOJOBA OIL USED TO CONTROL FOAMING DURING PENICILLIN FERMENTATION WAS ONLY ONE-SIXTH THE AMOUNT OF SPERM WHALE OIL USED FOR THE SAME PURPOSE.

OIL/MEDICINAL USES/PENICILLIN/SPERM WHALE OIL/FERMENTATION

0303

PINTO, J.D./FROMMER, S.I.

1979

A PRELIMINARY SURVEY OF THE INSECTS ASSOCIATED WITH JOJOBA.

PAGES 19-24 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

PRELIMINARY STUDIES NEAR AGUANGA, DEEP CANYON AND PALM DESERT, CALIFORNIA, HAVE INDICATED THAT SEVERAL SPECIES OF INSECTS ARE INTIMATELY ASSOCIATED WITH JOJOBA. SPECIES SUCH AS SCIRTOTHRIPS EWARTI, ASPHONDYLIA NEW SPECIES, PERIPLOCA NEW SPECIES, PUTO SIMMONDSIAE AND DIASPIS SIMMONDSIAE ARE KNOWN ONLY FROM JOJOBA; HOWEVER, OTHER SPECIES WITH KNOWN GENERALIST TENDENCIES ALSO ARE ASSOCIATED INCLUDING APHIS CRACCIVORA AND FRANKLINIELLA OCCIDENTALIS. SPECIES COMPOSITIONS OF THE JOJOBA FAUNA APPEAR TO VARY GEOGRAPHICALLY. IN THE NATURAL SETTINGS, POPULATIONS OF MOST OF THE POTENTIAL PESTS ARE LOW AND APPEAR TO BE UNDER SUFFICIENT NATURAL CONTROL. TO WHAT EXTENT THIS CONTROL COULD BE DISRUPTED THROUGH ENVIRONMENTAL MODIFICATIONS, SUCH AS LARGE-SCALE MONOCULTURES, REMAINS TO BE SEEN.

INSECTS/PESTS/ENVIRONMENTAL EFFECTS/CALIFORNIA/NATIVE POPULATIONS

0304

PINTO, J.D./FROMMER, S.I.

1980

A SURVEY OF THE ARTHROPODS ON JOJOBA (SIMMONDSIA CHINENSIS).

ENVIRONMENTAL ENTOMOLOGY 9(1):137-143.

IN A SURVEY OF ARTHROPODS ASSOCIATED WITH SYLVATIC JOJOBA IN CALIFORNIA AND ARIZONA, 106 SPECIES OF INSECTS AND MITES WERE COLLECTED. SPECIES INCLUDED ORTHOPTERA, THYSANOPTERA, ISOPTERA, HETEROPTERA, HOMOPTERA, COLEOPTERA, DIPTERA, LIPIDOPTERA, HYMENOPTERA AND ACARINA. OF THOSE, 50 ARE PHYTOPHAGOUS, 29 ARE PARASITIC AND 18 ARE PREDACEOUS. MOST OF THE PHYTOPHAGOUS SPECIES ALSO ARE KNOWN TO FEED ON PLANTS OTHER THAN JOJOBA; SEVERAL ARE NOTORIOUS GENERALISTS. THE BIONOMICS (ECOLOGY) OF THE FOUR MOST COMMON PHYTOPHAGOUS SPECIES,

ASPHONDYLIA SP. NOV. (CECIDOMYIIDAE), EPINOTIA KASLOANA (OLETHREUTIDE), PERIPLOCA SP. NOV (WALSHIIDAE) AND INCISITERMES FRUTICAVUS (KALOTERMITIDAE) ARE SUMMARIZED BRIEFLY. NONE OF THE PHYTOPHAGOUS SPECIES WERE OBSERVED TO CAUSE EXTENSIVE DAMAGE TO SYLVATIC JOJOBA. THE NUMEROUS PARASITIC AND PREDACEOUS ARTHROPODS PROBABLY ACCOUNT FOR THE NATURAL CONTROL OF MANY OF THEM. THOSE RELATIONSHIPS SHOULD BE CONSIDERED WHEN PLANNING COMMERCIAL JOJOBA PLANTATIONS.

ARTHROPODS/PLANTATION ESTABLISHMENT/ARIZONA/CALIFORNIA/PESTS/INSECTS

0305

POLLARD, M.R. ET AL

1979

STUDIES ON BIOSYNTHESIS OF WAXES BY DEVELOPING JOJOBA SEED. II. THE DEMONSTRATION OF WAX BIOSYNTHESIS BY CELL-FREE HOMOGENATES.

LIPIDS 14(7):651-662.

ENZYME ACTIVITIES WERE DEMONSTRATED IN CELL-FREE HOMOGENATES FROM DEVELOPING JOJOBA COTYLEDONS AS FOLLOWS: 1) ELONGATION OF LONG-CHAIN ACYL-COAS IN THE PRESENCE OF MALONYL-COA AND NADPH; 2) NADPH-DEPENDENT REDUCTION OF LONG-CHAIN ACYL-COAS TO THE CORRESPONDING ALCOHOLS; 3) ESTERIFICATION OF LONG-CHAIN ACYL-COAS AND THE ALCOHOLS PRODUCED FROM THEM INTO WAX; 4) ELONGATION OF STEAROYL-ACP TO EICOSANOATE AND DOCOSANOATE AS WELL AS REDUCTION TO STEARYL ALCOHOL; 5) DESATURATION OF STEAROYL-ACP TO OLEATE IN THE PRESENCE OF REDUCED FERREDOXIN; AND 6) INCORPORATION OF MALONYL-COA INTO LONG-CHAIN FATTY ACIDS AND ALCOHOLS IN THE PRESENCE OF ADDED ACYL CARRIER PROTEIN. THESE ACTIVITIES WERE ASSOCIATED ENTIRELY WITH THE FLOATING WAX PAD AFTER CENTRIFUGATION OF THE CELL-FREE HOMOGENATE AT 12,000 G FOR 20 MINUTES. PRODUCTION OF OLEATE FROM ACETATE BY ENZYMES USING ACP-THIOESTERS AS SUBSTRATES, FOLLOWED BY CONVERSION OF OLEYL-ACP TO OLCOYL-COA FOR SUBSEQUENT ELONGATION, REDUCTION, AND ESTERIFICATION, IS THE MOST PROBABLE IN VIVO PATHWAY FOR WAX BIOSYNTHESIS. THE SUBSTRATE SPECIFICITIES OF THE ELONGATION AND REDUCTION REACTIONS USING ACYL-COAS AS SUBSTRATED WERE EXAMINED FOR WAX COMPOSITION.

ENZYMES/COTYLEDONS/OIL/PLANT PHYSIOLOGY

0306

POLLARD, M.R./OHLROGGE, J.B./STUMPF, P.K.

1978

FORMATION OF 2-CYANOMETHYLENECYCLOHEXYL ACETATE BY INCUBATION OF ACETATE WITH SLICES OF JOJOBA COTYLEDONS.

PHYTOCHEMISTRY 17(10):1731-1733.

INCUBATION OF DEVELOPING OR GERMINATING JOJOBA COTYLEDON SLICES WITH ACETATE PRODUCED A POLAR MATERIAL THAT WAS ISOLATED AND IDENTIFIED AS E-2-CYANOMETHYLENE-4,5 DIMETHOXY 3-HYDROXYCYCLOHEXYL ACETATE. THE PRESENCE OF THIS COMPOUND, A DERIVATIVE OF SIMMONDSIN WITH THE GLUCOSE REPLACED BY ACETATE, WAS NOT DETECTED IN FRESH TISSUE.

POLARITY/SIMMONDSIN/GERMINATION/COTYLEDONS

0307

POLLARD, M.R./OHLROGGE, J.B./STUMPF, P.K.

1979

WAX ESTER BIOSYNTHESIS IN THE DEVELOPING JOJOBA SEED.

PAGES 71-81 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA SEED APPEARS UNIQUE AMONG PLANT SEEDS IN THAT IT USES C SUB 20 AND C SUB 22 MONOENOIC ACIDS AND ALCOHOLS ESTERIFIED TOGETHER AS A WAX FOR LIPID STORAGE. STUDIES UNDERTAKEN DURING 1977 ON THE INCORPORATION OF A VARIETY OF PRECURSORS INTO WAX ESTERS, FREE ALCOHOLS AND POLAR METABOLITES BY SLICES OF DEVELOPING JOJOBA COTYLEDONS ARE REPORTED. ADDED SUP 14 C-ACETATE CONTRIBUTED MAINLY TO THE CHAIN ELONGATION OF ENDOGENOUS OLEATE, WHEREAS SUP 14 C FROM ADDED GLUCOSE WAS UNIFORMLY DISTRIBUTED THROUGHOUT THE ACYL CHAIN OF THE FATTY ACIDS. THESE DATA SUGGEST THE EXISTENCE OF METABOLICALLY SEPARATE POOLS OF ACETATE AND/OR SITES FOR DE NOVO SYNTHESIS AND ELONGATION OF THE ACYL CHAINS. THE BIOSYNTHESIS OF OLEATE FROM ACETATE MAY REQUIRE ACYL CARRIER PROTEIN THIOESTER INTERMEDIATES. THE OLEATE THEN MAY TRANSFER AS FREE OLEIC ACID TO A SECOND SUBCELLULAR COMPARTMENT WHERE THE ENZYMES ARE RESPONSIBLE FOR CHAIN ELONGATION (C SUB 18 TO C SUB 20 AND C SUB 22), REDUCTION TO ALCOHOLS, AND ESTERIFICATION INTO WAX UTILIZE ACYLCOENZYME A THIOESTERS AS SUBSTRATES. WORK ON CELL-FREE PREPARATIONS FROM DEVELOPING JOJOBA COTYLEDONS TO INVESTIGATE THIS HYPOTHESIS ARE PRESENTED. WHEN SUP 14 C-ACYL COAS ARE ADDED TO IN VITRO PREPARATIONS THE EXPECTED CHAIN-ELONGATION AND REDUCED PRODUCTS ARE FOUND.

SEED/CHEMICAL COMPOSITION/COTYLEDONS/ESTERS/ALCOHOLS

0308

POOLE, M.L.

1979

CULTIVATING JOJOBA IN WESTERN AUSTRALIA.

JOJOBA HAPPENINGS 27:3-4.

SIX JOJOBA PLANTS WERE ESTABLISHED AT THE GASCOYNE RESEARCH STATION AT CARNARVON, WESTERN AUSTRALIA. GROWTH HAS BEEN SLOW. ALTHOUGH ADULT PLANTS CAN SURVIVE WITHOUT IRRIGATION DURING THE SUMMER, THEY SHOULD RESPOND WELL TO IT.

AUSTRALIA/PESTS/ORNAMENTAL USE

0309

POOLE, M.L.

1978

JOJOBA: A LIQUID WAX PRODUCING SHRUB.

WESTERN AUSTRALIAN DEPARTMENT OF AGRICULTURE FARMNOTE AGDEX 146/20. 4 P.

BASIC INFORMATION ON JOJOBA'S NATIVE HABITAT, PROPAGATION, USES, AND ITS POTENTIAL IN WESTERN AUSTRALIA.

PROPAGATION/ECONOMIC DEVELOPMENT/AUSTRALIA/MARKET DEMAND

0310

PRICE, R.L.

1982

A SIMPLE METHOD FOR DETECTION OF ADULTERATION OF JOJOBA OIL.

PAGES 236-238 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

A STUDY OF THE BASIC COMPONENTS OF JOJOBA AND A KNOWLEDGE OF SIMPLE SEPARATION TECHNIQUES FOR THESE COMPONENTS HAS GIVEN A SEMIQUANTITATIVE METHOD FOR DETECTING ADULTERATION IN JOJOBA OIL. USING THIN-LAYER CHROMATOGRAPHY, JOJOBA CAN BE ANALYZED FOR ADULTERATION BY VISUALLY COMPARING SPOTS APPEARING IN THE TRIGLYCERIDE AREA WITH THOSE TO WHICH VEGETABLE OIL HAS BEEN ADDED IN KNOWN QUANTITIES. JOJOBA OIL IS COMPOSED OF MONO-UNSATURATED FATTY ACIDS ESTERIFIED TO MONO-UNSATURATED, STRAIGHT CHAIN ALCOHOLS. THE ABSENCE OF TRIGLYCERIDES IN JOJOBA IS THE BASIS FOR THIS PROCEDURE.

OIL/ADULTERATION/FATTY ACIDS/ALCOHOLS/THIN LAYER CHROMATOGRAPHY

0311

PROSERPIO, G.

1981

THE JOJOBA (PRONOUNCED HO-HO-BA). SIMMONDSIA CHINENSIS (LINK) C.K. SCHNEIDER, (BUXACEAE) SYN. SIMMONDSIA CALIFORNICA (OR CALIFORNIA) NUTTALL. LOCAL INDIAN NAME, HOHOWI, COMMON NAME, SHEEPNUT.

EPPOS (ITALY) 63(7):374-387.

A REVIEW OF THE BOTANY OF JOJOBA AND PHYSICAL AND CHEMICAL PROPERTIES OF JOJOBA OIL.

OIL/COSMETICS/PRODUCT DEVELOPMENT

0312

PUEBLA, M.

1976

LA OPERACION JOJOBA DE MEXICO (OPERATION JOJOBA IN MEXICO, IN SPANISH).

PAGES 145-150 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

OPERATION JOJOBA HAS BECOME A MECHANISM TO PERMIT MASSIVE CULTIVATION OF JOJOBA IN ARID AND SEMIARID AREAS OF MEXICO. OBJECTIVES OF THE PROGRAM ARE TO GENERATE EMPLOYMENT OPPORTUNITIES, TO BETTER UTILIZE WATER RESOURCES NOW BEING USED ON OTHER CONVENTIONAL CROPS, AND TO DEVELOP AN EXPORTING AND IMPORTING FOREIGN EXCHANGE. THESE OBJECTIVES WILL BE ACHIEVED THROUGH: 1) SCIENTIFIC AND TECHNOLOGICAL INVESTIGATIONS TO DOMESTICATE JOJOBA AND TO DEVELOP COMMERCIAL PRODUCTS FROM THE OIL AND WAX; 2) SYSTEMATIC CULTIVATION OF JOJOBA ON SMALL RURAL PROPERTIES AND ON STATE AND COMMUNAL LANDS; AND 3) TO INDUSTRIALIZE THE USE OF JOJOBA SEEDS.

MEXICO/WATER USE/CULTIVATION/LAND USE/SOCIAL ASPECTS

0313

PUEBLA, M.

1982

MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA (PROCEEDINGS: IV INTERNATIONAL CONFERENCE ON JOJOBA).

CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

PROCEEDINGS OF THE FOURTH INTERNATIONAL CONFERENCE ON JOJOBA, HELD NOVEMBER 5-8, 1980, HERMOSILLO, SONORA, MEXICO.

OIL/MARKET DEMAND/COST ANALYSIS/PLANTATION MANAGEMENT/CHEMICAL REACTIONS/  
COSMETICS/PLANTATION ESTABLISHMENT

0314

PUREX CORPORATION LTD.

1965

A DIFFERENT APPROACH TO THE TREATMENT OF ACNE VULGARIS.

PUREX CORPORATION, RESEARCH AND DEVELOPMENT BULLETIN 201:1-2.

A PHARMACOLOGICAL JOJOBA WAX HAS ATTRACTED INTEREST BECAUSE FOLK USERS INSIST ON ITS EFFECTIVENESS IN THE TREATMENT OF DANDRUFF AND IN THE PROMOTION OF LUXURIANT HAIR GROWTH. SULFURIZED JOJOBA OIL COULD BE USED AS A THERAPEUTIC AGENT FOR CONTROL OF EXCESSIVE EXCRETIONS FROM THE SEBACEOUS GLANDS. SEBUM SECRETION APPEARS TO BE A SELF-LIMITING PROCESS, AND JOJOBA OIL APPEARS TO ACT AS EFFECTIVELY AS LARGE CONCENTRATIONS OF SEBUM IN SIGNALING A REDUCTION IN SECRETION. THE WAX IS READILY TAKEN UP BY THE SKIN, TO WHICH IT IMPARTS A VELVETY SOFTNESS, AND SEEMINGLY HALTS THE ACCUMULATION OF EXCESSIVE SEBUM.

MEDICINAL USES/SULFURIZATION/PRODUCT DEVELOPMENT/OIL

0315

QUILANTAN V., L.

1982

PROYECCION Y LOGROS DE LA INVESTIGACION AGRONOMICA CON JOJOBA DEL INIA EN EL CIANO DE LA COSTA DE HERMOSILLO, SONORA (CURRENT AND FUTURE ACTIVITIES IN THE AGRONOMIC INVESTIGATION OF JOJOBA BY CIANO ON THE COAST OF HERMOSILLO, SONORA, IN SPANISH).

PAGES 85-92 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

MEXICO'S NATIONAL AGRICULTURAL RESEARCH CENTER IN THE NORTHWEST, CENTRO DE INVESTIGACIONES AGRICOLAS DEL NOROESTE (CIANO), IS INVOLVED IN DOMESTICATION RESEARCH AND DEVELOPMENT OF JOJOBA.

MEXICO/SONORA/ECONOMIC DEVELOPMENT

RAGLESS, D.

1979

JOJOBA MARKETS.

JOJOBA HAPPENINGS 28:1-4.

THE JOJOBA OIL MARKET SHOULD NOT BE BASED SOLELY UPON ITS USE AS A SUBSTITUTE FOR SPERM WHALE OIL. A SMALL HIGH-PRICE MARKET AND A LARGE-VOLUME, LOWER PRICE MARKET SHOULD BE EXPLOITED.

ECONOMICS/COST ANALYSIS/PRODUCT DEVELOPMENT/SPERM WHALE OIL/OIL/MARKET DEMAND

0317

RAGLESS, D.

1979

JOJOBA MARKETS.

PAGES 16-21 IN SOUTH AUSTRALIA DEPARTMENT OF AGRICULTURE AND FISHERIES, JOJOBA: REPORT ON THE WORKSHOP FEBRUARY 1979. COORDINATING COMMITTEE ON NEW AGRO-BASED PRODUCTS, DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA. 32 P.

MARKETS ARE AVAILABLE FOR JOJOBA PRODUCTS; HOWEVER THEY WILL NEVER BE EXPLOITED UNLESS RELIABLE JOJOBA SUPPLIES ARE AVAILABLE. INITIAL PRODUCTION CAN BE DIRECTED TO THE SMALL VOLUME, HIGH PRICE MARKET WHILE PRODUCTION TECHNOLOGY IS DEVELOPING. LARGER PRODUCTION INCREASES MUST COMPETE ON THE LOWER PRICE MARKETS.

AUSTRALIA/MARKET DEMAND/PRODUCT DEVELOPMENT

0318

RAGLESS, D.

1979

JOJOBA.

SOUTH AUSTRALIA DEPARTMENT OF AGRICULTURE AND FISHERIES, MARKET DEVELOPMENT PAPER NO. 1, AGDEX 146/00. 7 P.

WORLDWIDE INTEREST HAS BEEN SHOWN IN JOJOBA FOR USE AS A SPERM WHALE OIL REPLACEMENT. DESPITE UNCERTAINTIES REGARDING MARKET DEMAND AND ULTIMATE PRICES, JOJOBA IS ATTRACTING WIDESPREAD ATTENTION AND ENTHUSIASM IN SOUTH AUSTRALIA.

SPERM WHALE OIL/MARKET DEMAND/AUSTRALIA/ECONOMIC DEVELOPMENT

0319

RAMIREZ A., M.

1982

NORMALIZACION DE LA CERA LIQUIDA NATURAL DE SEMILLA DE JOJOBA (STANDARDIZING NATURAL JOJOBA OIL, IN SPANISH).

PAGES 483-487 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.



ANALYTICAL CONSTANTS WERE DEFINED AND OFFICIAL MEXICAN GOVERNMENT STANDARDS WERE IDENTIFIED FOR NATURAL JOJOBA OIL. REFINED, HYDROGENATED AND SULFURIZED OIL WERE NOT INCLUDED. PARAMETERS FOR TESTING QUALITY ARE ACIDITY, REFRACTION, IODINE NUMBER, SAPONIFICATION, SPECIFIC WEIGHT, HUMIDITY, SCENT, AND FLASH POINT.

MEXICO/OIL/ANALYTICAL TECHNIQUES/CHEMICAL STRUCTURE/COMMERCIAL STANDARDS

0320

RAMONET R., M.R. ET AL

1981

GUIA PARA CULTIVAR JOJOBA EN LA COSTA DE HERMOSILLO (GUIDE TO CULTIVATING JOJOBA ON THE COAST OF HERMOSILLO, IN SPANISH).

SECRETARIA DE AGRICULTURAL Y RECURSOS HIDRAULICO, INSTITUTO NACIONAL DE INVESTIGACIONES AGRICOLAS, CENTRO DE INVESTIGACION AGRICOLAS DEL NOROESTE, CAMPO AGRICOLA EXPERIMENTAL COSTA DE HERMOSILLO, HERMOSILLO. 12 P.

CAMPO AGRICOLA EXPERIMENTAL EN LA COSTA DE HERMOSILLO (CAECH) BEGAN ITS JOJOBA RESEARCH IN 1972. THIS HANDBOOK INCLUDES INFORMATION ON SOIL PREPARATION, SEEDING, WATER REQUIREMENTS, WEED CONTROL, DISEASES, HARVESTING AND PHENOLOGY.

MEXICO/SONORA/PLANTATION ESTABLISHMENT/CULTIVATION/WATER USE/DISEASES/PHENOLOGY/WEED CONTROL

0321

RAMONET R., M.R.

1980

ESTUDIO DE CORRELACION Y REGRESION ENTRE CARACTERISTICAS CUANTITATIVAS Y LA PRODUCTIVIDAD EN PESO DE SEMILLA DE JOJOBA CULTIVADA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) EN LA COSTA DE HERMOSILLO, SONORA (STUDY OF THE REGRESSION AND CORRELATION BETWEEN QUANTITATIVE CHARACTERISTICS AND SEED PRODUCTION OF CULTIVATED JOJOBA ON THE COAST OF HERMOSILLO, SONORA, IN SPANISH).

UNIVERSIDAD DE SONORA, ESCUELA DE AGRICULTURA Y GANADERIA. INGENIERO AGRONOMO THESIS, 44 P. WITH APPENDIX.

THE CORRELATION BETWEEN OF JOJOBA GROWTH FORMS AND SEED PRODUCTION WAS EXAMINED TO DETERMINE PRIME INDICATOR CHARACTERISTICS FOR GENETIC SELECTION. NUMBERS OF SEEDS PRODUCED, DIAMETERS AND HEIGHTS OF PLANTS AND NUMBERS OF LATERAL AND MAJOR BRANCHES WERE EXAMINED. PLANTS WITH SMALLER-SIZED SEEDS PRODUCED GREATER YIELDS THAN PLANTS PRODUCING LARGER SIZED SEED. FOR GENETIC SELECTION AN IDEAL PLANT WOULD PRODUCE SEED ON ALL NODES AND WOULD HAVE A CONSISTENT VERTICAL GROWTH FORM.

MEXICO/GENETICS/SEED YIELD/GROWTH FORM

0322

RAMONET R., M.R.

1982

PRODUCTIVIDAD DE LA JOJOBA SIMMONDSIA CHINENSIS EN LA COSTA DE HERMOSILLO; BASE PARA UN ANALISIS ECONOMICO (PRODUCTIVITY OF JOJOBA ON THE COAST OF HERMOSILLO; BASIS FOR AN ECONOMIC ANALYSIS, IN SPANISH).

PAGES 450-454 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

PRODUCTIVITY OF JOJOBA ON THE COAST OF HERMOSILLO, MEXICO, WAS ANALYZED. THE FIRST SIGNIFICANT SEED HARVEST OCCURRED AFTER FOUR YEARS; THE AVERAGE SEED YIELD WAS 172 GRAMS PER PLANT. ON COMMERCIAL PLOTS ESTABLISHED WITH SEEDLINGS 52.8 PERCENT WERE MALE, 47.2 PERCENT WERE FEMALE. JOJOBA PRODUCTION IS ECONOMICALLY FEASIBLE ON DRY , MARGINAL LANDS.

MEXICO/SONORA/COST ANALYSIS/SEED YIELD/GENETIC VARIABILITY

0323

RASOOLZADEGAN, Y.R.

1980

PHYSIOLOGICAL EFFECTS OF SALINITY ON FOUR CLONES OF JOJOBA, SIMMONDSIA CHINENSIS (LINK) SCHNEIDER.

UNIVERSITY OF ARIZONA, DEPARTMENT OF PLANT SCIENCES, TUCSON. PH.D. DISSERTATION, 121 P.

FOUR CLONES OF JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) WERE USED TO STUDY THE EFFECTS OF SALINITY ON THE GROWTH, AS MEASURED BY SHOOT ELONGATION, NEW BRANCH DEVELOPMENT, NODE NUMBER, LEAF EXPANSION, NEW LEAF PRODUCTION AND DEFOLIATION, WAS STUDIED USING AN ISO-MOLAR MIXTURE OF NA<sub>2</sub>CO<sub>3</sub> PLUS CA<sub>2</sub>CL<sub>2</sub> SUB 2 AT 2, -4, -8 AND -16 BARS. PHYSIOLOGICAL PROCESSES, INCLUDING CHLOROPHYLL CONCENTRATIONS, CO<sub>2</sub> EXCHANGE RATES, STOMATAL RESISTANCES, LEAF WATER POTENTIALS, RELATIVE WATER CONTENT, LEAF SUCCULENCE, SPECIFIC LEAF WEIGHT, PROLINE ACCUMULATION AND PROTEIN CONCENTRATIONS, WERE MEASURED AT WEEKLY INTERVALS AFTER THE ADDITION OF SALTS.

SALINITY/PHOTOSYNTHESIS/PROTEINS/PROGENY/PROPAGATION

0324

RASOOLZADEGAN, Y.R./HOGAN, L./PALZKILL, D.A.

1982

RESPONSE OF JOJOBA TO 5 LEVELS OF SALINITY.

PAGES 113-120 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

EFFECTS OF FIVE LEVELS OF SALINITY ON GROWTH AND PHYSICAL PROCESSES OF FOUR JOJOBA CLONES WERE STUDIED. CUTTINGS OBTAINED FROM FOUR WILD PLANTS FROM SOUTHWESTERN ARIZONA WERE ROOTED UNDER MIST AND THEN WERE TRANSFERRED TO A SAND-NUTRIENT CULTURE SYSTEM IN A GREENHOUSE. AFTER A PERIOD OF ADAPTATION, CUTTINGS FROM EACH CLONE WERE EXPOSED TO A BASE NUTRIENT SOLUTION AND TO FOUR LEVELS OF AN ISOMOLAR MIXTURE OF NA<sub>2</sub>CO<sub>3</sub> AND CA<sub>2</sub>CL<sub>2</sub> SUB 2 (-2, -4, -8 AND -16 BARS). SALINITY WAS INCREASED AT THE RATE OF 1 BAR PER DAY UNTIL THE DESIRED LEVELS WERE REACHED. ONLY THE HIGHEST LEVEL OF SALINITY TESTED (-16 BARS) CAUSED OBVIOUS SYMPTOMS OF SALINITY DAMAGE (CHLOROSIS AND NECROSIS OF LEAF MARGINS AND ABSCISSION OF OLDER LEAVES). CLONES DIFFERED IN RESPONSE TO SALINITY; ONLY TWO OF THE FOUR CLONES TESTED SHOWED OBVIOUS SYMPTOMS OF SALINITY DAMAGE. GROWTH, MEASURED BY LEAF EXPANSION, WAS SIGNIFICANTLY REDUCED AT -4, -8 AND -16 BARS. GROWTH, MEASURED BY SHOOT ELONGATION, WAS DECREASED SIGNIFICANTLY AT -16 BARS, PRIMARILY DUE TO A LARGE DECREASE IN LIGHT RESPIRATION. IN THIS STUDY, EFFECTS OF SALINITY WERE STUDIED UNDER CONDITIONS OF ABUNDANT SOIL MOISTURE. EFFECTS OF THE SAME SALINITY TREATMENTS IN SOIL THAT DRIES OUT PROGRESSIVELY (SUCH AS IN A FIELD SITUATION) COULD BE MUCH MORE SEVERE.

SALINITY/PLANT GROWTH/ARIZONA/PROGENY/PROPAGATION

0325

RAWLES, R.L.

1976

THE DRIPPING SPRINGS JOJOBA PLANTATION.

JOJOBA HAPPENINGS 17:10-13.

IN 1976, 20 ACRES OF JOJOBA WERE PLANTED ON THE SAN CARLOS APACHE INDIAN RESERVATION, ARIZONA. SURVIVAL OF TRANSPLANTED AND DIRECT-SEEDED JOJOBA ARE NOTED. ANTS CAUSED CONSIDERABLE DAMAGE BY REMOVING LEAVES FROM SEEDLINGS. WEED CONTROL WAS A PROBLEM.

INDIAN RESERVATIONS/PLANTATION ESTABLISHMENT/ARIZONA/DIRECT SEEDING/SEEDLINGS/  
ECONOMIC DEVELOPMENT/IRRIGATION/PESTS/PLANT GROWTH

0326

RAWLES, R.L.

1977

JOJOBA OIL EXTRACTION (1972-1975) AT WRRRC, USDA-ARS, ALBANY, CALIFORNIA.

JOJOBA HAPPENINGS 18:3-8.

A ROSEDOWNS MECHANICAL EXTRACTION PRESS WAS USED TO PRESS JOJOBA SEED. SEED GRINDING PROBLEMS WERE PARTIALLY SOLVED BY FREEZING THE SEED BEFORE PLACING THEM IN A VERTICAL HAMMER MILL. GROUND SEED WAS HEATED BEFORE PRESSING. THE MOISTURE CONTENT AND TEMPERATURE OF THE GROUND SEED, AND TO A LESSER EXTENT, THE AMPERAGE DRAWN BY THE PRESS MOTOR, WERE CRITICAL TO THE EFFICIENT OPERATION OF THE PRESS. PRESSED OIL WAS ALLOWED TO SETTLE BEFORE FRACTIONATION. THE OIL EXTRACTION RATE WAS ABOUT 42 PERCENT.

MECHANICAL EXTRACTION/OIL

0327

RAWLES, R.L.

1977

SAN CARLOS APACHE JOJOBA DEVELOPMENT PROJECT--UPDATE.

JOJOBA HAPPENINGS 20:5-7.

THE 1977 NATIVE JOJOBA SEED HARVEST YIELDED BETWEEN 25,000 AND 28,000 POUNDS OF CLEAN, DRY SEED FROM THE APACHE RESERVATION. MECHANICAL EXTRACTION OF JOJOBA OIL BEGAN AT SAN CARLOS, ARIZONA. REMODELING OF FACILITIES WAS NECESSARY FOR THE INSTALLATION OF THE HANDER OIL PRESS PURCHASED FROM JAPAN. DURING THE 1976-1977 WINTER, WEATHER CONDITIONS, INCLUDING FREEZES, RESULTED IN HEAVY LOSSES OF TRANSPLANTED AND DIRECT-SEEDED JOJOBA SEEDLINGS AT THE 20-ACRE DRIPPING SPRINGS JOJOBA PLANTATION IN SAN CARLOS.

INDIAN RESERVATIONS/MECHANICAL EXTRACTION/SEED HARVEST/NATIVE POPULATIONS

0328

RAWLES, R.L.

1979

JOJOBA OIL EXTRACTION (1972-1975) AT WRRC, USDA-ARS, ALBANY, CALIFORNIA, AND AT SAN CARLOS APACHE INDIAN RESERVATION, ARIZONA (1977).

PAGES 279-283 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE UNIVERSITY OF ARIZONA OFFICE OF ARID LANDS STUDIES' JOJOBA OIL EXTRACTING PROCESS, USING A ROSE DOWNS AND A HANDER PRESS, IS EXPLAINED.

OIL/MECHANICAL EXTRACTION

0329

REDDY, S.J. ET AL

1982

RECENT ADVANCES IN VEGETATIVE PROPAGATION OF JOJOBA BY CUTTINGS.

PAGES 103-112 IN M. PUEBLA, ED, MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

STUDIES WERE PERFORMED AT THE UNIVERSITY OF ARIZONA ON VEGETATIVE PROPAGATION OF JOJOBA BY CUTTINGS. INDIVIDUAL JOJOBA PLANTS DIFFERED IN ROOTING ABILITY; PLANTS THAT WERE RELATED (HAVING SAME MOTHER PARENT) TENDED TO BE MORE SIMILAR IN ROOTING PERCENTAGES THAN NON-RELATED PLANTS, POINTING TO A STRONG GENETIC INFLUENCE ON ROOTING ABILITY. THE SUMMER PROVED TO BE THE POOREST TIME TO TAKE CUTTINGS. WINTER AND SPRING WERE MORE RESPONSIVE PERIODS, ALTHOUGH TREATMENT WITH GROWTH REGULATORS (IBA) WAS NECESSARY. SEASONAL CHANGES IN CARBOHYDRATE VALUES WERE NOTED; HOWEVER, WHEN THE ROOTING AND CARBOHYDRATE VALUE WERE COMPARED FOR INDIVIDUAL SHRUBS NO TREND WAS EVIDENT.

PROPAGATION/GENETICS/CLIMATE/CARBOHYDRATES/VEGETATIVE PROPAGATION

0330

REWO CHIMISCHE WERKE, G.M.B.H.

1980

MIXTURES OF SULFOSUCCINIC ACID HALF-ESTERS.

JAPAN KOKAI 80 64,566, MAY 15, 1980.

JOJOBA OIL 100, MONOETHANOLAMINE 10, AND NAOME WERE HEATED TO 140 C AND ALLOWED TO REACT FOR TWO HOURS. A WAXY SUBSTANCE WAS PRODUCED, WHICH CONTAINED A JOJOBA FATTY ACID MONOETHANOLAMIDE AND A JOJOBA FATTY ALCOHOL. THE MIXTURE WAS TREATED WITH 21 GRAMS MALEIC ANHYDRIDE TO GIVE A HALF-ESTER MIXTURE; A WHITE DISPERSION CONTAINING 30 PERCENT SOLIDS WAS OBTAINED AFTER SULFONATING WITH 310 GRAMS WATER CONTAINING 34 GRAMS NA SULFITE; A CLEAN VISCOUS LIQUID WAS OBTAINED WHEN DILUTED WITH WATER.

OIL/FATTY ACIDS/ALCOHOLS/SULFURIZATION/PRODUCT DEVELOPMENT/PATENTS

REYES, D.M./STOLZY, L.H./LABANAUSKAS, C.K.

1977

TEMPERATURE AND OXYGEN EFFECTS IN SOIL ON NUTRIENT UPTAKE IN JOJOBA SEEDLINGS.

AGRONOMY JOURNAL 69(4):647-650.

THIS GREENHOUSE STUDY WAS CONDUCTED WITH CONSTANT TEMPERATURE TANKS THAT MAINTAINED ROOT TEMPERATURES AT 21C, 27C, AND 33C. SOIL OXYGEN TO THE ROOTS WAS REGULATED THROUGH THE CONCENTRATION OF OXYGEN IN THE ATMOSPHERE ABOVE THE SOIL COLUMNS. PLANTS GROWN AT A 33C SOIL TEMPERATURE PRODUCED SIGNIFICANTLY MORE DRY WEIGHT THAN PLANTS AT 21C OR 27C. CONCENTRATIONS OF NITROGEN (N), PHOSPHORUS (P), POTASSIUM (K), SODIUM (NA), MANGANESE (MN) AND IRON (FE) IN THE LEAVES OF PLANTS GROWN AT 33C WERE SUBSTANTIALLY HIGHER THAN LEAVES GROWN AT 21C OR 27C. IN GENERAL, NUTRIENT CONCENTRATIONS IN ROOTS AND TOTAL AMOUNT IN PLANTS WERE HIGHER IN PLANTS GROWN AT 33C THAN AT 21C OR 27C. THE TWO LOWEST LEVELS OF SOIL OXYGEN TO THE ROOTS (1.5 AND 6.5 PERCENT) SIGNIFICANTLY REDUCED DRY WEIGHT OF LEAVES, STEMS, AND ROOTS, COMPARED WITH PLANTS GROWN AT OXYGEN LEVELS OF 12 AND 21 PERCENT. DECREASED SOIL OXYGEN SIGNIFICANTLY REDUCED THE CONCENTRATION OF K, CALCIUM (CA), MAGNESIUM (MG), ZINC (ZN), MN, AND BORON (B) IN LEAVES WHILE CONCENTRATIONS OF N, NA, AND FE WERE INCREASED. CONCENTRATIONS OF N, P, K, MG, NA, B, AND FE IN ROOTS GROWN UNDER LOW SOIL OXYGEN WERE LESS THAN PLANTS GROWN WITH 21 PERCENT OXYGEN. LOW LEVELS OF SOIL OXYGEN SIGNIFICANTLY INCREASED CONCENTRATIONS OF NA IN LEAVES AND STEMS, AND DECREASED THE CONCENTRATION IN THE ROOTS. GROWTH AND NUTRIENT UPTAKE OF JOJOBA SEEDLINGS IS BEST AT HIGHER TEMPERATURES AND IN WELL-AERATED SOILS.

PLANT GROWTH/ROOTS/SEEDLINGS/SOILS/TEMPERATURE

REYES, D.M./STOLZY, L.H./LABANAUSKAS, C.K.

1977

TEMPERATURE AND OXYGEN EFFECTS IN SOIL ON NUTRIENT UPTAKE IN JOJOBA SEEDLINGS.

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THE TWO LOWEST LEVELS OF SOIL OXYGEN SUPPLY TO THE ROOTS (1.5 AND 6.5 PERCENT SIGNIFICANTLY REDUCED DRY WEIGHT OF LEAVES, STEMS, AND ROOTS COMPARED TO PLANTS GROWN AT OXYGEN LEVELS OF 12 AND 21 PERCENT. DECREASED SOIL OXYGEN SIGNIFICANTLY REDUCED THE CONCENTRATION OF K, CALCIUM (CA), MAGNESIUM (MG), ZINC (ZN), MN, AND BORON (B) IN LEAVES WHILE CONCENTRATIONS OF N, NA, AND FE WERE INCREASED. CONCENTRATIONS OF N, P, K, MG, NA, B, AND FE IN ROOTS GROWN UNDER LOW SOIL OXYGEN WERE LESS THAN PLANTS GROWN WITH 21 PERCENT OXYGEN. LOW LEVELS OF SOIL OXYGEN SIGNIFICANTLY INCREASED CONCENTRATIONS OF NA IN LEAVES AND STEMS AND DECREASED THE CONCENTRATION IN THE ROOTS. THIS STUDY INDICATES THAT GROWTH AND NUTRIENT UPTAKE OF JOJOBA SEEDLINGS IS BEST AT HIGHER TEMPERATURES AND IN WELL-AERATED SOILS.

TEMPERATURE/OXYGEN SUPPLY/SOILS

REYES, M.N.J./JUVENAL, D.

1982

OBSERVACIONES PRACTICAS SOBRE JOJOBA (PRACTICAL OBSERVATIONS OF JOJOBA, IN SPANISH).

PAGES 99-102 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

CULTIVATED JOJOBA PLANTS ESTABLISHED WITH IRRIGATION DO NOT POSSESS THE DROUGHT- AND FREEZE-RESISTANCE OF NATIVE STANDS. IN NATURAL STANDS, THE ROOTS GROW DEEP AND VERTICALLY TO LEVELS PROVIDING SUFFICIENT MOISTURE TO INSULATE THE PLANTS FROM CHANGES IN CLIMATE AND PRECIPITATION. IRRIGATION CAUSES THE ROOTS TO GROW LATERALLY.

MEXICO/ROOTS/IRRIGATION

0334

RIETH, J./RICHARDSON, W./STOREY, R.

1981

THE PATHWAY OF (SUP 14 CO SUB 2) FIXATION IN YOUNG GREENHOUSE-GROWN JOJOBA SEEDLINGS.

JOJOBA HAPPENINGS 36:3.

GREENHOUSE-GROWN JOJOBA SEEDLINGS FIX CARBON VIA THE C SUB 3 PATHWAY OF PHOTOSYNTHESIS.

PHOTOSYNTHESIS/SEEDLINGS/CARBON FIXATION

0335

ROEHR, C.M.

1910

A PRELIMINARY REPORT ON THE ANALYSIS OF THE SEEDS OF SIMMONDSIA CALIFORNICA.

PACIFIC PHARMACIST 3:335-338.

ANALYSIS OF JOJOBA SEEDS SHOWED 6.06 PERCENT FIXED OIL, 42.87 PERCENT FAT AND 12.97 PERCENT PROTEIDS. THE FIXED OIL WAS A THICK, VISCID, YELLOW OR REDDISH-BROWN LIQUID: THE COLOR DEPENDED ON THE TEMPERATURE USED IN ITS EXTRACTION. IT RESEMBLED OTHER EUPHORBIACEOUS OILS, BEING SOLUBLE IN ABSOLUTE ALCOHOL, IN GLACIAL ACETIC ACID AND IN OIL OF TURPENTINE. WHEN EXPOSED TO THE AIR, IT RESEMBLED A SEMIDRYING OIL.

MEDICINAL PLANTS/CHEMICAL STRUCTURE/OIL

0336

ROMO L., I./GUERRERO R., J.C./AVILA S., J.

1982

IDENTIFICACION DE ENFERMEDADES EN JOJOBA CULTIVADA SIMMONDSIA CHINENSIS (LINK) SCHNEIDER, EN LA COSTA DE HERMOSILLO, 1979-1980 (IDENTIFICATION OF DISEASES IN CULTIVATED JOJOBA, COAST OF HERMOSILLO, 1979-1980, IN SPANISH).

PAGES 39-56 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

DURING THE 1979-1980 SEASON, STRESSED OR DISEASED JOJOBA PLANT SAMPLES FROM CULTIVATED FIELDS IN THE HERMOSILLO COASTAL AREA WERE TESTED. CUTTINGS WERE TREATED WITH PDA AND THEN INCUBATED AT TEMPERATURES OF 28 C PLUS OR MINUS 2 DEGREES FOR FOUR TO SIX DAYS. PATHOGENIC TESTS OF ISOLATED MICROORGANISMS WERE USING THE KOCH METHOD. JOJOBA PLANTS OF VARIOUS AGES WERE INNOCULATED USING DIFFERENT INNOCULATION TECHNIQUES. MICROORGANISMS IDENTIFIED AS DISEASE VECTORS INCLUDED: FUSARIUM OXYSPORUM, WHICH CAUSES WILTING AND DISCOLORATION OF THE TISSUE, MACROPHOMINA PHASEOLI, WHICH CAUSES RADICLE ROTTING, ALTERNARIA SP., WHICH CAUSES CONCENTRIC RINGED SPOTS ON THE LEAVES; AND PHYMATOTRICHUM OMNIVORUM, WHICH CAUSES ROOT ROT.

MEXICO/SONORA/DISEASES/PLANT PATHOLOGY/ROOT ROT/PATHOGENS

0337

ROST, T.L. ET AL

1977

ANATOMY OF JOJOBA (SIMMONDSIA CHINENSIS) SEED AND THE UTILIZATION OF LIQUID WAX DURING GERMINATION.

ECONOMIC BOTANY 31(2):140-147.

THE STRUCTURE OF THE EMBRYO OF MATURE SEEDS AND THEIR EXTERNAL MORPHOLOGY DURING EARLY GERMINATION WERE INVESTIGATED. THE EMBRYO IS STRAIGHT AND INVESTING. A HYPOCOTYL SHEATH SURROUNDS THE RADICLE LIKE A HOLLOW CONE. THE APICAL MERISTEM IS A LOW MOUND OF CELLS IN A SHALLOW DEPRESSION BETWEEN THE BROAD SHORT PETIOLES OF THE COTYLEDONS. DURING GERMINATION THESE PETIOLES LENGTHEN AND FORCE THE EMBRYO AWAY FROM THE COTYLEDONS AND SEED COAT. THE HYPOCOTYL ELONGATES AND THE PRIMARY ROOT RAPIDLY EXTENDS AND IS WELL DEVELOPED BEFORE THE APICAL MERISTEM BECOMES ACTIVE. A MATURE IMBIBED SEED CONTAINS APPROXIMATELY 50 PERCENT OIL. AFTER GERMINATION THERE IS A LINEAR DECREASE IN THE AMOUNT OF WAX TO APPROXIMATELY 10 PERCENT AT 30 DAYS.

GERMINATION/OIL/PLANT GROWTH/PLANT MORPHOLOGY/ROOTS/SEEDLINGS/SEED

0338

ROST, T.L. ET AL

1978

A DESCRIPTION OF JOJOBA SEED ANATOMY AND THE USE OF COTYLEDON WAX DURING GERMINATION.

PAGES 135-142 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

INVESTIGATIONS CONCERNED THE STRUCTURE OF MATURE SEEDS AND THE USE OF LIQUID WAX DURING GERMINATION. THE SEED EMBRYO IS STRAIGHT AND EMBEDDED IN THE COTYLEDONS. A HYPOCOTYL SHEATH SURROUNDS THE RADICLE LIKE A HOLLOW CONE. THE APICAL MERISTEM IS A LOW MOUND OF CELLS IN A SHALLOW DEPRESSION BETWEEN THE BROAD SHORT PETIOLES OF THE COTYLEDONS. DURING GERMINATION THESE PETIOLES LENGTHEN AND FORCE THE EMBRYO AWAY FROM THE COTYLEDONS AND SEED COAT. THE HYPOCOTYL ELONGATES AND THE PRIMARY ROOT RAPIDLY EXTENDS AND IS WELL DEVELOPED BEFORE THE APICAL MERISTEM BECOMES ACTIVE. A MATURE, IMBIBED SEED CONTAINS APPROXIMATELY 50 PERCENT LIQUID WAX. AFTER GERMINATION THERE IS A LINEAR DECREASE IN THE AMOUNT OF WAX TO APPROXIMATELY 10 PERCENT AT 30 DAYS.

COTYLEDONS/GERMINATION/OIL/PLANT MORPHOLOGY

ROST, T.L. ET AL

1979

THE PRODUCTION OF JOJOBA WAX IN TISSUE CULTURE.

PAGES 207-221 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

STRUCTURAL AND PHYSIOLOGICAL CHANGES IN CULTURED COTYLEDON CELLS ARE SIMILAR TO GERMINATING COTYLEDONS IN SOME RESPECTS. STRUCTURALLY, CULTURED EXPLANTS SWELL AND THEN PROLIFERATE NEW CALLUS AROUND THEIR ENTIRE PERIPHERY. SURFACE CALLUS CELLS ARE LOOSE AND FRIABLE, USUALLY SPHERICAL AND SUBTENDED BY A TIGHT MASS OF CALLUS PARENCHYMA WITH DISPERSED TRACHEARY ELEMENTS. WAX AND PROTEIN DIMINISH WITH TIME IN CULTURE, WHILE SOLUBLE CARBOHYDRATES, STARCH AND AMINO ACIDS INCREASE SIMULTANEOUSLY. CULTURED COTYLEDON SEGMENTS, CONTRARY TO GERMINATING COTYLEDONS, SHOW INCREASED DRY WEIGHT. INCORPORATING SUP 14 C-ACETATE INTO THE PETROLEUM ETHER EXTRACTED FRACTION FROM CALLUS CELLS, PLUS THE PRESENCE OF DISTINCT WAX BODIES, INDICATE THAT WAX SYNTHESIS PROBABLY OCCURS IN NEW CALLUS.

PLANT PHYSIOLOGY/TISSUE CULTURE/COTYLEDONS/OIL/PROTEINS

0340

ROST, T.L. ET AL

1978

VEGETATIVE REGENERATION OF JOJOBA PLANTS IN NATURE.

JOJOBA HAPPENINGS 25:4-6.

JOJOBA PLANTS PROPAGATE VEGETATIVELY BY FORMING UNDERGROUND SUCKER SHOOTS ATTACHED TO MATURE SURFACE STEMS. AS PLANTS MATURE, THEY TEND TO DIE FROM THE CENTER OUT, LEAVING CLONAL RINGS OF PROGENY PLANTS. VEGETATIVELY PROPAGATED PLANTS FORM A MORE SHALLOW ROOT SYSTEM THAN PLANTS PROPAGATED FROM SEED.

PROPAGATION/VEGETATIVE REGENERATION/ROOTS

0341

ROST, T.L./HINCHEE, M.A.W.

1980

PRELIMINARY REPORT OF THE PRODUCTION OF CALLUS, ORGANOGENESIS AND REGENERATION OF JOJOBA (*SIMMONDSIA CHINENSIS*) IN TISSUE CULTURE.

JOURNAL OF HORTICULTURAL SCIENCE 55(3):299-306.

JOJOBA SHOOT TIPS, LEAVES, STEMS AND COTYLEDONS WERE CULTURED ON MURASHIGE AND SKOOG MEDIA SUPPLEMENTED WITH 3 PERCENT SUCROSE AND VARIOUS AUXINS AND CYTOKININS. CALLUS WAS INITIATED ON ALL EXPLANTS WHEN AN AUXIN (GENERALLY 10 SUP -5 M) SUCH AS NAPHTHALENE ACETIC ACID, IAA OR 2,4-D, AND A CYTOKININ (GENERALLY 10 SUP -5 M) SUCH AS ISOPENTYLADENINE, KINETIN OR ZEATIN, WERE ADDED TO THE MEDIUM. ROOTS WERE INDUCED ON CULTURED LEAF STEM AND COTYLEDON PIECES. SHOOT TIPS, WHICH ELONGATED IN CULTURE AND BRANCHED Laterally, ALSO WERE INDUCED TO ROOT. ROOTING OF ELONGATED APICES WAS ACCOMPLISHED BY A TWO-STEP PROCEDURE WITH DIFFERENT MEDIA, HORMONES AND TEMPERATURES, RESULTING IN COMPLETE PLANTLETS. PLANTS DEVELOPED FROM IN VITRO CULTURE DID NOT SURVIVE WHEN TRANSFERRED IN SOIL TO THE GREENHOUSE.

TISSUE CULTURE/CALLUS/ORGANOGENESIS/REGENERATION/ROOTING/PROPAGATION



ROST, T.L./PATERSON, K.E.

1978

STRUCTURAL AND HISTOCHEMICAL CHARACTERIZATION OF THE COTYLEDON STORAGE ORGANELLES OF JOJOBA (*SIMMONDSIA CHINENSIS*).

PROTOPLASMA 95(1-2):1-10.

JOJOBA COTYLEDON CELLS ARE ISODIAMETRIC AND 44 MICROMETERS IN DIAMETER. THEY CONTAIN TWO PROMINENT STORAGE ORGANELLES--WAX AND PROTEIN BODIES. ISOLATED AND INTACT WAX BODIES REACT POSITIVELY WITH SEVERAL LIPID HISTOCHEMICAL STAINS; THEY ARE SPHERICAL AND 1.5 MICROMETERS IN DIAMETER. PROTEIN BODIES ARE IRREGULAR IN SHAPE, BUT USUALLY APPEAR SPHERICAL. THEY RANGE IN DIAMETER FROM 7-15 MICROMETERS, ARE UNIT MEMBRANE BOUND, HAVE AN IRREGULAR GRAINY MATRIX AND DO NOT CONTAIN A GLOBOID INCLUSION. PROTEIN BODIES STAIN POSITIVELY FOR BOTH PROTEIN AND LIPID. THE POSSIBLE COMPOSITION AND ROLE OF THIS PROTEIN/LIPID BODY COMPLEX IS DISCUSSED.

CHEMICAL STRUCTURE/COTYLEDONS/PLANT PHYSIOLOGY

0343

ROST, T.L./PATERSON, K.E.

1979

CHARACTERIZATION OF ISOLATED AND IN SITU WAX BODIES AND PROTEIN BODIES FROM MATURE COTYLEDONS OF JOJOBA.

PAGES 223-236 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA COTYLEDON CELLS ARE ISODIAMETRIC AND 29-68  $\mu$  M IN DIAMETER (AVERAGE 44 MICROMETERS). THEY CONTAIN TWO PROMINENT STORAGE ORGANELLES--WAX BODIES AND PROTEIN BODIES. ISOLATED AND IN SITU WAX BODIES REACT POSITIVELY WITH SEVERAL LIPID HISTOCHEMICAL STAINS; THEY ARE SPHERICAL AND AVERAGE 1.5 MICROMETERS IN DIAMETER. PROTEIN BODIES ARE IRREGULAR IN SHAPE, BUT USUALLY ARE SPHERICAL. THEY RANGE IN DIAMETER FROM 2-17 MICROMETERS (AVERAGE = 6.7) ARE UNIT MEMBRANE BOUND, HAVE AN IRREGULAR GRAINY MATRIX AND DO NOT CONTAIN A GLOBOID INCLUSION. PROTEIN BODIES STAIN POSITIVELY FOR BOTH PROTEIN AND LIPID AND MAY PLAY A ROLE IN WAX BIOSYNTHESIS OR DIGESTION.

COTYLEDONS/PLANT PHYSIOLOGY/PROTEINS/LIPIDS

0344

ROST, T.L./WANG, P./LAMBERT, C.

1979

EXAMINATION OF VEGETATIVE ORGANS OF JOJOBA (*SIMMONDSIA CHINENSIS* LINK, SCHNEID.) FOR STORED WAX.

HORTSCIENCE 14(3, SECTION 1):274-275.

LEAVES, STEMS AND ROOTS OF JOJOBA EACH CONTAINED EQUIVALENT AMOUNTS OF EXTRACTABLE PETROLEUM ETHER. TLC SEPARATION OF SEED AND VEGETATIVE ORGAN EXTRACTS SHOWED A LEAF FRACTION THAT CO-CHROMATOGRAPHED APPROXIMATELY WITH THE SEED WAX CONTROL. HISTOCHEMICAL AND POLARIZED LIGHT OBSERVATIONS DEMONSTRATED THE POSSIBLE OCCURRENCE OF A BIREFRINGENT COMPONENT (POSSIBLY A WAX, BUT NOT IDENTICAL TO SEED WAX) ON THE LEAF SURFACE BUT NOT INTERNALLY IN ANY ORGAN.

PLANT PHYSIOLOGY/EXTRACTS/ANALYTICAL TECHNIQUES

ROTMAN, K.P.

1982

UPDATE: JOJOBA WATER-HARVESTING EXPERIMENT, PAPAGO INDIAN RESERVATION, SELLS, ARIZONA.

JOJOBA HAPPENINGS 38:3-7.

A 1-ACRE JOJOBA PLANTATION WAS ESTABLISHED AT SELLS, ARIZONA, IN 1975. WATER-HARVESTING TECHNIQUES ALLOW RAIN WATER TO BE STORED AND THEN PUMPED BACK ONTO THE PLANTATION WHEN REQUIRED. IN 1981, THE AVERAGE CLEAN-SEED YIELD WAS APPROXIMATELY 13 GRAMS PER PLANT.

ARIZONA/INDIAN RESERVATIONS/PLANTATION ESTABLISHMENT/WATER HARVESTING/  
SEED YIELD/PROPAGATION/SEX RATIOS

0346

ROTMAN, K.P.

1982

JOJOBA IN AUSTRALIA: PAST, PRESENT AND FUTURE.

PAGES 462-466 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

IN AUSTRALIA, MORE THAN 2,000 ACRES OF JOJOBA ARE UNDER CULTIVATION. GROWERS ASSOCIATIONS, SUCH AS THE AUSTRALIA JOJOBA ASSOCIATION, SHOULD HELP TO DISSEMINATE ACCURATE INFORMATION ABOUT GROWING CONDITIONS.

AUSTRALIA/CLIMATE/SALINITY/SOILS/WATER USE

0347

RUIZ, A./FLORES, E./KULJASHA, M.A.

1979

EXTRACCION MECANICA DEL ACEITE DE JOJOBA (MECHANICAL EXTRACTION OF JOJOBA OIL, IN SPANISH).

PAGES 285-289 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA OIL EXTRACTION DATA WERE GENERATED ON A PILOT PLANT LEVEL. A HANDER EXPPELLER EX-100 WITH A CAPACITY OF 130 KG/HR, A COOKER AND A FILTER PRESS WERE USED. VARIABLES TESTED WERE SEED MOISTURE, MEAL THICKNESS, SEED COOKING CONDITIONS AND HULL PERCENTAGE. UNDER APPROPRIATE CONDITIONS, EXTRACTION EFFICIENCY CAN BE HIGHER THAN 80 PERCENT.

OIL/SEED MEAL/MECHANICAL EXTRACTION

SAMAC, D. ET AL

1980

PROTEIN CONTENT, TRYPSIN INHIBITOR AND NITROGEN METABOLISM IN JOJOBA SEEDS.

JOJOBA HAPPENINGS 33:11-18.

GERMINATING COTYLEDONS SHOWED AN EARLY, SMALL LOSS OF EXTRACTABLE PROTEIN DUE TO AMINOPEPTIDASE ACTIVITY (APA) AND CARBOXYPEPTIDASE ACTIVITY (CPA). CPA, RAPID LOSS OF EXTRACTABLE PROTEIN, PROBABLY IS DUE TO THE SEVERAL-FOLD INCREASE IN ACID ENDOPEPTIDASE ACTIVITY (EPA). JOJOBA MEAL MAY BE USEFUL AS BOVINE FEED BECAUSE IT CONTAINS BOVINE PROTEASE INHIBITORS. BECAUSE THE SEED LACKS FUNGAL PROTEINASE INHIBITORS, DISEASE COULD BE A PROBLEM WHEN GERMINATING SEEDS UNDER WET FIELD CONDITIONS.

CHEMICAL COMPOSITION/COTYLEDONS/GERMINATION/PROTEINS/NITROGEN METABOLISM/TRICOTYLEDONY/SEED MEAL

0349

SAMAC, D./STOREY, R.

1981

PROTEOLYTIC AND TRYPSIN INHIBITOR ACTIVITY IN GERMINATING JOJOBA SEEDS (SIMMONDSIA CHINENSIS).

PLANT PHYSIOLOGY 68(6):1339-1344.

CHANGES IN PROTEOLYTIC ACTIVITY WERE MONITORED DURING GERMINATION IN EXTRACTS FROM COTYLEDONS OF JOJOBA SEEDS. AFTER IMBIBITION, THE COTYLEDONS CONTAINED HIGH LEVELS OF SULFHYDRYL AMINOPEPTIDASE ACTIVITY BUT LOW LEVELS OF SERINE CARBOXYPEPTIDASE ACTIVITY (CPA). CPA INCREASED WITH GERMINATION THROUGH APPARENT LOSS OF A CPA INHIBITOR IN THE SEED. ENDOPEPTIDASE ACTIVITY (EPA) (ASSAYED AT PH 4, 5, 6, 7 AND 8) DURING GERMINATION WERE DISTINCTLY DIFFERENT. JOJOBA COTYLEDONARY EXTRACTS INHIBITED THE ENZYMIC ACTIVITY OF TRYPSIN, CHYMOTRYPSIN AND PEPSIN BUT NOT THE PROTEASE FROM ASPERGILLUS SAOTOI. THE HEAT-LABILE TRYPSIN INHIBITOR SUBSTANCE WAS FOUND IN COMMERCIALY PROCESSED SEED MEAL AND IN THE ALBUMIN FRACTION OF SEED PROTEINS. TRYPSIN INHIBITOR ACTIVITY DECREASED WITH GERMINATION.

GERMINATION/COTYLEDONS/SEED/CHEMICAL STRUCTURE/PROTEOLYTIC ACTIVITY/TRYPSIN INHIBITOR

0350

SANCHEZ, G.O.

1944

LA JOJOBA: PLANTA CALIFORNIANA DE GRAN PORVENIR (THE JOJOBA, CALIFORNIAN PLANT OF GREAT PROMISE, IN SPANISH).

HACIENDA 39:324-326.

A BRIEF DESCRIPTION OF JOJOBA HABITAT. INSTRUCTION FOR SEEDING, TRANSPLANTING SEEDLINGS AND GENERAL CARE OF CULTIVATED PLANTS ARE OUTLINED.

SEEDLINGS/CULTIVATION/IRRIGATION/SEED YIELD/FOODS/PLANTING MANAGEMENT/BAJA CALIFORNIA

SANO, M./YOSHIDA, N.

1978

LIQUID SHORTENINGS CONTAINING JOJOBA OIL.

JAPAN KOKAI 78 44,660, APRIL 21, 1978.

A JAPANESE PATENT HAS BEEN GRANTED TO PREPARE LIQUID SHORTENINGS BY COMBINING HYDROGENATED JOJOBA OIL 0.1 TO 10.0 PERCENT, AN EMULSIFIER 0.1 TO 5.0 PERCENT, AND A LIQUID PLANT OIL 85.0 TO 99.8 PERCENT. A SHORTENING WAS PREPARED BY MIXING 920 KG SOYBEAN OIL AND 30 KG GLYCEROL MONOSTEARATE AT 80 DEGREES AND THEN COMBINING WITH 50 KG HYDROGENATED JOJOBA OIL. WHEN KEPT AT LOW TEMPERATURES FOR ONE MONTH THE MIXTURE WAS STABLE AND PRODUCED NO PRECIPITATE.

JAPAN/FOODS/SOYBEAN OIL/PATENTS/HYDROGENATED OIL

0352

SAUNDERS, C.F.

1930

A NEGLECTED NUT OF THE DESERT REGION.

DESERT 2:91.

JOJOBA SEEDS HAVE BEEN EATEN RAW OR ARE GROUND AND USED IN A COFFEE-LIKE BEVERAGE. THE OIL HAS BEEN USED TO PROMOTE GROWTH OF HAIR AND EYEBROWS, AS A TABLE OIL AND AS A REMEDY FOR CANCER.

OIL/SEED/NATURAL HISTORY/MEDICINAL USES

0353

SAVAGE, E.S.

1951

A COMPARATIVE STUDY OF THE UTILIZATION OF JOJOBA AND COTTONSEED OIL IN THE RAT.

UNIVERSITY OF SOUTHERN CALIFORNIA, DEPARTMENT OF BIOCHEMISTRY AND NUTRITION, LOS ANGELES. M.S. THESIS, 34 P.

JOJOBA OIL SHOWED THE LOWEST DIGESTIBILITY IN THE RAT OF ANY OTHER LIPID OILS STUDIED. THIS PHENOMENON MAY RESULT FROM A DECREASED HYDROLYSIS IN THE GASTROINTESTINAL TRACT SINCE LARGE AMOUNTS OF UNHYDROLYZED WAX WERE FOUND IN THE FECES. FOLLOWING THE ADMINISTRATION OF JOJOBA OIL, A LOWERED UTILIZATION OF COTTONSEED OIL RESULTS OVER A CONSIDERABLE PERIOD OF TIME. THIS MAY BE TRACED TO A DELAYED EXCRETION OF UNDIGESTED JOJOBA OIL OR TO A RE-EXCRETION OF THE WAX OR ALCOHOL VIA BILE OR INTESTINAL MUCOSA. THE NON-SAPONIFIABLE FRACTION OF THE FECES WAS THREE TO FOUR TIMES NORMAL.

OIL/ORGANIC COMPOUNDS/DIGESTION/SEED/RODENTS/FEEDING STUDIES

0354

SCARLET, P.L.

1978

JOJOBA IN A NUTSHELL.

JOJOBA INTERNATIONAL CORPORATION, CARPINTERIA. 55 P.

A COMPREHENSIVE COMPILATION OF AVAILABLE NATURAL HISTORY, CULTIVATION AND POTENTIAL USE INFORMATION.

PLANTATION MANAGEMENT/PROPAGATION/SOILS/IRRIGATION/PRUNING/TEMPERATURE/  
FERTILIZERS/PESTS/SEED HARVEST

0355

SCHMID, R.

1978

FLORAL AND FRUIT ANATOMY OF JOJOBA (SIMMONDSIA CHINENSIS).

PAGES 143-148 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA:  
MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU  
APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE  
1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS  
ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

A COMPARATIVE ANALYSIS IS MADE BETWEEN THE MALE AND FEMALE FLOWER HISTOLOGY  
OF JOJOBA (SIMMONDSIA CHINENSIS).

SEX DETERMINATION/SEED/FLOWERING/PLANT PHYSIOLOGY

0356

SCOGIN, R.

1980

SEROTAXONOMY OF SIMMONDSIA CHINENSIS (SIMMONDSIACEAE).

ALISO 9(4):555-559.

THE PRESENCE OF SEROLOGICAL CROSS-REACTIVITY BETWEEN SIMMONDSIA AND THREE  
GENERA OF THE EUPHORBIACEAE AND THE ABSENCE OF REACTIVITY WITH ALL OTHER  
COMMONLY DEEMED RELATED TAXA THAT WERE TESTED, STRONGLY SUPPORT A RELATIONSHIP  
BETWEEN THE EUPHORBIACEAE AND SIMMONDSIA. THE POSSIBILITY OF THE REACTIVITY  
WITH THE EUPHORBIACEAE BEING ARTIFACTUAL AND ANTISYSTEMATIC IS MUCH LESS LIKELY  
BY ITS ABSENCE IN ANY OF A WIDE TAXONOMIC SPECTRUM OF OTHER TESTED SPECIES.  
THE SEROLOGICAL CROSS-REACTIVITY DATA ARE MOST CONSISTENT WITH A SYSTEMATIC  
TREATMENT OF SIMMONDSIA AS A SEPARATE FAMILY WITHIN THE EUPHORBIALES. THESE  
DATA ALSO INDICATE A CLOSE AFFINITY WITH THE FAMILY EUPHORBIACEAE, ESPECIALLY  
WITH THE SUBFAMILIES ACALYPHOIDEAE AND EUPHORBIOIDEAE.

EUPHORBIACEAE/SYSTEMATICS

0357

SCOGIN, R./BROWN, S.

1979

LEAF FLAVONOIDS OF SIMMONDSIA CHINENSIS (SIMMONDSIACEAE).

ALISO 9(3):475-477.

SIMMONDSIACEAE IS A MONOTYPIC FAMILY CONSISTING OF THE SINGLE SPECIES SIMMONDSIA CHINENSIS. ECONOMIC INTEREST IN SIMMONDSIA RECENTLY HAS INCREASED GREATLY BECAUSE OF THE UNIQUE LIQUID WAX WHICH IS FOUND IN ITS SEED. AN INVESTIGATION OF THE LEAF FLAVONOIDS OF SIMMONDSIA REVEALED ONE WELL-CHARACTERIZED AND THREE PREVIOUSLY UNREPORTED ISORHAMNETIN GLYCOSIDES.

OIL/LEAVES/GLYCOSIDES

0358

SECRETARIA DE AGRICULTURA Y RECURSOS HIDRAULICOS, INSTITUTO NACIONAL DE INVESTIGACIONES AGRICOLAS, CENTRO DE INVESTIGACIONES AGRICOLAS DEL NOROESTE

1979

JOJOBA EN LA COSTA DE HERMOSILLO (JOJOBA ON THE COAST OF HERMOSILLO, IN SPANISH).

CIRCULAR CIANO NO. 108. 21 P.

SUGGESTIONS ON PLANT ESTABLISHMENT, CULTURAL PRACTICES, WATER REQUIREMENTS, FLOWERING PERIODS, DISEASES AND SEX DISTRIBUTION ARE BASED ON RESEARCH CONDUCTED BY HERMOSILLO'S COASTAL AGRICULTURAL EXPERIMENT STATION.

MEXICO/CULTIVATION/DISEASES/SEX RATIOS/WATER USE/PLANTATION MANAGEMENT

0359

SEPULVEDA B., J.I.

1978

PROFUNDIDAD DE SIEMBRA DE LA SEMILLA DE JOJOBA EN RELACION AL DESARROLLO DE PLANTAS EN CONDICIONES DE VIVERO (THE RELATIONSHIP OF DEPTH OF SOWING TO DEVELOPMENT OF NURSERY-GROWN JOJOBA SEEDLINGS, IN SPANISH).

PAGES 61-65 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

TECHNIQUES AND METHODS FOR PROPAGATING JOJOBA UNDER TREE-NURSERY CONDITIONS WERE EXPLORED. FOUR SOWING LEVELS WERE TESTED. DATA REGARDING GERMINATION PERIOD, RADICLE DEVELOPMENT HYPOCOTYL EMERGENCE PERCENTAGE, PLANT HEIGHT AND NUMBER OF LEAVES WERE OBTAINED IN A PERIOD OF 44 TO 58 DAYS.

PROPAGATION/GERMINATION/PLANT GROWTH/SEEDLINGS

SEPULVEDA B., J.I./PARRA H., H.

1975

PROGRAMA PARA EL MEJORAMIENTO Y DESARROLLO DE LA JOJOBA (SIMMONDSIA CHINENSIS (LINK) SCHNEIDER) EN EL ESTADO DE BAJA CALIFORNIA SUR (PROGRAM TO IMPROVE JOJOBA DEVELOPMENT IN THE STATE OF BAJA CALIFORNIA SUR, IN SPANISH).

SECRETARIA DE AGRICULTURA Y GANADERIA, SUBSECRETARIA FORESTAL Y DE LA FAUNA, INSTITUTO NACIONAL DE INVESTIGACIONES FORESTALES, MEXICO. BOLETIN DIVULGATIVO NO. 38. 27 P.

INITIAL STUDIES OF JOJOBA DISTRIBUTION, AND SOIL AND ELEVATIONAL PREFERENCE, WERE MADE ON NATURAL POPULATIONS AT THE CMPO EXPERIMENTAL FORESTAL DE ZONAS ARIDAS 'TODOS SANTOS.' ECOLOGICAL STUDIES WERE THEN EXTENDED TO SIX ZONES IN SOUTHERN BAJA CALIFORNIA WHERE JOJOBA GROWS WILD. TWENTY-ONE HERMAPHRODITIC PLANTS WERE LOCATED IN THE WILD AND ARE BEING USED AS SOURCE MATERIAL FOR PLANTINGS.

MEXICO/BAJA CALIFORNIA/NATIVE POPULATIONS/ENVIRONMENTAL EFFECTS/PHEENOLOGY/ SEED HARVEST

0361

SEPULVEDA B., J.I./PARRA H., H.

1976

LA JOJOBA, SIMMONDSIA CHINENSIS (LINK) SCHNEIDER. UNA ALTERNATIVA PARA EL DESARROLLO ECONOMICO DE LAS ZONAS ARIDAS Y SEMIARIDAS DE MEXICO (JOJOBA: AN ALTERNATIVE FOR ECONOMIC DEVELOPMENT OF THE ARID AND SEMIARID AREAS OF MEXICO, IN SPANISH).

CIENCIA FORESTAL (REVISTA DEL INSTITUTO NACIONAL DE INVESTIGACIONES FORESTALES, MEXICO) 1(4):40-49.

A BOTANICAL DESCRIPTION OF JOJOBA IS FOLLOWED BY NOTES ON ITS DISTRIBUTION, ETHNOBOTANY, USES OF THE OIL AND CULTIVATION IN THE UNITED STATES, ISRAEL AND MEXICO.

ETHNOBOTANY/OIL/CALIFORNIA/ARIZONA/ISRAEL/MEXICO/ECONOMIC DEVELOPMENT

0362

SHANI, A.

1982

CHEMICAL TRANSFORMATIONS OF JOJOBA OIL.

PAGES 257-260 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

DERIVATIVES OF JOJOBA OIL MAY FILL INDUSTRIAL, MEDICAL, COSMETIC OR OTHER NEEDS. DERIVATIVES CAN BE PREPARED BY DIVIDING THE ESTER INTO TWO PARTS AND USING EACH SEPARATELY. ALSO, LONG-CHAIN ESTERS CAN BE MODIFIED AND CONVERTED INTO NEW CHEMICALS.

CHEMICAL COMPOSITION/ESTERS/JOJOBYL/JOJOBAMIDE/OIL

SHANI, A.

1979

AN EFFICIENT SYNTHESIS OF MUSCALURE FROM JOJOBA OIL OR OLEYL ALCOHOL.

JOURNAL OF CHEMICAL ECOLOGY 5(4):557-564.

A FOUR-STEP SYNTHESIS OF (Z)-9-TRICOSENE (MUSCALURE), A COMPONENT OF THE PHEROMONE OF THE HOUSEFLY, FROM JOJOBA OIL BY 3-CARBON (OR 5-CARBON) UNTIL ELONGATION WAS DEVELOPED IN OVERALL HIGH YIELD. THE SEQUENCE OF REACTIONS AND THE PURITY OF THE PRODUCTS COULD BE EASILY FOLLOWED BY NUCLEAR MAGNETIC RESONANCE (NMR) TECHNIQUE.

OIL/PRODUCT DEVELOPMENT/MUSCALURE

0364

SHANI, A./HOROWITZ, E.

1980

QUATERNARY AMMONIUM SALTS DERIVED FROM JOJOBA OIL.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 57(5):161-166.

QUATERNARY AMMONIUM SALTS DERIVED FROM JOJOBA OIL HAVE SPECIAL POTENTIAL AS GERMICIDES, SURFACTANTS, EMULSIFIERS AND PHASE TRANSFER REAGENTS. THE JOJOBYL IODIDE AND MESYLATE REACT MORE READILY WITH AMINES THAN THE CHLORIDE, WHICH IS CONSISTENT WITH THE EXPECTED RELATIVE LEAVING GROUP REACTIVITY OF THE DIFFERENT HALIDES. THE NUCLEOPHILICITY OF THE TERTIARY AMINE, CONTAINING ONE LONG CHAIN DERIVED FROM JOJOBA OIL IS SIMILAR TO THAT OF OTHER TERTIARY AMINES CONTAINING ONLY SHORT ALKYL CHAINS. THE SALTS ARE THERMALLY STABLE UP TO 100 C TO 110 C.

GERMICIDES/OIL/SALTS/PRODUCT DEVELOPMENT/ALCOHOLS

0365

SHANI, A./LURIE, P./WISNIAK, J.

1980

SYNTHESIS OF JOJOBAMIDE AND HOMOJOBAMIDE.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 57(3):112-114.

JOJOBAMIDE WAS SYNTHESIZED FROM METHYL JOJOBOATE AND CONCENTRATED AMMONIUM HYDROXIDE BY HIGH TEMPERATURE TREATMENT OF THE MIXTURE IN A SEALED VESSEL. HOMOJOBAMIDE WAS SYNTHESIZED BY PARTIAL HYDROLISIS OF HOMOJOJOBYLNITRILE, WHICH WAS PREPARED FROM JOJOBA MESYLATE. THE MELTING POINTS OF THE AMIDES WERE RELATIVELY HIGH (GREATER THAN 75 C) FOR A MIXTURE OF AMIDES.

JOJOBAMIDE/MELTING POINT/HOMOJOBAMIDE/PRODUCT DEVELOPMENT

0366

SHARP, P.B.

1974

AN ANTHOCYANIN IN SIMMONDSIA CHINENSIS: GENETIC AND TAXONOMIC IMPLICATIONS.

UNIVERSITY OF ARIZONA, TUCSON. M.S. THESIS, 56 P.



A RED-VIOLET COLORED ANTHOCYANIN, ONE OF SEVEN ISOAMYL ALCOHOL-SOLUBLE PIGMENTS, IS PRESENT IN SIMMONDSIA CHINENSIS. THE HYDROLYZED PIGMENT HAS BEEN TENTATIVELY IDENTIFIED AS MALVIDIN.

THE ANTHOCYANIN APPEARS AS THE MAJOR COMPONENT OF A TANNINIFEROUS GROUP OF PIGMENTS PRESENT IN EVERY ORGAN OF THE PLANT. THE LOCATION OF ANTHOCYANIN-CONTAINING CELLS IN THE LEAVES SUGGESTS THAT THEY PROTECT THE VASCULAR BUNDLES, AN INDICATION THAT JOJOBA MAY BE A C SUB 4 PLANT.

THE GENETIC IMPLICATIONS OF THE PRESENCE OF ANTHOCYANIN ARE DISCUSSED. THE PRODUCTION OF ANTHOCYANINS IS GENETICALLY CONTROLLED AND ACCOUNTS FOR MANY VARIATIONS IN LEAF COLOR AMONG SIMMONDSIA INDIVIDUALS; HOWEVER, THE ANTHOCYANIN LEAF PIGMENTS ARE NOT SEX-LINKED.

THE ABILITY OF ANY PLANT TO PRODUCE ANTHOCYANIN IS IN ITSELF A TAXONOMICALLY SIGNIFICANT FACTOR. NO ANTHOCYANINS HAVE BEEN REPORTED IN THE FIVE GENERA REPORTED WITH SIMMONDSIA IN THE BUXACEAE. FURTHERMORE, JOJOBA DIFFERS FROM OTHER MEMBERS OF THE FAMILY IN IMPORTANT ANATOMICAL ASPECTS. IT IS SUGGESTED THAT UPON THE BASIS OF THE ANATOMICAL DIFFERENCES AND THE PRESENCE IN JOJOBA OF ANTHOCYANIN (WHICH IS CONSIDERED A PHYLOGENETICALLY PRIMITIVE CHARACTERISTIC) THAT THE POSITION OF SIMMONDSIA IN THE BUXACEAE COULD BE QUESTIONED.

GENETICS/PHOTOSYNTHESIS/PLANT CHEMISTRY/SYSTEMATICS

0367

SHERBROOKE, W.C.

1976

DIFFERENTIAL ACCEPTANCE OF TOXIC JOJOBA SEED (SIMMONDSIA CHINENSIS) BY FOUR SONORAN DESERT HETEROMYID RODENTS.

ECOLOGY 57(3):596-602.

SELECTED NATIVE HETEROMYID RODENTS WERE PLACED ON DIETS OF JOJOBA SEEDS, WHICH CONTAIN CYANOGENIC GLUCOSIDES, TO DETERMINE THEIR ABILITY TO UTILIZE THE WILD SEED CROP. PEROGNATHUS BAILEYI ATE JOJOBA SEEDS AND LIVED ON A DIET OF SEEDS OR MEAL FOR SEVERAL WEEKS. P. PENICILLATUS, P. INTERMEDIUS AND DIPODOMYS MERRIAMI REFUSED JOJOBA SEED DIETS AND LOST WEIGHT RAPIDLY. APPARENTLY P. BAILEYI HAS A DETOXIFICATION MECHANISM NOT POSSESSED BY THE OTHER SPECIES. CYANOGENIC GLUCOSIDES IN JOJOBA SEEDS MAY FUNCTION AS A DEFENSE IN SEED PREDATION. THE DEVELOPMENT OF DETOXIFICATION MECHANISMS BY P. BAILEYI COULD HAVE BEEN A COEVOLUTIONARY RESPONSE TO THE DEVELOPMENT OF SEED TOXICITY IN JOJOBA. BIOGEOGRAPHICALLY THEIR DISTRIBUTIONS ARE BROADLY OVERLAPPING. JOJOBA SEED STORAGE BY P. BAILEYI MAY DISPERSE SEEDS AND FACILITATE GERMINATION AND SEEDLING SURVIVAL. JOJOBA SEED TOXICITY MAY BE AN IMPORTANT FACTOR IN RESOURCE ALLOCATION AMONG COEXISTING SEED-EATING RODENTS IN JOJOBA HABITATS.

GERMINATION/PLANT DISTRIBUTION/RODENTS/SEED/NATIVE POPULATIONS

0368

SHERBROOKE, W.C.

1977

FIRST YEAR SEEDLING SURVIVAL OF JOJOBA (SIMMONDSIA CHINENSIS) IN THE TUCSON MOUNTAINS, ARIZONA.

SOUTHWESTERN NATURALIST 22(2):225-234.

RECENTLY GERMINATED JOJOBA SEEDLINGS (219) WERE LOCATED IN OCTOBER AND NOVEMBER 1974 AND OBSERVED MONTHLY FOR 12 MONTHS THEREAFTER. TOTAL SEEDLING SURVIVAL WAS 12 PERCENT. SEEDLINGS IN A PROTECTED SITUATION (ASSOCIATED WITH ADULT JOJOBA SHRUBS, OTHER WOODY PERENNIALS, OR ROCKS) HAD A SIGNIFICANTLY

HIGHER SURVIVAL RATE (22 PERCENT), BY DECEMBER 1975, THAN SEEDLINGS GROWING IN EXPOSED SITES (6 PERCENT). SEEDLING MORTALITY APPEARED TO BE RELATED TO BOTH CLIMATIC (DROUGHT AND FREEZING) AND BIOTIC (RODENT) FACTORS. PERIODS OF VEGETATIVE GROWTH AND SEEDLING GERMINATION WERE NOTED.

ARIZONA/FREEZING/GERMINATION/PLANT GROWTH/RODENTS/SEASONAL VARIATION/  
SEEDLINGS

0369

SHERBROOKE, W.C.

1976

EDITORIAL: THE SCIENTIFIC NAME OF JOJOBA.

JOJOBA HAPPENINGS 16:1-2.

BASED ON THE INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE THE ONLY VALID SCIENTIFIC NAME FOR JOJOBA IS SIMMONDSIA CHINENSIS (LINK) SCHNEIDER.

SYSTEMATICS

0370

SHERBROOKE, W.C.

1978

JOJOBA -- A SONORAN DESERT SHRUB.

PACIFIC DISCOVERY 31(2):22-29.

INTEREST IN JOJOBA IS TRACED FROM THE EARLY MISSIONARIES THROUGH THE DISCOVERY OF THE SEED OIL IN 1933, TO 1970 WHALE PROTECTION LEGISLATION IN THE UNITED STATES RESULTING IN CURRENT ATTEMPTS TO CULTIVATE THE SHRUB.

RODENTS/TOXICITY/OIL/SURVIVAL/SEEDLINGS

0371

SHERBROOKE, W.C.

1978

JOJOBA: AN ANNOTATED BIBLIOGRAPHIC UPDATE.

SUPPLEMENT TO ARID LANDS RESOURCE INFORMATION PAPER NO. 5, UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 80 P.

ANNOTATED BIBLIOGRAPHY.

BIBLIOGRAPHIES/ETHNOBOTANY/PLANT MORPHOLOGY/PROPAGATION/GENETICS/  
PHYTOGEOGRAPHY/WILDLIFE/SPERM WHALE OIL/PRODUCT DEVELOPMENT/OIL/SEED MEAL

0372

SHERBROOKE, W.C./HAASE, E.F.

1974

JOJOBA: A WAX-PRODUCING SHRUB OF THE SONORAN DESERT.

ARID LANDS RESOURCE INFORMATION PAPER NO. 5, UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 140 P.

LITERATURE REVIEW AND ANNOTATED BIBLIOGRAPHY.

BIBLIOGRAPHIES/ETHNOBOTANY/PLANT MORPHOLOGY/PROPAGATION/GENETICS/  
PHYTOGEOGRAPHY/SYSTEMATICS/EVOLUTION/WILDLIFE/ORNAMENTAL USE/SPERM WHALE OIL/  
PRODUCT DEVELOPMENT/OIL/SEED MEAL

0373

SIMPSON, T.D./MIWA, T.K.

1977

X-RAY STUDY OF HYDROGENATED JOJOBA WAX.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 54(2):54-58.

CRYSTALLOGRAPHIC ANALYSIS OF HYDROGENATED JOJOBA WAX ESTER SHOWED A MONOCLINIC CRYSTAL STRUCTURE WITH ORTHORHOMBIC PERPENDICULAR CHAIN PACKING. THE CELL DIMENSIONS WERE: A=4.99, B=7.44, C=55.2 ANGSTROM, BETA = 90 DEGREES. A LARGER SECONDARY UNIT CELL WAS OBSERVED AND IDENTIFIED AS PERMITTING THE HYDROCARBON ESTER CHAINS FREEDOM OF ROTATION. HYDROGENATED JOJOBA WAX ESTER IS CRYSTALLOGICALLY SIMILAR TO POLYETHYLENE.

CHEMICAL STRUCTURE/ESTERS/HYDROGENATED OIL

0374

SIMPSON, T.D./MIWA, T.K.

1978

CRYSTALLOGRAPHIC STUDY OF HYDROGENATED JOJOBA WAX AND ITS RELATIONSHIP TO POLYETHYLENE.

PAGES 199-218 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

CRYSTALLOGRAPHIC ANALYSIS OF HYDROGENATED JOJOBA WAX ESTER SHOWS THE STRUCTURE TO BE MONOCLINIC WITH ORTHORHOMBIC O<sub>1</sub> CHAIN PACKING. CELL DIMENSIONS ARE: A = 4.98, B = 7.44, C = 55.2 ANGSTROM, BETA = 90 DEGREES. THE HYDROCARBON CHAINS ARE VERTICAL TO THE UNIT CELL BASE AND ARE IN CONTRAST TO THE TILTED CHAIN STRUCTURES OF OTHER NORMAL LONG CHAIN FATTY ACID ESTERS. A LARGER SECONDARY UNIT CELL IS OBSERVED AND IDENTIFIED AS PERMITTING THE ESTER CHAINS TO HAVE FREEDOM OF HYDROCARBON CHAIN ROTATION. HYDROGENATED JOJOBA WAX ESTER IS INFINITELY MISCIBLE WITH POLYETHYLENE AND IS ALMOST CRYSTALLOGRAPHICALLY IDENTICAL TO THE POLYMER.

ESTERS/FATTY ACIDS/CHEMICAL COMPOSITION/HYDROGENATED OIL/POLYETHYLENE

0375

SLOANE, B./KAZANSKY, J.

1980

ARIZONA JOJOBA PLANTATIONS: SPRING 1980.

JOJOBA HAPPENINGS 31:5-7.

THE PRESENT AND POTENTIAL GROWTH OF THE JOJOBA INDUSTRY IN ARIZONA WAS SURVEYED. IN 1980, MORE THAN 6,000 ACRES WERE PLANTED IN JOJOBA IN THE CASA GRANDE, HYDER AND HARQUAHALA VALLEYS AND IN THE YUMA AREA.

ARIZONA/PLANTATION ESTABLISHMENT

0376

SMITH, N.C., JR.

1981

INCREASING THE YIELD OF JOJOBA.

JOJOBA HAPPENINGS 37:5-10.

THE POTENTIAL YIELD OF JOJOBA IS THE CRITICAL FACTOR IN ASSESSING THE ECONOMIC POTENTIAL OF THIS AGRO-INDUSTRIAL CROP.

SEED YIELD/BREEDING/GENETICS/POLLINATION/PROPAGATION

0377

SODINI, G./CANELLA, M./PATRICELLI, A.

1979

EXTRACTION OF UNDESIRABLE AND/OR TOXIC GLUCOSIDIC COMPOUND FROM VEGETABLES.

UNITED STATES PATENT 4,148,928, APRIL 10, 1979.

THE SIMMONDSIN CONTENT OF JOJOBA SEED FLOUR CAN BE DECREASED FROM APPROXIMATELY 3 PERCENT TO 750 PPM. THE PRODUCT CAN BE USED TO PREPARE A PROTEIN ISOLATE SUITABLE FOR FOOD USE. THE PRODUCT CONTAINED 35.6 PERCENT PROTEIN, 11 PERCENT CRUDE FIBER, AND 746 PPM SIMMONDSIN.

PRODUCT DEVELOPMENT/SEED FLOUR/SIMMONDSIN/PROTEINS/PATENTS

0378

SOUTH AUSTRALIA DEPARTMENT OF AGRICULTURE AND FISHERIES

1979

JOJOBA: REPORT ON THE WORKSHOP, FEBRUARY 1979.

CO-ORDINATING COMMITTEE ON NEW AGRO-BASED PRODUCTS, DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA. 32 P.

PROCEEDINGS OF THE SOUTH AUSTRALIAN 1979 JOJOBA WORKSHOP INCLUDE TRANSCRIPTS OF DELIVERED PAPERS, SUMMARIES OF GENERAL DISCUSSIONS AND AN ACTION PLAN FOR JOJOBA DEVELOPMENT.

AUSTRALIA/ECONOMIC DEVELOPMENT/MARKET DEMAND

SPADARO, J.J./EAVES, P.H./GASTROCK, E.A.

1960

DIRECT EXTRACTION OF JOJOBA SEED.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 37(3):121-124.

A BENCH-SCALE FILTRATION-EXTRACTION PROCESS WAS APPLIED TO JOJOBA SEED. BASED ON EXPERIENCE WITH OTHER OILSEEDS, THERE SHOULD BE GOOD CORRELATION BETWEEN THE BENCH-SCALE AND ITS COMMERCIAL APPLICATION. MOISTURE CONTENTS OF THE MATERIAL DURING COOKING WERE OPTIMUM AT 10 AND 15 PERCENT. MASS VELOCITIES IN EXCESS OF 2,000 AND EXTRACTION EFFICIENCIES OF MORE THAN 98 PERCENT WERE OBTAINED. THESE RESULTS ARE CONSIDERED SUITABLE FOR COMMERCIAL APPLICATION. HEXANE IS RECOMMENDED OVER HEPTANE AS THE EXTRACTION SOLVENT. THE USE OF UNCOOKED FLAKES IS NOT CONSIDERED FEASIBLE FOR LARGE-SCALE PRODUCTION.

SEED/SOLVENT EXTRACTION/OIL

0380

SPADARO, J.J./LAMBOU, M.G.

1973

PREPARATION OF JOJOBA PRODUCTS AND THEIR POTENTIAL USES.

PAGES 47-60 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, UNIVERSITY OF ARIZONA, TUCSON. 81 P.

RESEARCH CONTRIBUTIONS OF THE SOUTHERN MARKETING AND NUTRITION RESEARCH DIVISION OF U.S. DEPARTMENT OF AGRICULTURE IN NEW ORLEANS ARE REVIEWED. MECHANICAL EXTRACTION OF JOJOBA OIL IS DESCRIBED AND COMPARED WITH METHODS OF SOLVENT-EXTRACTION AND FILTRATION EXTRACTION. JOJOBA OIL IS AN EXCELLENT SOURCE OF CARBON SUB 20 AND CARBON SUB 22 STRAIGHT-CHAIN ALCOHOLS AND ACIDS. THESE COMPOUNDS COULD SERVE AS POTENTIAL INTERMEDIATES IN THE PREPARATION OF DISINFECTANTS, SURFACTANTS, DETERGENTS, LUBRICANTS, DRIERS, EMULSIFIERS, RESINS, PLASTICIZERS, PROTECTIVE COATINGS, FIBERS, CORROSION INHIBITORS, CREAMS, OINTMENTS, EMULSIFIERS, ANTIFOAMERS AND OTHER PRODUCTS.

ALCOHOLS/HYDROGENATION/EPOXIDATION/POLYMERIZATION/MECHANICAL EXTRACTION/  
SOLVENT EXTRACTION/SEED MEAL/ACIDS/OIL/PRODUCT DEVELOPMENT/CHEMICAL STRUCTURE

0381

SPENCER, G.F./PLATTNER, R.D./MIWA, T.K.

1977

JOJOBA OIL ANALYSIS BY HIGH PRESSURE LIQUID CHROMATOGRAPHY AND GAS CHROMATOGRAPHY/MASS SPECTROMETRY.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 54(5):187-189.

COMPOSITIONS OF LIQUID WAX ESTERS CAN BE DETERMINED USING TWO ANALYTICAL PROCEDURES. WAX ESTER HOMOLOGS CAN BE SEPARATED BY HIGH PRESSURE LIQUID CHROMATOGRAPHY. THE ACID AND ALCOHOL MOIETIES FROM EACH HOMOLOG CAN THEN BE DETERMINED. WAX ESTER COMPOSITION ALSO CAN BE DETERMINED BY GAS CHROMATOGRAPHIC SEPARATION OF HYDROGENATED JOJOBA WAX ESTERS ACCORDING TO CHAIN LENGTH. ANCILLARY MASS SPECTROMETRIC IDENTIFICATION OF THE ACID AND ALCOHOL MOIETIES THEN FOLLOWS. DOUBLE BONDS IN THE ALKYL CHAINS IN JOJOBA LIQUID WAXES WERE ALMOST EXCLUSIVELY (98 PERCENT) OMEGA-9, WHEN EXAMINED BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY AND OXONOLYSIS/GAS CHROMATOGRAPHY/MASS SPECTROMETRY.

CHEMICAL STRUCTURE/ESTERS/GAS LIQUID CHROMATOGRAPHY/OIL

0382

STUBBLEFIELD, T.M./WRIGHT, N.G.

1976

JOJOBA BEATS COTTON, BUT YOU HAVE TO WAIT AWHILE.

PROGRESSIVE AGRICULTURE IN ARIZONA 28(1):14-17.

ECONOMIC RETURNS BASED ON COSTS OF JOJOBA PLANTATION DEVELOPMENT AND SEED PRICE ARE ANALYZED. WITH HAND-HARVESTED SEED SELLING AT .50 PER POUND (CLEAN, DRY SEED) COSTS OUTFRAN RETURNS THROUGH ALL YEARS. WITH HAND-HARVESTED SEED SELLING AT .75 DOLLARS PER POUND THERE IS A PROFIT OF 892 DOLLARS ABOVE ALL COSTS INCURRED BY YEAR 12; PROFITS THE FOLLOWING YEAR ARE 1,937 DOLLARS PER ACRE. MECHANICALLY HARVESTED SEED SELLING AT .50 DOLLARS PER POUND YIELDS A NET RETURN AFTER YEAR 12 OF 2,716 DOLLARS PER ACRE. MECHANICALLY HARVESTED SEED, SELLING AT .75 DOLLARS PER POUND RETURNS 4,591 DOLLARS PER ACRE AFTER PRODUCTION LEVELS OUT.

ECONOMIC DEVELOPMENT/SEED/MECHANICAL HARVESTING EQUIPMENT/COST ANALYSIS

0383

STUBBLEFIELD, T.M./WRIGHT, N.G.

1977

ESTIMATED COSTS AND RETURNS FOR PRODUCING JOJOBA ON THE INDIAN RESERVATIONS IN ARIZONA AND CALIFORNIA.

JOJOBA HAPPENINGS 19:3-14.

THE ECONOMIC POTENTIAL OF JOJOBA PLANTATION DEVELOPMENT ON INDIAN RESERVATIONS WAS ANALYZED. THE BREAK-EVEN COST FOR EACH YEAR IS A REFLECTION OF THE AMOUNT OF CAPITAL THAT IS NEEDED TO PAY OFF ESTABLISHMENT (YEARS ONE THROUGH THREE) AND OPERATING COSTS (PRO-RATED OVER THE NEXT SEVEN YEARS).

ARIZONA/CALIFORNIA/COST ANALYSIS/ECONOMIC DEVELOPMENT/INDIAN RESERVATIONS

0384

STUBBLEFIELD, T.M./WRIGHT, N.G.

1978

ESTIMATED JOJOBA COSTS - 1976.

PAGES 311-321 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

BASED ON AVAILABLE INFORMATION, COMMERCIAL PRODUCTION OF JOJOBA APPEARS TO BE FEASIBLE AT A PRICE OF .50 DOLLARS PER POUND FOR CLEAN, DRY SEED. MECHANICAL HARVESTING WOULD COST APPROXIMATELY 200 DOLLARS PER ACRE BASED ON A YIELD OF 10 POUNDS OF SEED PER PLANT, 875 PLANTS PER ACRE. IF THE PRICE OF CLEAN, DRY SEED WAS INCREASED TO .75 DOLLARS PER POUND IT WOULD BE PROFITABLE TO PRODUCE SEED IF HAND HARVESTED FOR .38 DOLLARS PER POUND.

SEED/HARVESTING/ECONOMICS/COST ANALYSIS/MARKET

0385

SUTRON CORPORATION

1976

JOJOBA: STATUS AND POTENTIAL.

U.S. BUREAU OF INDIAN AFFAIRS, WASHINGTON, D.C. 38 P.

JOJOBA PROJECTS WERE ANALYZED ON THE BASIS OF THE WEALTH THAT WOULD ACCRUE TO INDIAN RESERVATIONS AS A RESULT OF INVESTING IN JOJOBA PLANTATIONS. WILD HARVESTS SHOULD CONTINUE AND AN INVESTMENT OF 6 MILLION DOLLARS OVER FIVE YEARS WOULD ESTABLISH LARGE-SCALE PLANTATIONS ON INDIAN RESERVATIONS IN ARIZONA AND CALIFORNIA. THERE IS NO URGENCY TO DEVELOP A MECHANICAL HARVESTER.

COST ANALYSIS/ECONOMIC DEVELOPMENT/INDIAN RESERVATIONS

0386

SWEET, C.

1982

THE SEMI-RURAL DEVELOPMENT OF JOJOBA PLANTATIONS.

PAGES 401-409 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

WATER IS A MAJOR CONCERN TO JOJOBA GROWERS. MOST GROWERS CURRENTLY USE SOME TYPE OF IRRIGATION. IN THE FUTURE, GROWERS WILL HAVE TO LOOK TO RECYCLED WATER. JOJOBA CURRENTLY DOES NOT HAVE A PEST PROBLEM. HOWEVER, KNOWLEDGE OF CHEMICAL PESTICIDES SHOULD BE ACQUIRED FOR THE FUTURE. A SMALL JOJOBA FARM COULD FUNCTION AS A TAX SHELTER OR RETIREMENT HOME.

CULTIVATION/EUCALYPTUS/LAND USE/WATER USE/IRRIGATION

0387

SZABO, L.G.

1979

JOJOBA OIL AND WAX.

GYOGYSZERESZET (HUNGARY) 23(4):129-131.

A REVIEW OF CHARACTERISTICS, COMPOSITION AND PHARMACEUTICAL USES OF JOJOBA OIL AND WAX.

OIL/HYDROGENATED OIL/CHEMICAL STRUCTURE/PRODUCT DEVELOPMENT

0388

TAGUCHI, M.

1978

TEST RESULTS ON SAFETY OF JOJOBA OIL TO BE USED FOR COSMETICS.

PAGES 149-170 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

ACUTE TOXICITY, EYE IRRITATION, REPEAT PATCH AND SKIN IRRITATION TESTS WERE CONDUCTED USING JOJOBA OIL. JOJOBA OIL WAS DETERMINED TO BE SAFE FOR USE AS AN OIL-PHASE RAW MATERIAL FOR COSMETICS.

COSMETICS/OIL/TOXICITY/PRODUCT DEVELOPMENT

0389

TAGUCHI, M./KUNIMOTO, T.

1980

JOJOBA WAX IN COSMETIC CREAMS AND LOTIONS.

COSMETICS & TOILETRIES 95(4):39-41.

APPROXIMATELY 300 LOTS OF JOJOBA CRUDE OIL WERE EXAMINED FOR SPECIFIC GRAVITY, REFRACTIVE INDEX, SAPONIFICATION NUMBER, GAS CHROMATOGRAPHY, AND ACID IODINE AND PEROXIDE VALUES. THE QUALITY OF CRUDE OIL VARIED ACCORDING TO COUNTRY OF ORIGIN, METHOD OF EXTRACTION, TIME OF HARVEST, DRYING CONDITIONS, SEED AND OIL STORAGE CONDITION, ETC. FOR USE IN COSMETICS, JOJOBA OIL SHOULD BE STABLE IN QUALITY AND SHOULD BE COLORLESS AND ODORLESS; THE REFINING PROCESS SHOULD BE SAFE. BECAUSE OF THE HIGH COST AND UNCERTAIN SUPPLY, THE CONTENTS RATIO OF JOJOBA OIL IN JAPANESE COSMETICS IS THE MINIMUM NECESSARY TO BRING OUT THE CHARACTERISTICS OF THE JOJOBA OIL.

COSMETICS/OIL/CHEMICAL STRUCTURE/CHEMICAL COMPOSITION

0390

TAL, M. ET AL

1979

SALT TOLERANCE IN SIMMONDSIA CHINENSIS: WATER BALANCE AND ACCUMULATION OF CHLORIDE, SODIUM AND PROLINE UNDER LOW AND HIGH SALINITY.

ANNALS OF BOTANY 43(6):701-708.

THE RESPONSE OF JOJOBA PLANTS TO SALINITY WAS STUDIED IN SOLUTION CULTURES. PLANTS ARE HIGHLY TOLERANT TO SODIUM CHLORIDE (NaCl) AT CONCENTRATIONS OF 0, 100, 200 AND 600 M MOL L<sup>-1</sup> NaCl. PLANT GROWTH WAS NOT AFFECTED BY SALINITY. THEY ACCUMULATED LARGE AMOUNTS OF CL<sup>-</sup>, Na<sup>+</sup> AND PROLINE. THE AMOUNTS DECREASED RAPIDLY IN PLANTS TRANSFERRED BACK TO THE CONTROL MEDIUM. POTASSIUM CONTENT DECREASED IN Na-Cl-TREATED PLANTS AND TENDED TO INCREASE RAPIDLY TO THE CONTROL LEVEL IN PLANTS TRANSFERRED TO THE CONTROL MEDIUM. THE EFFECT OF SALINITY ON WATER BALANCE WAS NOT APPRECIABLE. AS SUGGESTED FOR OTHER XEROPHYTIC SPECIES, IT COULD BE ASSUMED THAT THE HIGH TOLERANCE OF JOJOBA TO SALINITY PLAYS AN IMPORTANT ROLE IN ITS ABILITY TO ENDURE PERIODS OF DROUGHT. THE ROLE OF PROLINE DURING OR AFTER STRESS IS NOT KNOWN.

SALINITY/WATER USE/CHLORIDE/SODIUM/PROLINE/PLANT GROWTH/WATER STRESS

0391

TAUSSKY, I.

1944

COMPOSITION OF MATTER AND PREPARATION AND PROCESS OF PRODUCING THE SAME.

U.S. PATENT 2,350,082, MAY 30, 1944.



SHORTENING MATERIALS USUALLY MADE OF HYDROGENATED COTTON SEED, SOYBEAN OR OTHER OILS ARE SUBSTANTIALLY LACKING IN EMULSIFYING POWER. THIS EMULSIFYING POWER CAN BE ADDED BY USING THE UNSAPONIFIABLE DISTILLATE OF UNHARDENED, ELAIDINATED OR HYDROGENATED JOJOBA OIL, I.E., UNHARDENED, ELAIDINATED OR HYDROGENATED JOJOBA ALCOHOL, AS SHORTENING MATERIAL.

ALCOHOLS/SEED/PATENTS/OIL/PRODUCT DEVELOPMENT

0392

TAUSSKY, I.

1946

PROCESSES OF REFINING, PURIFYING, AND HYDROGENATING FATS, FATTY ACIDS, AND WAXES.

U.S. PATENT 2,413,009, DECEMBER 24, 1946.

A REFINED SUBSTANCE SELECTED FROM THE GROUP CONSISTING OF FATS, FATTY ACIDS AND WAXES, INCLUDING JOJOBA WAX, IS COMBINED WITH A SMALL PERCENTAGE OF A FINELY-DIVIDED SPENT HYDROGENATION CATALYST AND IS SUBJECTED TO HYDROGEN PRESSURE OF BETWEEN 50 AND 750 POUNDS PER SQUARE INCH AT A TEMPERATURE SLIGHTLY ABOVE 212 F.

PATENTS/ACIDS/OIL/CHEMICAL STRUCTURE

0393

TAUTVYDAS, K.J.

1979

ORGANOGENESIS IN TISSUE CULTURE OF JOJOBA (SIMMONDSIA CHINENSIS).

PAGES 25-38 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

CONDITIONS NECESSARY FOR REGENERATING PLANTS FROM UNORGANIZED JOJOBA CALLUS WERE INVESTIGATED. EXPLANTS WERE TAKEN FROM COTYLEDONS AND VARIOUS ORGANS OF ONE-YEAR-OLD OR YOUNGER SEEDLINGS. SEVERAL MINERAL NUTRIENT MEDIA SUPPLEMENTED WITH VITAMINS AND GROWTH REGULATORS SUPPORTED GROWTH AND CALLUSING OF ALL EXPLANT, EXCEPT ROOTS. PRODUCING VIGOROUS GREEN CALLUS WHICH COULD BE SUBCULTURED ON SOLID OR LIQUID MEDIA WAS FAVORED BY HIGH SALT MEDIA. CALLUS GREENING WAS ENHANCED BY INCREASING CONCENTRATIONS OF NH SUB 4 NO SUB 3 UP TO 3 G/L AND BY NAA. PRODUCING CALLUS REQUIRED BOTH AN AUXIN AND CYTOKININ. UNDER CERTAIN CONDITIONS, JOJOBA STEM CALLUS FORMED CELLS PRODUCING LARGE DROPS OF OIL. ORANOGENESIS IN JOJOBA CALLUS WAS LIMITED TO ROOT FORMATION. HERE ALSO BOTH AN AUXIN AND A CYTOKININ WERE REQUIRED, BUT THE AUXIN CONCENTRATION HAD TO BE AT LEAST THREE TIMES GREATER THAN THAT OF THE CYTOKININ FOR BEST RESULTS. CONCENTRATIONS OF NAA IN THE RANGE OF 0.5 : 5 MG/L AND BA IN THE RANGE OF 0.04 TO 2 MG/L PERMITTED ROOT FORMATION. NITROGEN CONCENTRATIONS ABOVE 40 MM AND ILLUMINATION GREATER THAN 100 FT-C. REPRESSED ROOT FORMATION.

REGENERATION/CALLUS/PLANT NUTRIENTS/TISSUE CULTURE/ORGANOGENESIS

0394

TEJADA DE HERNANDEZ, I.

1976

VALOR NUTRITIVO DE ALGUNOS INGREDIENTES DE ZONAS ARIDAS (NUTRITIVE VALUE OF SOME ARID-ZONE VEGETATION, IN SPANISH).

TECNICA PECUARIA EN MEXICO 31:89-93.

THE NUTRITIVE VALUE OF JOJOBA MEAL, GUAYULE LEAVES (AFTER RUBBER WAS REMOVED) AND THE OIL OF CHICA PALM SEEDS WAS STUDIED. JOJOBA (FED TO CHICKS) AND GUAYULE (FED TO RATS) WERE TOXIC.

SEED MEAL/TOXICITY/PALATABILITY/FEEDING EXPERIMENTS

0395

THOMPSON, A.E.

1973

NEEDS FOR HORTICULTURAL RESEARCH ON PROPAGATION, CULTURE AND BREEDING OF JOJOBA.

PAGES 33-36 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

HORTICULTURAL DEVELOPMENT OF JOJOBA AS A CULTIVATE COULD BE ACCOMPLISHED BY THE ARIZONA AGRICULTURAL EXPERIMENT STATION. THREE MAJOR AREAS OF RESEARCH ARE CONSIDERED: 1) PLANT BREEDING AND GENETICS; 2) ASEXUAL AND SEXUAL PROPAGATION AND PLANT ESTABLISHMENT; AND 3) METHODS OF CULTURE. ONCE THE EVALUATION OF JOJOBA HAS PROVIDED MORE INFORMATION, PROBABLY FIVE TO EIGHT YEARS, JOJOBA COULD BECOME AN IMPORTANT NEW CROP AND AN IMPORTANT CONTRIBUTION TO INDIAN RESERVATION ECONOMICS.

ARIZONA/GENETICS/REPRODUCTION/GENETIC VARIABILITY/PLANTING MANAGEMENT/IRRIGATION/BREEDING/SEEDLINGS/CULTIVATION/DISEASES/PESTS/INSECTS/INDIANS OF NORTH AMERICA/ECONOMIC DEVELOPMENT

0396

THOMSON, P.H. ED.

1976

CALIFORNIA RARE FRUIT GROWERS JOJOBA HANDBOOK.

CALIFORNIA RARE FRUIT GROWERS, SPECIAL PUBLICATION NO. 2, STAR ROUTE, BOX P, BONSALE, CALIFORNIA 92003. 118 P.

TOPICS DISCUSSED INCLUDE: BOTANY AND DISTRIBUTION, ORIGIN OF COMMON AND SCIENTIFIC NAMES, DESCRIPTION OF PLANT, PHENOLOGY, PROPAGATION, TRANSPLANTING, POLLINATION, PESTS AND DISEASES, SELECTION CRITERIA, AREAS SUITABLE FOR CULTIVATION, EARLY ARIZONA PLANTINGS, AND CALIFORNIA PLANTINGS.

ARIZONA/CALIFORNIA/AGRONOMY/NATIVE POPULATIONS/PROPAGATION/POLLINATION/INSECTS/DISEASES/PLANTATION ESTABLISHMENT

0397

THOMSON, P.H. ED.

1978

JOJOBA HANDBOOK: SECOND EDITION.

BONSALL PUBLICATIONS, BONSALL, CALIFORNIA. 156 P.

REVISED EDITION OF P.H. THOMSON (1976) CALIFORNIA RARE FRUIT GROWERS JOJOBA HANDBOOK, CALIFORNIA RARE FRUIT GROWERS, SPECIAL PULLICATION NO. 2.

AGRONOMY/ARIZONA/CALIFORNIA/PLANT DISTRIBUTION/PLANTATION MANAGEMENT/  
POLLINATION/WILDLIFE

0398

TOBIAS, J.W./MAZZUCO, A.F./LATORRE, R.J.

1947 - 1949

ACCION IN VITRO DE LA CERA LIQUIDA EXTRAIDA DE LAS SEMILLAS DE SIMMONDSIA CALIFORNICA NUTT. SOBRE EL MYCOBACTERIUM TUBERCULOSIS (IN VITRO ACTION OF THE LIQUID WAX EXTRACTED FROM SIMMONDSIA CALIFORNICA NUTT. SEEDS ON MYCOBACTERIUM TUBERCULOSIS, IN SPANISH).

INSTITUTO MODELO DE CLINICA MEDICA, BUENOS AIRES, ANALES 27:803-818.

THE LIQUID WAX OBTAINED FROM THE SEEDS OF JOJOBA HAS AN INTENSE INHIBITORY ACTION ON TUBERCLE BACILLI. THE VIRULENT MYCOBACTERIUM TUBERCULOSIS PUT INTO CONTACT WITH THIS WAX DOES NOT GROW IN THE USUAL CULTURE MEDIA. IT IS NOT POSSIBLE TO DEMONSTRATE ITS PRESENCE IN THE SMEARS, EXAMINED WITH THE ELECTRON MICROSCOPE, CONSISTING OF MATERIAL DERIVED FROM THE CULTURE MEDIA OF THE EMULSION OF THE BACILLI IN THE LIQUID WAX.

MEDICINAL PLANTS/BACTERIA/MICROORGANISMS/OIL/PRODUCT DEVELOPMENT

0399

TOMOFF, C.S./JOHNSON, J.D.

1973

JOJOBA SEED PRODUCTION POTENTIAL: ARIZONA, 1972.

PAGES 27-28 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

THE GEOGRAPHICAL DISTRIBUTIONS OF JOJOBA POPULATIONS MAY BE MAPPLD EXPRESSING THEM IN TERMS OF THEIR POPULATION DENSITIES, SEX RATIOS AND PRESENT FRUITING CONDITIONS. THE SEED PRODUCTION POTENTIAL FOR EACH POPULATION ON A WEIGHT PER ACRE BASIS CAN THEN BE ESTIMATED. DROUGHT HAS CAUSED MANY PLANTS TO ABORT THEIR FRUIT. DENSE FRUITING STANDS ARE SITUATED PREDOMINANTLY ON NORTHEAST, NORTH, AND NORTHWEST FACING SLOPES, ALONG STEEP SLOPES IMMEDIATELY ADJACENT TO WASHES OR RUNOFFS, OR ON RELATIVELY FLAT TERRAIN WHICH IS FED WITH CONSIDERABLE RUNOFF.

SEED/FRUITING/DROUGHT TOLERANCE/ASPECT/SLOPE EXPOSURE/PHENOLOGY/SEED YIELD/  
PLANT DISTRIBUTION/MICROENVIRONMENT/NATIVE POPULATIONS

TOYO AEROSOL INDUSTRY CO. LTD.

1982

HAIR AEROSOLS.

JAPAN KOKAI TOKKYO KOHO JP 82 02,215, JANUARY 7, 1982.

HAIR CONDITIONER AEROSOLS CONTAIN POLYOXYPROPYLENE BU ETHER AND JOJOBA OIL IN RATIOS OF 0.5 TO 50 PERCENT TO 0.1 TO 15 PERCENT. THE PREPARATION PREVENTS DAMAGE TO HAIR.

PATENTS/PRODUCT DEVELOPMENT/COSMETICS/OIL

0401

TREI, J.E. ET AL

1979

EVALUATIONS OF DEOILED, NON-DETOXIFIED JOJOBA MEAL WITH LAMBS.

AMERICAN SOCIETY OF ANIMAL SCIENTISTS, WESTERN SECTION, ANNUAL MEETING PROCEEDINGS 30:239-280.

THREE FEEDING TRIALS WERE CONDUCTED WITH LAMBS FED DEOILED NONDETOXIFIED JOJOBA MEALS RANGING IN TOXICANTS BETWEEN 4.1 PERCENT TO 4.6 PERCENT SIMMONDSIN AND .5 PERCENT TO .2 PERCENT SIMMONDSIN 2'-FERULATE. ALL LAMBS WERE ADAPTED FOR SEVEN TO 10 DAYS TO THE BASAL PELLETTED RATION. IN TRIAL I, HEXANE DEOILED MEAL WAS FED AT 10 PERCENT OF THE RATION COMPARED WITH A 10 PERCENT COTTONSEED MEAL (CSM) BASAL RATION. FEED CONSUMPTION (PERCENT BW), GRAINS (KG/DAY), AND FEED CONVERSION WERE 4.2, .24 AND 6.25 VS. 4.0, .24 AND 8.75 FOR CSM AND JOJOBA MEAL SUPPLEMENTED RATIONS, RESPECTIVELY. AFTER 24 DAYS ON FEED, DETAILED HISTOPATHOLOGICAL ANALYSIS OF LYMPH NODE, LIVER, LUNG, SPLEEN AND BONE MARROW REVEALED ALL TISSUES TO BE WITHIN NORMAL LIMITS. IN TRIAL II, METHYLENE CHLORIDE DEOILED MEAL WAS OFFERED AT 0 PERCENT, 10 PERCENT, 20 PERCENT AND 30 PERCENT LEVELS IN THE RATION WITH FOUR 23-KG LAMBS ALLOTTED TO EACH TREATMENT. TWO LAMBS WERE SACRIFICED AFTER 35 DAYS ON FEED; THE BALANCE WERE SLAUGHTERED AFTER 98 DAYS WITH NO PATHOLOGICAL TISSUE LESIONS FOR EITHER TIME PERIOD ATTRIBUTABLE TO TREATMENTS. THERE WERE NO SIGNIFICANT DIFFERENCES IN VITAL SIGNS DUE TO TREATMENT. FOR THE FIRST 35 DAYS, ADG WAS .22, .02, .06 AND .06 FOR BASAL, 10 PERCENT, 20 PERCENT AND 30 PERCENT JOJOBA MEAL RATIOS (P LESS THAN .05), RESPECTIVELY. CORRESPONDING DAILY FEED CONSUMPTIONS (KG) WERE 1.41, .75 AND 84 (P LESS THAN .05). DURING THE FINAL 63 DAYS, ADG AND FEED CONSUMPTION (KG) WAS .30 AND 1.83 VS .17 AND 1.16 FOR BASAL AND 30 PERCENT RATIOS, RESPECTIVELY. IN TRIAL III, METHYL CHLOROFORM DEOILED MEAL WAS FED AT 0 PERCENT AND 10 PERCENT LEVELS TO FOUR 32-KG LAMBS ALLOTTED TO EACH TREATMENT. ADGS WERE .24 AND .20 FOR BASAL AND JOJOBA RATIOS, RESPECTIVELY. CORRESPONDING FEED CONSUMPTIONS WERE 1.75 AND 1.67. REDUCED FEED INTAKE WITH DEOILED BUT NONDETOXIFIED JOJOBA MEALS HAS COMPLICATED NUTRITIONAL ASSESSMENT.

SEED MEAL/LAMBS/TOXICITY/SIMMONDSIN

0402

TURNER, S.J.

1979

ENVIRONMENTAL CONSEQUENCES OF HARVESTING JOJOBA FROM NATURAL STANDS.

PAGES 325-333 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

NATURAL STANDS OF JOJOBA HAVE BEEN INTENSIVELY HARVESTED BY THE SAN CARLOS APACHE INDIANS FOR THE PAST SEVERAL YEARS. UNHARVESTED STUDY AREAS ARE COMPARED TO HARVESTED AREAS. A BRIEF DESCRIPTION OF HARVESTERS AND THE HARVEST IS FOLLOWED BY A DISCUSSION OF THE IMPACT OF HARVESTING UPON THE ENVIRONMENT.

NATIVE POPULATIONS/SEED HARVEST/INDIAN RESERVATIONS/ENVIRONMENTAL EFFECTS

0403

U.N. INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO), VIENNA

1981

THE JOJOBA POTENTIAL.

SAME AS AUTHOR. UNIDO/IO.425. 216 P.

A REVIEW OF JOJOBA PRODUCTION, PROCESSING AND MARKETING BASED ON WORK OF THE INDUSTRIES DEVELOPMENT CORPORATION, HAIFA, ISRAEL.

SEED HARVEST/SEED MEAL/PRODUCT DEVELOPMENT/MARKET DEMAND/ECONOMIC DEVELOPMENT/ISRAEL

0404

U.S. DEPARTMENT OF AGRICULTURE SCIENCE AND EDUCATION ADMINISTRATION

1979

QUICK BIBLIOGRAPHY SERIES: JOJOBA, SERIES NO. NAL-BIBL. 79-19.

TECHNICAL INFORMATION SYSTEMS, SCIENCE AND EDUCATION ADMINISTRATION, U.S. DEPARTMENT OF AGRICULTURE, BELTSVILLE, MARYLAND, 12 P.

NO ABSTRACT.

BIBLIOGRAPHIES

0405

UTZ, W.J. ET AL

1982

NUTRITIONAL EVALUATION OF THE JOJOBA PLANT: ELEMENTAL ANALYSIS OF THE SEED MEAL.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY 30(2):392-394.

JOJOBA SEEDS FROM VARIOUS GEOGRAPHIC SOURCES WERE ANALYZED FOR NITROGEN, PHOSPHORUS, SODIUM, CHLORINE, SULFUR, POTASSIUM, CALCIUM, MAGNESIUM, IRON AND OTHER TRACE ELEMENTS OF NUTRITIONAL IMPORTANCE. THE DIFFERENT SOURCES WERE SIGNIFICANTLY DIFFERENT IN THEIR TRACE ELEMENTS; HOWEVER, THE SEED MEAL COMPARED FAVORABLY WITH FEED RATIONS FOR COWS AND CHICKENS.

FEEDING STUDIES/SEED/SEED MEAL/NATIVE POPULATIONS/TRACE ELEMENTS/LIVESTOCK

0406

VAN TIEGHEM, P.

1897

SUR LES BUXACEES. I: SUR LE GENRE SIMMONDSIE, CONSIDERE COMME TYPE D'UNE FAMILLE DISTINCTE, LES SIMMONDSIACEES (ON THE BUXACEAE. I: ON THE GENUS SIMMONDSIA CONSIDERED AS THE TYPE OF A DISTINCT FAMILY, SIMMONDSIACEAE, IN FRENCH).

ANNALES DES SCIENCES NATURELES, BOTANIQUE ET BIOLOGIE VEGETALE 5:290-301.

THE STEM, LEAF, ROOT, FLOWERS, FRUIT, SEEDLING AND GERMINATION OF SIMMONDSIA WERE EXAMINED. SIMMONDSIA WAS OUTSTANDING IN THE FOLLOWING: STEM AND ROOT STRUCTURE, DIOECIOUS HABIT, FIVE PART CALYX, CYCLIC CONFORMATION OF THE TWO TYPES OF FLOWERS, ABSENCE OF A COROLLA, POLYSTAMENS, CONFORMATION OF THE PISTIL, UNITY OF THE OVULE IN EACH CARPEL, APICAL INSERTION OF THE STIGMA AND THEIR OLD AGE, THE ABSENCE OF ALBUMEN IN THE COTYLEDONS, THE ACCUMBENT OF THE COTYLEDONS AND IN THE GERMINATION WITH HYPOGEOUS COTYLEDONS. SIMMONDSIA DIFFERS SO GREATLY FROM OTHER MEMBERS OF THE FAMILY BUXACEAE THAT IT SHOULD CONSTITUTE THE TYPE OF A DISTINCT MONOTYPIC FAMILY, THE SIMMONDSIACEAE.

SYSTEMATICS/STEMS/LEAVES/ROOTS/FLOWERS/SEED/PLANT MORPHOLOGY/GERMINATION/SEEDLINGS/BUXACEAE

0407

VAN TIEGHEM, P.

1898

SUR LE GENRE SIMMONDSIE, CONSIDERE COMME TYPE D'UNE FAMILLE DISTINCTE, LES SIMMONDSIACEES (ON THE GENUS SIMMONDSIA, CONSIDERED AS THE TYPE OF A DISTINCT FAMILY, THE SIMMONDSIACEAE, IN FRENCH).

JOURNAL DE BOTANIQUE 12:103-112.

THE STEM, LEAF, ROOT, FLOWERS, FRUIT, SEEDLINGS AND GERMINATION OF SIMMONDSIA WERE EXAMINED. SIMMONDSIA DIFFERS SO GREATLY FROM OTHER MEMBERS OF THE FAMILY BUXACEAE THAT IT SHOULD CONSTITUTE THE TYPE OF A DISTINCT MONOTYPIC FAMILY, THE SIMMONDSIACEAE.

SYSTEMATICS/STEMS/LEAVES/ROOTS/FLOWERS/SEED/PLANT MORPHOLOGY/BUXACEAE

0408

VERBISCAR, A.J. ET AL

1979

DETOXIFICATION AND ANALYSES OF JOJOBA MEAL.

PAGES 185-197 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

OIL-EXTRACTED SEED MEAL CONTAINS ABOUT 30 PERCENT CRUDE PROTEIN AND 8 PERCENT TOTAL SUGARS AS INVERT, WHICH MAKE IT A POTENTIAL FEED INGREDIENT FOR LIVESTOCK. EVEN THE SEED HULLS CONTAIN ABOUT 7 PERCENT CRUDE PROTEIN AND 3 PERCENT TOTAL SUGARS. HOWEVER, ALL EXTRACTED MEAL CONTAINS APPROXIMATELY 4.5 PERCENT SIMMONDSIN, 1 PERCENT SIMMONDSIN 2'-FERULATE AND AT LEAST ONE OTHER MINOR STRUCTURALLY RELATED COMPOUND. SIMMONDSIN, ALTHOUGH NOT HIGHLY TOXIC IN AN ACUTE DOSE, IS AN ANTI-NUTRITIONAL FACTOR, WHICH, EVEN AT 0.15 PERCENT LEVELS

IN A NORMAL RATION, CAUSES RATS TO REDUCE THEIR FEED INTAKE. VARIOUS METHODS HAVE BEEN EXPLORED TO REMOVE OR MODIFY THESE COMPOUNDS IN JOJOBA MEAL TO MAKE IT PALATABLE AND NUTRITIONALLY ACCEPTABLE AS A LIVESTOCK FEED INGREDIENT. SOLVENT EXTRACTION, HEAT, CHEMICAL AND MICROBIAL METHODS ARE BEING STUDIED AS POTENTIAL, LOW-COST PRACTICAL DETOXIFICATION PROCESSES. REMOVING OIL FROM MEAL TO A 1 TO 2 PERCENT OIL LEVEL IS CONSIDERED THE FIRST STEP IN ANY ECONOMIC DETOXIFICATION. DETOXIFIED MEALS CURRENTLY ARE BEING FED TO MICE, CHICKENS AND SHEEP WITH EXPERIMENTAL CATTLE STUDIES SCHEDULED. FOR MICE AND CHICKENS, NUTRITIONAL UTILITY OF THE MEAL IS RELATED TO LOWER SIMMONDSIN LEVELS. FOR SHEEP, NUTRITIONAL ASSESSMENT OF OIL-EXTRACTORS BUT NONDETOXIFIED JOJOBA MEAL IS COMPLICATED BY A PALATABILITY FACTOR. UTILIZING NONDETOXIFIED JOJOBA MEAL IN BAKING FOODS FOR HUMAN USE IS CONTRA INDICATED. HIGH PERFORMANCE LIQUID CHROMATOGRAPHY AND THIN LAYER CHROMATOGRAPHY ANALYTICAL METHODS HAVE BEEN DEVELOPED TO MONITOR THE UNDESIRABLE TOXICANTS IN JOJOBA MEALS AND OTHER PLANT PARTS.

SEED MEAL/TOXICITY/SIMMONDSIN/DETOXIFICATION/FEEDING STUDIES/LIVESTOCK

0409

VERBISCAR, A.J. ET AL

1980

DETOXIFICATION OF JOJOBA MEAL.

AGRICULTURAL AND FOOD CHEMISTRY 28(3):571-578.

JOJOBA MEAL CONTAINS UP TO 30 PERCENT CRUDE PROTEIN, MAKING IT A POTENTIAL ANIMAL FEED INGREDIENT. THE MEAL IS TOXIC TO RODENTS AND CHICKENS AND LESS TOXIC TO SHEEP. TOXICITY IS DUE TO THE PRESENCE OF SIMMONDSIN AND AS MANY AS THREE OTHER STRUCTURALLY RELATED CYANOMETHYLENECYCLOHEXYL GLYCOSIDES IN THE MEAL. SOLVENT EXTRACTION AND HEAT AND CHEMICAL METHODS WERE INVESTIGATED FOR DETOXIFYING THE MEAL. SOLVENT EXTRACTION AND HEAT AND CHEMICAL METHODS WERE INVESTIGATED FOR DETOXIFYING THE MEAL. A NEW METHOD WAS DEvised TO RAPIDLY HYDRATE THE CYANO COMPOUNDS IN THE MEAL TO AMIDES USING AMMONIACAL HYDROGEN PEROXIDE. THIS DETOXIFIED JOJOBA MEAL WAS WELL ACCEPTED BY MICE, CHICKENS AND SHEEP AT 10 PERCENT ADDITIVE LEVELS IN RATIONS. TOXICITY OF SIMMONDSIN APPARENTLY IS RELATED TO THE CYANO AGLYCON THAT CAN BE SPLIT FROM THE GLUCOSE CONJUGATE IN THE GUT OR STOMACH OF MONOGASTRIC ANIMALS. MICROORGANISMS IN THE RUMEN OF SHEEP SERVE TO DETOXIFY SIMMONDSIN IN JOJOBA MEAL.

SEED MEAL/TOXICITY/SIMMONDSIN/FEEDING STUDIES/DETOXIFICATION/LIVESTOCK

0410

VERBISCAR, A.J. ET AL

1981

DETOXIFICATION OF JOJOBA MEAL BY LACTOBACILLI.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY 29(2):296-302.

SELECTED STRAINS OF LACTOBACILLUS ACIDOPHILUS AND L. BULGARICUS GROW WELL ON JOJOBA SEED MEAL AND REDUCE THE LEVELS OF SIMMONDSIN AND OTHER CYANO TOXICANTS. LACTOBACILLI APPARENTLY MODIFY THE CYANO GROUPS OF THE TOXICANTS DURING THEIR GROWTH, THEREBY DETOXIFYING THE MEAL. AMMONIA, USED IN THE PROCESS, FACILITATES THE DETOXIFICATION. THIS IS THE FIRST TIME THAT LACTOBACILLI OF ANY SPECIES OR STRAIN HAVE BEEN REPORTED TO ACT ON CYANO GROUPS, INDICATING THE POSSIBLE PRESENCE OF A NITRILASE IN THIS FOOD-GRADE MICROORGANISM. THE LACTOBACILLUS TREATMENT ALSO INCREASES PALATABILITY OF DEOILED JOJOBA MEAL, WHICH IS OTHERWISE POORLY ACCEPTED IN ANIMAL RATIONS.

SEED MEAL/TOXICITY/SIMMONDSIN/PALATABILITY/LACTOBACILLI/DETOXIFICATION

0411

VERBISCAR, A.J./BANIGAN, T.F.

1978

COMPOSITION OF JOJOBA SEEDS AND FOLIAGE.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY 26(6):1456-1459.

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY AND THIN-LAYER CHROMATOGRAPHY METHODS WERE DEVELOPED TO ASSAY TWO MAJOR TOXICANTS IN JOJOBA PLANT TISSUES. SIMMONDSIN, THE MOST PREVALENT TOXICANT, IS PRESENT IN SEEDS AT 2.3 PERCENT LEVELS AND ALSO IS FOUND IN HULLS, LEAVES, TWIGS, CORE WOOD AND MALE INFLORESCENCE. SIMMONDSIN 2'-FERULATE, THE SECOND MOST PREVALENT TOXICANT, OCCURS IN SEEDS BUT WAS NOT FOUND IN THE OTHER PLANT TISSUES INVESTIGATED. OIL, PROTEIN, CARBOHYDRATE AND AMINO ACID LEVELS OF THE SEEDS ALSO ARE REPORTED.

TOXICITY/SIMMONDSIN/SEED/LEAVES/CHEMICAL COMPOSITION/LIQUID CHROMATOGRAPHY

0412

VIETMEYER, N.D.

1977

THE JOJOBA: CINDERELLA CROP FOR THE '70'S.

PAGES 192-201 IN 1977 YEARBOOK OF SCIENCE AND THE FUTURE. ENCYCLOPAEDIA BRITANNICA, CHICAGO. 448 P.

A REVIEW OF JOJOBA'S MERITS AND POTENTIALS.

OIL/INDIAN RESERVATIONS/ECONOMIC DEVELOPMENT/PRODUCT DEVELOPMENT/  
SPERM WHALE OIL

0413

VIETMEYER, N.D.

1973

SUMMARIZING REMARKS.

PAGES 75-77 IN E.F. HAASE AND W.G. MCGINNIES, EDS., JOJOBA AND ITS USES: AN INTERNATIONAL CONFERENCE, JUNE 1972. UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 81 P.

THREE PROBLEMS OF ORGANIZATION WERE IDENTIFIED: 1) THE NEED FOR A CAREFULLY PREPARED MONOGRAPH; 2) THE NEED TO APPLY THE LATEST TECHNOLOGY FROM ALL PERTINENT FIELDS; AND 3) THE NEED TO ESTABLISH A TASK GROUP FOR NATIONAL AND INTERNATIONAL COOPERATION IN THE RESEARCH AND DEVELOPMENT OF JOJOBA.

ARIZONA/ECONOMIC DEVELOPMENT



0414

WALLACE, C.S./RUNDEL, P.W.

1979

SEXUAL DIMORPHISM AND RESOURCE ALLOCATION IN MALE AND FEMALE SHRUBS OF SIMMONDSIA CHINENSIS.

OECOLOGIA (BERLIN) 44(1):34-39.

DESERT POPULATIONS OF JOJOBA EXHIBIT SEX-RELATED LEAF AND CANOPY DIMORPHISMS NOT PRESENT IN POPULATIONS FROM MORE MESIC COASTAL ENVIRONMENTS. LEAVES ON FEMALE SHRUBS HAVE CHARACTERISTICALLY LARGER SIZES, GREATER SPECIFIC WEIGHTS AND GREATER WATER-HOLDING CAPACITY THAN MALE LEAVES IN DESERT HABITATS. IN COASTAL SCRUB ENVIRONMENTS NO SIGNIFICANT DIFFERENCE IS PRESENT, WITH LEAF CHARACTERISTICS OF BOTH SEXES SIMILAR TO THOSE OF DESERT MALE SHRUBS. DESERT FEMALE SHRUB CANOPIES ARE TYPICALLY RELATIVELY OPEN WITH LITTLE MUTUAL BRANCH SHADING OF BRANCHES. FEMALE PLANTS ALLOCATE A GREATER PROPORTION OF THEIR VEGETATIVE RESOURCES TO LEAVES THAN DO MALE PLANTS. CONSIDERING TOTAL BIOMASS, MALE PLANTS ALLOCATE 10 TO 15 PERCENT OF THEIR RESOURCES (BIOMASS, CALORIES, GLUCOSE EQUIVALENTS, N, P) TO REPRODUCTIVE TISSUES. FEMALE ALLOCATION IS DEPENDENT ON SEED SET. AT 100 PERCENT SEED SET, FEMALES WOULD ALLOCATE 30 TO 40 PERCENT OF THEIR RESOURCES TO REPRODUCTION, WHILE FEMALE REPRODUCTIVE INVESTMENT WOULD EQUAL THAT OF MALES AT APPROXIMATELY 30 PERCENT SEED SET. SEXUAL DIMORPHISM AND THE ASSOCIATED PHYSIOLOGICAL CHARACTERISTICS IN JOJOBA ACT AS AN ALTERNATIVE TO DIFFERENTIAL HABITAT SELECTION BY MALE AND FEMALE PLANTS. FEMALE PLANTS RESPOND TO LIMITED WATER RESOURCES IN DESERT AREAS BY INCREASING THEIR EFFICIENCY IN ALLOCATING LIMITED RESOURCES TO REPRODUCTIVE STRUCTURES.

CLIMATE/SEX DETERMINATION/CLIMATIC-VEGETAL RELATIONSHIPS/WATER USE/  
SEXUAL DIMORPHISM

0415

WALTERS, P.R./MACFARLANE, N./SPENSLEY, P.C.

1979

JOJOBA: AN ASSESSMENT OF PROSPECTS.

TROPICAL PRODUCTS INSTITUTE, REPORT G128, LONDON. 32 P.

THE SPERM WHALE OIL AND ANIMAL AND VEGETABLE WAX MARKETS ARE EXAMINED IN AN ATTEMPT TO ESTABLISH MARKET PRICE AND VOLUME PARAMETERS FOR JOJOBA OIL AND WAX. JOJOBA MUST BE CONSIDERED AS ONE OF A NUMBER OF POSSIBLE PLANT INTRODUCTIONS TO ARID ZONES. RESEARCH PRIORITIES SHOULD AIM TO OVERCOME LIMITATIONS IN CULTIVATING THE CROP.

SPERM WHALE OIL/INTRODUCED SPECIES/OIL/MARKET DEMAND

0416

WATANABE, T./TAKAHASHI, K./MATSUDA, K.

1979

CARBOHYDRATES OF JOJOBA SEED: ISOLATION AND CHARACTERIZATION OF XYLOGLUCAN.

PAGES 83-105 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

ZONE ELECTROPHORESIS AND SEDIMENTATION ANALYSIS INDICATED THAT THE XYLOGLUCAN ISOLATED FROM THE 24 PERCENT POTASSIUM HYDROXIDE EXTRACT OF JOJOBA SEED WAS HOMOGENEOUS. IT HAD (ALPHA) SUB D + 47.3 DEGREES (C 0.95, WATER), AND ON COMPLETE ACID HYDROLYSIS, YIELDED GLUCOSE, XYLOSE, GALACTOSE AND FUCOSE IN THE APPROXIMATE RATION OF 10.0 : 6.3 : 4.4 : 0.3. ITS SOLUTION GAVE A REDDISH-VIOLET COLOR WITH IODINE STAINING REAGENT, AND THE MAXIMUM ABSORPTION WAS OBSERVED AT 645 NM. THE MOLECULAR WEIGHT OF THE XYLOGLUCAN FROM JOJOBA SEED WAS 175,000, WHICH WAS DETERMINED BY GEL FILTRATION ON SEPHAROSE CL-6B. THE XYLOGLUCAN GAVE GLUCOSE, XYLOSE, GALACTOSE, FUCOSE AND ISO-PRIMEVEROSE AFTER TREATMENT WITH THE CRUDE ENZYME PREPARATION FROM ASPERGILLUS ORYZAE. TREATMENT OF THE XYLOGLUCAN WITH PURIFIED CELLULASE FROM TRICHODERMA VIRIDIE FOLLOWED BY GEL FILTRATION ON BIO-GEL P-2 AND P-4 YIELDED HIGHER OLIGOSACCHARIDES I, II, AND III (DECA-, NONA- AND HEPTA-SACCHARIDE) AS THE HYDROLYSIS PRODUCTS. THESE OLIGOSACCHARIDES WERE FURTHER TREATED WITH PARTIALLY PURIFIED BETA-GLUCOSIDASE FROM ASPERGILLUS ORYZAE, AND THE DIGESTS WERE CHARACTERIZED. FROM THE RESULTS OF THE STRUCTURAL ANALYSIS AND MOLAR RATIO OF THESE HIGHER OLIGOSACCHARIDES, THE REPEATING UNIT OF THE XYLOGLUCAN FROM JOJOBA SEED WAS PROPOSED.

SEED/CARBOHYDRATES/CHEMICAL COMPOSITION

0417

WATANABE, T./TAKAHASHI, K./MATSUDA, K.

1980

ISOLATION AND CHARACTERIZATION OF OLIGOSACCHARIDES FROM PURIFIED CELLULASE DIGEST OF JOJOBA (SIMMONDSIA CHINENSIS) SEED XYLOGLUCAN.

AGRICULTURAL AND BIOLOGICAL CHEMISTRY 44(4):791-797.

TREATMENT OF XYLOGLUCAN FROM JOJOBA SEEDS WITH PURIFIED CELLULASE FROM TRICHODERMA VIRIDE, FOLLOWED BY GEL FILTRATION ON BIO-GEL P-2, YIELDED HIGHER AND LOWER OLIGOSACCHARIDE FRACTIONS. FROM THE LATTER FRACTION, SIX KINDS OF PURE OLIGOSACCHARIDES WERE OBTAINED BY PREPARATIVE PAPER CHROMATOGRAPHY.

CHEMICAL COMPOSITION/SEED/XYLOGLUCAN/EXTRACTS/OLIGOSACCHARIDES

0418

WELLS, F.B.

1948

PROCESSES OF MAKING SULFURIZED JOJOBA OIL.

U.S. PATENT 2,450,403, SEPTEMBER 28, 1948.

JOJOBA OIL MAY BE SUPERIOR TO SPERM WHALE OIL FOR THE FOLLOWING REASONS:  
1) IT HAS A PLEASANT ODOR; 2) IT IS VERY PURE AND NEEDS LITTLE OR NO REFINEMENT;  
3) SINCE IT IS A NATIVE VEGETABLE PRODUCT, THE SUPPLY IS MORE SECURE; 4) IT TAKES UP LARGE AMOUNTS OF SULFUR; 5) THE OIL DOES NOT DARKEN ON SULFURIZATION; AND 6) IT REMAINS LIQUID WHEN HIGHLY SULFURIZED. RESULTS OF MIXING THE SULFURIZED JOJOBA OIL WITH VARIOUS LUBRICANTS SHOW THAT THE SULFUR CONTENT REMAINS HIGHER THAN FOR SIMILAR PREPARATIONS USING SPERM WHALE OIL.

ORGANIC COMPOUNDS/PATENTS/SPERM WHALE OIL/SULFURIZATION/OIL/PRODUCT DEVELOPMENT

0419

WELLS, F.B.

1955

A NOTE ON JOJOBA BEAN MEAL, A POTENTIAL FEED.

CEREAL CHEMISTRY 32(2):157-159.

PROTEIN, CARBOHYDRATE, ASH AND MINERAL CONTENT WERE DETERMINED FOR JOJOBA SEED MEAL, FROM WHICH THE OIL HAD BEEN EXTRACTED. THE MEAL WAS FED TO RATS WITH GOOD RESULTS. IT WAS ALSO UTILIZED TO REPLACE SOYBEAN FLOUR IN A POLLEN SUBSTITUTE FOR BEES. HUMAN CONSUMPTION OF SEED AND MEAL HAD NO ADVERSE EFFECT, BUT THE TASTE WAS BITTER.

SEED/ORGANIC COMPOUNDS/BEEES/FEEDING STUDIES/PALATABILITY/POLLEN/SEED MEAL

0420

WELLS, F.B.

1954

JOJOBA OIL, A LIQUID WAX, AND SOME OF ITS APPLICATIONS.

JOURNAL OF CHEMICAL EDUCATION 31(5):253-254.

THE FREE ALCOHOLS AND PARTICULARLY THE FREE ACIDS FROM JOJOBA OIL WOULD FIND SOME APPLICATION IN THE FREE STATE, BUT THE WIDEST FIELD OF APPLICATION IS UNDOUBTEDLY IN SOME COMBINED FORM.

LIPIDS/ALCOHOLS/ACIDS/SULFURIZATION/OIL

0421

WELLS, M.A./TOMOFF, C.S.

1973

AN ANALYSIS OF THE OIL CONTENT, AND THE FATTY ACID, FATTY ALCOHOL AND WAX ESTER COMPOSITION DURING DEVELOPMENT OF JOJOBA (SIMMONDSIA CALIFORNICA) SEEDS.

UNIVERSITY OF ARIZONA, OFFICE OF ARID LANDS STUDIES, TUCSON. 12 P.  
(UNPUBLISHED)

ALTHOUGH THERE IS A CLEAR INCREASE IN THE OIL CONTENT PER SEED DURING MATURATION, THE QUALITATIVE COMPOSITION OF THE OIL AS WELL AS THE QUANTITATIVE COMPOSITION OF FATTY ACIDS AND ALCOHOLS, AND WAX ESTERS DO NOT CHANGE SIGNIFICANTLY. NO EVIDENCE WAS OBTAINED FOR THE PREFERENTIAL SYNTHESIS OF THE 42 CARBON ATOM WAX ESTER DURING SEED MATURATION. THUS, THE NON-RANDOM NATURE OF THE WAX ESTERS MUST REFLECT THE SPECIFICITY OF THE ENZYME SYSTEM RESPONSIBLE FOR WAX ESTER SYNTHESIS. WHATEVER DESIRABLE PROPERTIES THE PECULIAR WAX ESTER COMPOSITION OF JOJOBA OIL MAY HAVE, THESE PROPERTIES CAN BE FOUND IN THE OIL REGARDLESS OF THE STAGE OF MATURATION OF THE SEED, OR THE LENGTH OF TIME THE SEEDS ARE STORED. THUS, THE EXACT TIMING OF SEED PICKING IS NOT AN IMPORTANT FACTOR IN THE QUALITY OF THE OIL OBTAINED FROM THE SEEDS. THE QUANTITY OF OIL, HOWEVER, WILL BE HIGHER THE MORE MATURE THE SEEDS ONCE THE SEEDS ARE DRY, PROLONGED STORAGE DOES NOT AFFECT THE WAX ESTER COMPOSITION AND THEREFORE PRESUMABLY THE QUALITY OF THE OIL. IT IS EXTREMELY IMPORTANT TO AVOID ALLOWING THE SEEDS TO SIT, EVEN FOR SHORT PERIODS OF TIME, UNDER CONDITIONS FAVORABLE TO GERMINATION OR GROWTH OF MOLD.

SEED/OIL/ALCOHOLS/ORGANIC COMPOUNDS/PHEENOLOGY/PLANT GROWTH/AGE DETERMINATION/  
PLANT PHYSIOLOGY/BIOSYNTHESIS/SEED YIELD

0422

WENDEL, O.W.

1980

JOJOBA--A PROMISING LIQUID COSMETIC WAX.

COSMETICS & TOILETRIES 95(8):41-45.

HISTORICAL USES OF JOJOBA OIL, CHEMICAL COMPOSITION, WAX ESTER COMBINATIONS AND OIL PROPERTIES ARE OUTLINED. FORMULAS FOR A JOJOBA-BASED HAND AND BODY LOTION, NIGHT CREAM, DRY-SKIN TREATMENT AND PEARLIZED SHAMPOO ARE DISCUSSED.

OIL/CHEMICAL STRUCTURE/PRODUCT DEVELOPMENT/COSMETICS

0423

WHITNER, T.C., JR.

1940

FACTICE-CONTAINING PRINTING INK.

U.S. PATENT 2,191,603, FEBRUARY 27, 1940.

PRINTING INKS PRIMARILY CONSIST OF A LIQUID VEHICLE, A PIGMENT AND A BINDING AGENT. MANY RESINS HAVE BEEN USED AS BINDING AGENTS. IN PLACE OF THEM AN OIL-SOLUBLE FACTICE, PARTICULARLY THE FACTICE MADE FROM JOJOBA OIL, CAN BE EMPLOYED AS A BINDING AGENT FOR PRINTING INKS. THE RESULTING FILMS ARE DRY, NON-SMUDGING, AND FLEXIBLE. JOJOBA OIL FACTICE IS PARTICULARLY APPLICABLE TO THE PREPARATION OF QUICK-DRYING INKS BECAUSE OF ITS SOLUBILITY IN A WIDE VARIETY OF LIQUIDS.

OIL/ORGANIC COMPOUNDS/PATENTS/PRODUCT DEVELOPMENT

0424

WILLIAMS, R.R.

1980

THE TOXICITY OF SIMMONDSIN, A GLYCOSIDE FOUND IN JOJOBA (SIMMONDSIA CHINENSIS).

UNIVERSITY OF ARIZONA, TUCSON. M.S. THESIS, 74 P.

SIMMONDSIN WAS EXTRACTED, PURIFIED, AND ANALYZED USING SEVERAL TECHNIQUES. THE ACUTE SINGLE DOSE TOXICITY OF SIMMONDSIN WAS STUDIED USING MICE BY COMPARING WEIGHT GAINS AND FOOD INTAKE WITH CONTROLS. NO LETHALITIES RESULTED FROM THE SINGLE-DOSE STUDIES AND NO SIGNIFICANT DIFFERENCE WAS NOTED BETWEEN THE TREATED GROUPS; HOWEVER, A STATISTICAL DIFFERENCE WAS NOTED BETWEEN THE CONTROL GROUPS AND THE TREATED GROUPS. A SUBACUTE STUDY WAS DONE USING MICE TO DETERMINE ORGAN LESIONS, IF ANY, AND TO TEST A HYPOTHESIS THAT CYANIDE MIGHT BE PRODUCED BY BIOTRANSFORMATION OF SIMMONDSIN. IN TWO EXPERIMENTS, BLOOD CYANIDE AND THIOCYANATE WERE ELEVATED AND RELATED TO BOTH LENGTH OF TREATMENT AND DOSE. NO SPECIFIC ORGAN LESIONS WERE FOUND, HOWEVER, LEADING TO THE HYPOTHESIS OF A GENERALIZED TOXICITY OR A TOXICITY FROM SEVERAL METABOLITES RATHER THAN FROM A SINGLE ONE.

SIMMONDSIN/EXTRACTS/TOXICITY/RODENTS/FEEDING STUDIES

WILLIAMS, R.R./PRICE, R.L.

1982

THE TOXICITY OF SIMMONDSIN, A JOJOBA GLYCOSIDE.

PAGES 317-335 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

A BIOTRANSFORMATION OF SIMMONDSIN TO CYANIDE OCCURS IN MICE. CYANIDE AND THIOCYANATE LEVELS INCREASED WITH BOTH TIME AND DOSE. CONTRARY TO PREVIOUSLY PUBLISHED REPORTS, AND PROBABLY DUE TO SPECIES DIFFERENCES BETWEEN MICE AND RATS, NO MORTALITY WAS SEEN. HOWEVER, THE SUBJECTS DID SHOW AN OVERALL DOSE DEPENDENCY.

CYANIDE/RODENTS/SIMMONDSIN/TOXICITY

0426

WISNIAK, J.

1975

INVESTIGATION OF CHEMICAL PROPERTIES AND POSSIBLE USES OF JOJOBA OIL.

BEN-GURION UNIVERSITY OF THE NEGEV, DEPARTMENT OF CHEMICAL ENGINEERING, BEER-SHEVA, ISRAEL. UNITED STATES-ISRAEL BINATIONAL SCIENCE FOUNDATION GRANT NO. 349. 112 P.

SOME OF THE MOST IMPORTANT PHYSICAL PROPERTIES OF JOJOBA OIL WERE MEASURED AS A FACTOR OF THE TEMPERATURE. NUMEROUS ISOMERIZATION AND HYDROGENATION RUNS WERE MADE. REFRACTIVE INDEX, DENSITY, VISCOSITY, DIELECTRIC CONSTANT, SPECIFIC CONDUCTIVITY, AND SURFACE TENSION WERE MEASURED OVER AN AMPLE TEMPERATURE RANGE. JOJOBA OIL WAS ISOMERIZED WITH SELENIUM AND NO SUB 2 CATALYSTS UNDER A WIDE RANGE OF CONDITIONS. THE REACTION WITH SELENIUM IS FIRST ORDER IN THE ISOMER AND 1/3 ORDER IN THE CATALYST, WITH AN ACTIVATION ENERGY OF 35 KCAL/G MOL YIELDS UP TO 56 PERCENT TRANS ISOMER AND MELTING POINTS 36 C TO 40 C. THE REACTION WITH NO SUB 2 IS FASTER, PROCEEDS UNDER Milder CONDITIONS WITH A YIELD OF 75 PERCENT TRANS ISOMER, AND RAISES THE MELTING POINT OF THE OIL TO 42 C. ISOMERIZATION RESULTS POINT OUT THAT THE OIL CAN BE HARDENED TO A SOLID THAT HAS A MELTING POINT ABOUT THE HUMAN BODY TEMPERATURE, AND THUS ITS POSSIBLE MEDICAL USES ARE AMPLIFIED. THE SOLUBILITY OF HYDROGEN IN JOJOBA OIL HAS BEEN DETERMINED AT TEMPERATURES OF 50 C TO 250 C AND PRESSURES BETWEEN 100 TO 800 PSIG. THE SYSTEM BEHAVED ACCORDING TO HENRY'S LAW WITH A HEAT OF SOLUTION OF 1,240 CAL/G MOL AND ENTROPY OF SOLUTION OF 2.9 CAL/K G MOL. THE PARTIAL VOLUME OF HYDROGEN VARIED BETWEEN 24.6 TO 62.9 ML/G MOL IN THE TEMPERATURE RANGE CONSIDERED. JOJOBA OIL WAS HYDROGENATED WITH SEVERAL NICKEL AND COPPERCHROMITE CATALYSTS UNDER A WIDE RANGE OF TEMPERATURE, PRESSURE, CATALYST CONCENTRATION AND AGITATION RATES. THE REACTION WAS PSEUDO-FIRST ORDER WITH NICKEL CATALYSTS AND WAS CONTROLLED BY THE SURFACE REACTION BETWEEN ATOMIC HYDROGEN AND ADSORBED UNSATURATE. ACTIVATION ENERGIES VARIED BETWEEN 14.4 AND 29.5 KCAL/G MOL. SEVERE POISONING WAS OBSERVED WITH ONE OF THE CATALYSTS TESTED. ISOMERIZATION DURING HYDROGENATION WAS UNAFFECTED BY CHANGES IN CATALYST CONCENTRATIONS, AND OPERATING TEMPERATURE. IT INCREASED WITH DECREASED PRESSURES AND AGITATION RATES. THE HYDROGENATED WAX HAS BEEN COMPARED WITH CARNAUBA AND BEESWAX AND HAS BEEN SHOWN TO HAVE AN EXCELLENT REPLACEMENT POTENTIAL.

CHEMICAL REACTIONS/HYDROGENATION/ISOMERIZATION/ISRAEL/OIL/MEDICINAL USES/  
PRODUCT DEVELOPMENT

0427

WISNIAK, J.

1977

JOJOBA OIL AND DERIVATIVES.

PROGRESS IN THE CHEMISTRY OF FATS AND OTHER LIPIDS (PERGAMON PRESS)  
15:167-218.

THE CHEMICAL AND PHYSICAL PROPERTIES OF JOJOBA LIQUID WAX AND ITS CHEMICAL MODIFICATION INTO SUBSTANCES HAVING USEFUL PROPERTIES ARE REVIEWED. JOJOBA OIL IS DISCUSSED WITH REFERENCE TO EXTRACTION, PROPERTIES, MOLECULAR DESCRIPTION, TOXICITY, AND COMPOSITION. THE POTENTIAL OF JOJOBA MEAL AS A BY-PRODUCT IS REVIEWED. CHEMICAL MODIFICATIONS OF THE OIL ARE DISCUSSED IN DETAIL: CIS-TRANS ISOMERIZATION, HYDROGENATION, SULFURIZATION AND SULFUR-CHLORINATION, LUBRICATING PROPERTIES OF THE SULFUR AND SULFUR-CHLORINATED DERIVATIVES, EPOXIDATION, MALEINIZATION, ACRYLATE-METHACRYLATE ESTERS, AND ESTER REDUCTION.

CHEMICAL REACTIONS/ESTERS/GERMINATION/HYDROGENATION/ISOMERIZATION/SEED MEAL/  
SOILS/PLANT MORPHOLOGY/PRODUCT DEVELOPMENT/SEEDLINGS/SULFURIZATION/TOXICITY

0428

WISNIAK, J.

1979

PHOSPHONATION OF JOJOBA OIL.

PAGES 113-119 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

JOJOBA OIL HAS BEEN SHOWN TO POSSESS EXCELLENT LUBRICATING PROPERTIES. ITS DERIVATIVES, I.E. SULFURIZED AND SULFOHALOGENATED OIL, HAVE EQUAL OR BETTER CHARACTERISTICS THAN SPERM WHALE OIL. THE POSSIBILITY OF PRODUCING JOJOBA PHOSPHONATES TO STUDY THE KINETICS OF THE REACTION AND THE INFLUENCE OF OPERATING VARIABLES AND TO EVALUATE THE MECHANICAL PROPERTIES OF THE DERIVATIVES ARE EXPLORED.

OIL/LUBRICANTS/CHEMICAL REACTIONS/PHOSPHONATION/SPERM WHALE OIL

0429

WISNIAK, J./ALFANDARY, P.

1975

GEOMETRICAL ISOMERIZATION OF JOJOBA OIL.

I & EC (INDUSTRIAL AND ENGINEERING CHEMISTRY) PRODUCT RESEARCH AND DEVELOPMENT  
14(3):177-18C.

JOJOBA OIL HAS BEEN ISOMERIZED WITH SELENIUM AND NO SUB 2 CATALYSTS UNDER A WIDE RANGE OF CONDITIONS. THE REACTION WITH SELENIUM IS FIRST ORDER IN THE ISOMER AND 1/3 ORDER IN THE CATALYST, WITH AN ACTIVATION ENERGY OF 35 KCAL/MOL, YIELDS UP TO 56 PERCENT TRANS ISOMER, AND MELTING POINTS 36 C TO 40 C. THE REACTION WITH NO SUB 2 IS FASTER, PROCEEDS UNDER Milder CONDITIONS WITH A YIELD OF 75 PERCENT TRANS ISOMER, AND RAISES THE MELTING POINT TO 42 C.

CHEMICAL REACTIONS/ISRAEL/OIL/ISOMERIZATION

WISNIAK, J./ALFANDARY, P.

1979

SPERM WHALE OIL REPLACEMENTS FROM HALOGENATION OF JOJOBA OIL.

INDUSTRIAL AND ENGINEERING CHEMISTRY (I AND EC) PRODUCT RESEARCH AND DEVELOPMENT 18:358-364.

KINETICS OF THE CHLORINATION AND BROMINATION OF JOJOBA OIL HAS BEEN STUDIED AT DIFFERENT TEMPERATURES, SOLVENTS AND OPERATING CONDITIONS. CHLORINATION FOLLOWS FIRST-ORDER KINETICS IN DOUBLE BOND CONCENTRATION WITH AN ACTIVATION ENERGY OF -11 KILOCALORIES PER MOLE (KCAL/MOL). SOLVENTS WITH HIGH DIELECTRIC CONSTANT INCREASE THE RATE OF REACTION. BROMINATION INVOLVES A TWO-STEP MECHANISM WITH ONE OR TWO BROMINE MOLECULES PER DOUBLE BOND; UP TO 0.2 S REACTION TIME THE RATE IS FIRST ORDER IN EACH OF THE REAGENTS, AND AFTERWARDS IT IS FIRST ORDER IN THE DOUBLE BONDS AND SECOND ORDER IN BROMINE. FASTER RATES ARE OBTAINED LOWERING THE TEMPERATURE AND/OR INCREASING THE DIELECTRIC CONTENT OF THE SOLVENT. THE CHLORINATED DERIVATIVE IMPROVES THE LOAD CARRYING CAPACITY OF LUBRICATING OIL.

CHEMICAL REACTIONS/SOLVENTS/OIL/LUBRICANTS/SPERM WHALE OIL/HALOGENATION

0431

WISNIAK, J./BENAJAHU, H.

1975

SULFURIZATION OF JOJOBA OIL.

I & EC (INDUSTRIAL AND ENGINEERING CHEMISTRY) PRODUCT RESEARCH AND DEVELOPMENT 14(4):247-258.

JOJOBA OIL WAS SULFURIZED WITH SULFUR MONOCHLORIDE AND SULFUR TO STUDY THE KINETICS AND PARAMETERS OF THE PROCESS AND THE CHARACTERISTICS OF THE FINAL PRODUCT. REACTION RUNS WERE CONDUCTED IN THE RANGE OF SULFUR CONTENT TO 8 PERCENT, ADDITION TIME 0 TO 140 MINUTES, AGITATION SPEEDS 100 TO 500 RPM, TEMPERATURES 20 C TO 100 C, AND SOLVENT DIELECTRIC CONSTANT RANGES TO 35. RESULTS WERE ANALYZED BY TRACKING THE REACTION WITH NMR SPECTRA. REACTION BETWEEN THE OIL AND S SUB 2 CL SUB 2 OCCURS BY ADDITION TO THE DOUBLE BOND, AND CROSS LINKAGE TAKES PLACE WITH A CORRESPONDING INCREASE IN VISCOSITY AND MOLECULAR WEIGHT. REACTION IN SOLVENTS FOLLOWS A FIRST-ORDER RATE WITH RESPECT TO THE PERCENTAGE OF DOUBLE BONDS, AND IS HIGHLY INFLUENCED BY THE DIELECTRIC CONSTANT OF THE SOLVENT AND THE ADDITION OF ACCELERATORS.

CHEMICAL REACTIONS/ISRAEL/OIL/SULFURIZATION

0432

WISNIAK, J./BENAJAHU, H.

1976

INVESTIGATION OF CHEMICAL PROPERTIES AND POSSIBLE USES OF JOJOBA OIL. PART 2.

BEN-GURION UNIVERSITY OF THE NEGEV, DEPARTMENT OF CHEMICAL ENGINEERING, BEER-SHEVA, ISRAEL. UNITED STATES-ISRAEL BINATIONAL SCIENCE FOUNDATION, GRANT NO. 349. 83 P.

JOJOBA OIL WAS SULFURIZED WITH SULFUR MONOCHLORIDE TO STUDY THE KINETICS AND PARAMETERS OF THE PROCESS AND THE CHARACTERISTICS OF THE FINAL PRODUCT. REACTION RUNS WERE CONDUCTED IN THE RANGE OF SULFUR CONTENT 0-8 PERCENT, DROPPING TIME 0 TO 140 MINUTES, AGITATION SPEEDS 100 TO 500 RPM, TEMPERATURES 20 C TO 100 C, AND DIELECTRIC CONSTANTS 2 TO 35. RESULTS WERE ANALYZED BY TRACKING THE REACTION WITH NMR SPECTRA.

THE FOLLOWING RESULTS WERE OBTAINED: 1) REACTION BETWEEN JOJOBA OIL AND S SUB 2 CL SUB 2 OCCURS BY ADDITION TO THE DOUBLE BOND, AND IN A 1:1 MOIAR RATIO BETWEEN THE REAGENTS; 2) THE CHLORINE AND SULFUR ARE CONNECTED TO THE OIL MOLECULES IN THE SAME ATOMIC RATIO; 3) CROSS LINKAGE TAKES PLACE WITH A CORRESPONDING INCREASE IN VISCOSITY AND MOLECULAR WEIGHT; 4) THE REACTION FOLLOWS A PSEUDO-FIRST ORDER WITH RESPECT TO THE PERCENTAGE OF DOUBLE BONDS; 5) THE ORDER OF THE REACTION IS BETWEEN FIRST AND SECOND WITH RESPECT TO S SUB 2 CL SUB 2; 6) DEVIATIONS FROM PSEUDO-FIRST ORDER ARE CAUSED BY AN INCREASE IN THE VISCOSITY OF THE SOLUTION; 7) TEMPERATURE INFLUENCE ON THE REACTION RATE IS NEGLIGIBLE COMPARED WITH THE INFLUENCE OF THE DIELECTRIC CONSTANT; 8) THE REACTION MECHANISM INVOLVES TWO STAGES, WITH A POLAR INTERMEDIATE; 9) ACCELERATORS INCREASE THE DIELECTRIC CONSTANT OF THE SOLUTION; AND 10) AN INCREASE IN THE DIELECTRIC CONSTANT INCREASES THE RATE OF REACTION. THE INCREASE DEPENDS ON THE MOLECULAR STRUCTURES INVOLVED.

#### SULFURIZATION/PRODUCT DEVELOPMENT/ISRAEL/OIL/CHEMICAL REACTIONS

0433

WISNIAK, J./BENAJAHU, H.

1981

SULFUR BROMINATION OF JOJOBA OIL.

PETROCULTURE 2(1):24-25.

JOJOBA OIL HAS BEEN SULFUR-BROMINATED WITH SULFUR MONOBROMIDE TO STUDY THE KINETICS AND PARAMETERS OF THE REACTION AND THE MECHANICAL PROPERTIES OF THE PRODUCT. REACTION RUNS WERE CONDUCTED IN THE RANGE 1.1 TO 8 PERCENT SULFUR AND 3.6 TO 20.9 PERCENT BROMIDE UNDER DIFFERENT MODES OF OPERATION. THE REACTION TAKES PLACE BY STRAIGHT ADDITION OF THE SULFUR HALIDE TO THE DOUBLE BOND. THE DECREASE WITH TIME OF THE NUMBER OF DOUBLE BONDS IN SOLVENTS WITH DIFFERENT DIELECTRIC CONSTANT FOLLOWS FIRST-ORDER KINETICS. MECHANICAL TESTING OF SULFUR-BROMINATED DERIVATIVES INDICATES THAT THE PRODUCT HAS SUPERIOR PROPERTIES AS A LUBRICATION ADDITIVE, PARTICULARLY FOR EXTREME PRESSURE (FOUR-BALL WELD POINT) LOAD CARRYING APPLICATIONS.

#### OIL/SULFURIZATION/CHEMICAL REACTIONS/LUBRICANTS

0434

WISNIAK, J./BENAJAHU, H.

1978

SULFURIZATION OF JOJOBA.

PAGES 291-310 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

JOJOBA OIL HAS BEEN SULFURIZED WITH SULFUR MONOCHLORIDE AND SULFUR TO STUDY THE KINETICS AND PARAMETERS OF THE PROCESS AND FINAL PRODUCT CHARACTERISTICS. REACTION RUNS WERE CONDUCTED IN THE SULFUR CONTENT RANGE 0 TO 8 PERCENT, DROPPING TIME 0 TO 140 MINUTES, AGITATION SPEEDS 100 TO 500 RPM, TEMPERATURE 20



C TO 100 C AND SOLVENT DIELECTRIC CONSTANT 2 TO 35. RESULTS WERE ANALYZED BY TRACKING THE REACTION WITH NMR SPECTRA. THE REACTION BETWEEN OIL AND S SUB 2 CL SUB 2 OCCURS BY ADDING TO THE DOUBLE BOND, AND THE CROSS LINKAGE TAKES PLACE WITH A CORRESPONDING INCREASE IN VISCOSITY AND MOLECULAR WEIGHT. REACTION IN SOLVENTS FOLLOW A FIRST-ORDER RATE WITH RESPECT TO THE PERCENTAGE OF DOUBLE BONDS AND IS INFLUENCED HIGHLY BY THE SOLVENT'S DIELECTRIC CONSTANT AND THE ADDITION OF ACCELERATORS.

OIL/SULFURIZATION/CHEMICAL REACTIONS/SOLVENTS

0435

WISNIAK, J./BENAJAHU, H.

1978

SULFUR BROMINATION OF JOJOBA OIL.

INDUSTRIAL AND ENGINEERING CHEMISTRY PRODUCT RESEARCH AND DEVELOPMENT  
17(4):335-342.

JOJOBA OIL HAS BEEN SULFUR-BROMINATED WITH SULFUR MONOBROMIDE TO STUDY THE KINETICS AND PARAMETERS OF THE REACTION AND THE MECHANICAL PROPERTIES OF THE PRODUCT. REACTION RUNS WERE CONDUCTED IN THE RANGE 1.1 PERCENT TO 8 PERCENT SULFUR AND 3.6 PERCENT TO 20.9 PERCENT BROMINE UNDER DIFFERENT MODES OF OPERATION. THE REACTION TAKES PLACE BY STRAIGHT ADDITION OF THE SULFUR HALIDE TO THE DOUBLE BOND. THE DECREASE WITH TIME OF THE NUMBER OF DOUBLE BONDS IN SOLVENTS WITH DIFFERENT DIELECTRIC CONSTANT FOLLOWS FIRST ORDER KINETICS. MECHANICAL TESTING OF SULFUR-BROMINATED DERIVATIVES INDICATES THAT THE PRODUCT HAS SUPERIOR PROPERTIES AS A LUBRICATION ADDITIVE, PARTICULARLY FOR EXTREME PRESSURE (FOUR-BALL WELD POINT) LOAD CARRYING APPLICATIONS.

OIL/SULFURIZATION/CHEMICAL REACTIONS/LUBRICANTS

0436

WISNIAK, J./BENAJAHU, H.

1978

LIQUID JOJOBA OIL DERIVATIVES.

U.S. PATENT 4,130,495, DECEMBER 19, 1978.

A NON-FACTICE SULFOHALOGENATED JOJOBA OIL IS CHARACTERIZED BY A MOLECULAR WEIGHT LESS THAN 4,500, AN IODINE VALUE GREATER THAN 5, AND A SULFUR CONTENT BELOW 8.7 PERCENT. ITS SULFUR TO HALOGEN MOLE RATIO IS ABOUT 1.1:1.0 TO ABOUT 1.0:1.1.

OIL/CHEMICAL COMPOSITION/DERIVATIVES/PATENTS

0437

WISNIAK, J./HOLIN, M.

1975

HYDROGENATION OF JOJOBA OIL.

1 & EC (INDUSTRIAL AND ENGINEERING CHEMISTRY) PRODUCT RESEARCH AND DEVELOPMENT  
14(4):226-231.

JOJOBA OIL WAS HYDROGENATED WITH SEVERAL NICKEL AND COPPER-CHROMITE CATALYSTS UNDER A WIDE RANGE OF TEMPERATURES, PRESSURES, CATALYST CONCENTRATIONS AND AGITATION RATES. THE REACTION WAS PSEUDO-FIRST ORDER. WITH NICKEL CATALYSTS THE OIL WAS CONTROLLED BY THE SURFACE REACTION BETWEEN ATOMIC HYDROGEN AND ABSORBED UNSATURATE. ACTIVATION ENERGIES VARIED BETWEEN 12.8 AND 29.5 KCAL/MOL. SEVERE POISONING WAS OBSERVED WITH ONE OF THE CATALYSTS TESTED. COPPER-CHROMITE CATALYSTS COULD NOT HYDROGENATE THE OIL, BUT SUBSTANTIAL ISOMERIZATION WAS OBSERVED.

HYDROGENATION/ISOMERIZATION/ISRAEL/OIL/CHEMICAL REACTIONS

0438

WISNIAK, J./LIBERMAN, D.

1975

SOME PHYSICAL PROPERTIES OF SIMMONDSIA OIL.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 52(7):259-261.

THE REFRACTIVE INDEX, DENSITY, VISCOSITY, DIELECTRIC CONSTANT, SPECIFIC CONDUCTIVITY, AND SURFACE TENSION OF SIMMONDSIA OIL WERE MEASURED AT DIFFERENT TEMPERATURES.

OIL/ISRAEL

0439

WISNIAK, J./STEIN, S.

1974

HYDROGEN SOLUBILITY IN JOJOBA OIL.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 51(11):482-485.

THE SOLUBILITY OF HYDROGEN IN JOJOBA OIL HAS BEEN DETERMINED AT TEMPERATURES OF 50-250 C AND PRESSURES BETWEEN 100-800 PSIG. THE SYSTEM BEHAVES ACCORDING TO HENRY'S LAW WITH A HEAT OF SOLUTION OF 1240 CAL/G MOL AND ENTROPY OF SOLUTION OF 2.9 CAL/K G MOL. THE PARTIAL VOLUME OF HYDROGEN VARIES BETWEEN 24.9-62.9 ML/G MOL IN THE TEMPERATURE RANGE CONSIDERED.

ISRAEL/OIL/CHEMICAL REACTIONS/HYDROGENATION

0440

WISNIAK, J./STEIN, S.

1974

HYDROGEN SOLUBILITY IN JOJOBA OIL.

(UNPUBLISHED).

THE SOLUBILITY OF HYDROGEN IN JOJOBA OIL HAS BEEN DETERMINED AT TEMPERATURES BETWEEN 50 C AND 250 C AND PRESSURES BETWEEN 103 AND 800 POUNDS PER SQUARE INCH GAUGE. THE SYSTEM BEHAVES ACCORDING TO HENRY'S LAW, SOLUBILITY DECREASED WITH INCREASED TEMPERATURES, WITH A HEAT OF SOLUTION OF 1,240 CALORIES/GRAM MOLECULE ENTROPY OF SOLUTION OF 2.9 CALORIES/DEGREE KELVIN GRAM MOLECULE. THE PARTIAL VOLUME OF HYDROGEN VARIES BETWEEN 24.6 AND 62.9 MILLIMETERS/GRAM MOLECULE IN THE TEMPERATURE RANGE CONSIDERED.

HYDROGENATION/TEMPERATURE/OIL/LIPIDS

0441

WOCHOK, Z.S./SLUIS, C.J.

1979

MICROPROPAGATION FOR JOJOBA IMPROVEMENT PROGRAMS.

JOJOBA HAPPENINGS 26:1-5.

TISSUE-CULTURE PROPAGATION OF JOJOBA HAS BEEN SUCCESSFUL. THE MULTIPLICATION FACTOR FOR THE ORIGINAL EXPLANTS RANGED FROM THREE-FOLD TO 10-FOLD. SOME SHOOTS ROOTED AND DEVELOPED INTO HEALTHY PLANTS. MICROPROPAGATION OF JOJOBA SHOULD ALLOW DEVELOPMENT OF SITE-SPECIFIC STRAINS.

PROPAGATION/TISSUE CULTURE

0442

WOODHOUSE, R.M.

1979

THE PHYSIOLOGICAL ECOLOGY OF THE DESERT EVERGREEN SHRUB SIMMONDSIA CHINENSIS (JOJOBA).

PAGES 345-360 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

THE GAS EXCHANGE AND WATER RELATIONS OF THE SCLEROPHYLLOUS EVERGREEN SONORAN DESERT SHRUB SIMMONDSIA CHINENSIS (LINK) SCHNEID. WERE MEASURED THROUGHOUT A 14-MONTH PERIOD AT LOCATIONS DIFFERING IN SOIL WATER AVAILABILITY. GROSS PHOTOSYNTHESIS FOR PLANTS AT TWO SITES WAS WITHIN THE RANGE OF SIMILAR LIFE-FORM SPECIES. HOWEVER, STOMATAL CONDUCTANCES WERE SOMEWHAT HIGHER THAN PREVIOUSLY REPORTED FOR OTHER SCLEROPHYLLOUS SHRUBS. LIKE OTHER DROUGHT-TOLERANT SHRUBS, GROSS PHOTOSYNTHESIS AND STOMATAL CONDUCTANCES WERE STILL MEASURABLE AT LOW PLANT WATER POTENTIALS (CA. -70 BARS). PHOTOSYNTHESIS/TRANSPIRATION RATIOS WERE LOW WITH MAXIMA GENERALLY LESS THAN 3.4. GENERALLY, SEASONAL WATER RELATIONS AND THE MAGNITUDE OF GAS EXCHANGE FOR PLANTS AT BOTH SITES FOLLOWED THE SEASONAL VARIATION IN SOIL WATER POTENTIAL. ALSO, GROSS PHOTOSYNTHESIS WAS REDUCED BY COOL WINTER TEMPERATURES FOR PLANTS AT BOTH SITES. THIS REDUCTION IN PHOTOSYNTHETIC CAPACITY WAS NOT ATTRIBUTABLE TO STOMATAL CLOSURE. HOWEVER, PLANTS OF THIS SPECIES WERE CAPABLE OF MODERATE PHOTOSYNTHETIC ACTIVITY DURING THE SUMMER WHEN WATER WAS AVAILABLE. A 33 PERCENT GREATER ANNUAL INPUT OF WATER FOR IRRIGATED PLANTS RESULTED IN AN ALMOST TWO-FOLD INCREASE IN CARBON ASSIMILATION POTENTIALS AS MEASURED BY GROSS PHOTOSYNTHESIS. AGRONOMIC IMPLICATIONS OF THE ABOVE ARE SUGGESTED.

SOILS/WATER USE/STOMATA/TEMPERATURE/AGRONOMY/PHOTOSYNTHESIS

0443

WRIGHT, N.G.

1978

JOJOBA ECONOMICS.

JOJOBA HAPPENINGS 24:11-13.

MECHANICALLY PICKED SEED WOULD PAY BACK ALL COSTS BY THE 10TH YEAR OF DEVELOPMENT IF 470 FEMALE JOJOBA PLANTS PER ACRE YEILD 3 POUNDS OF SEED PER PLANT, AND IF CLEAN-DRY SEED SELLS FOR 1.50 DOLLARS PER POND. HAND-HARVESTED SEED WOULD PAY BACK ALL COSTS AND SHOW A PROFIT BY THE 12TH YEAR OF DEVELOPMENT. TO COMPETE IN OTHER MARKETS, JOJOBA OIL MAY HAVE TO BE PRODUCED FOR LESS.

OIL/ECONOMICS/COST ANALYSIS/PLANTATION ESTABLISHMENT/SEED HARVEST

0444

WRIGHT, N.G.

1980

THE JOJOBA GOLD RUSH: FACT OR FICTION.

JOJOBA HAPPENINGS 33:1-6.

BASED ON 1980 DOLLARS, A JOJOBA PLANTATION COULD START TO SHOW A PROFIT BY THE 12TH YEAR. JOJOBA THEN WOULD HAVE TO BE PRODUCED FOR LESS THAN 1 DOLLAR PER POUND TO COMPETE WITH PRODUCTS PRESENTLY ON THE MARKET.

PLANTATION ESTABLISHMENT/ECONOMICS/MARKET DEMAND/COST ANALYSIS

0445

WRIGHT, N.G.

1978

JOJOBA ECONOMIC POTENTIAL LOOKS GOOD.

SOUTHWEST FARM PRESS 5(45):14, 18.

THE PRODUCTION OF JOJOBA ON PLANTATIONS CAN BE ECONOMICALLY FEASIBLE IF A MECHANICAL HARVESTER CAN BE DEVELOPED. IF IMPROVED STRAINS CAN BE SELECTED TO IMPROVE YIELDS, CONTINUED JOJOBA DEVELOPMENT WILL BE ECONOMICALLY FAVORABLE.

COST ANALYSIS/PLANTATION ESTABLISHMENT/ECONOMIC DEVELOPMENT

0446

WRIGHT, N.G.

1979

THE OVERALL ECONOMIC POTENTIAL FOR GROWING JOJOBA UNDER CULTIVATION IN THE SOUTHWEST--1978.

PAGES 305-319 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

UNDER PRESENT ECONOMIC CONDITIONS, A POUND OF JOJOBA OIL CAN BE PRODUCED FOR ABOUT 3.50 DOLLARS PER POUND USING HAND-HARVESTED SEED FROM NATIVE STANDS. IN CENTRAL ARIZONA, IF JOJOBA WERE CULTIVATED ON IDLE FARM LAND USING DIRECT SEEDING, IT IS ESTIMATED THAT A POUND OF OIL COULD BE PRODUCED FOR ABOUT 1.25 DOLLARS PER POUND, USING PRESENT TECHNOLOGY AND MECHANICAL HARVESTING.

ECONOMICS/SEED HARVEST/ARIZONA/OIL/COST ANALYSIS/MARKET DEMAND

WU, X.Y./MOREAU, R.A./STUMPF, P.K.

1981

STUDIES OF BIOSYNTHESIS OF WAXES BY DEVELOPING JOJOBA SEED: III. BIOSYNTHESIS OF WAX ESTERS FROM ACYL-COA AND LONG-CHAIN ALCOHOLS.

LIPIDS 16(12):897-902.

ACYL-COA:ALCOHOL TRANSACYLASE ACTIVITY WAS DEMONSTRATED IN CELL-FREE HOMOGENATES OF DEVELOPING JOJOBA SEEDS. THE OPTIMAL PH WAS 8.0 TO 8.1 UNDER OPTIMAL CONDITIONS, WAX FORMATION HAD A NEARLY LINEAR RELATIONSHIP WITH EXTRACT CONCENTRATION. THE TIME COURSE OF WAX FORMATION ALSO WAS LINEAR UP TO 30 MINUTES. CIS-11-EICOSENOYL WAS THE MOST EFFECTIVE ALCOHOL SUBSTRATE. TETRADECANOL, OCTADECANOL, DODECANOL, CIS-9-OCTADECANOL, AND CIS-13-EICOSENOYL GAVE PROGRESSIVELY LOWER ACTIVITIES. EITHER SATURATED OR UNSATURATED ACYL-COA WITH 18 OR 20 C-ATOMS HAD SIMILAR ACTIVITY. THE ENZYME WAS FAIRLY STABLE AT 0 C, WAS LESS STABLE AT RT AND LABILE ABOVE 30 C. DIFFERENTIAL CENTRIFUGATION SHOWED THAT THE 12,000 X G FAT PAD WAS THE MOST ACTIVE IN WAX FORMATION; TO MAXIMIZE THE ACTIVITY, A 12,000 X G SUPERNATANT APPEARED TO BE NECESSARY. THIS FACTOR IN THE SUPERNATANT WAS THERMOLABILE AND NONDIALYZABLE.

ENZYMES/SEED/ALCOHOLS/CHEMICAL STRUCTURE/PH/COTYLEDONS

0448

YERMANOS, D.M.

1974

AGRONOMIC SURVEY OF JOJOBA IN CALIFORNIA.

ECONOMIC BOTANY 28(2):160-174.

ELEVEN POPULATIONS OF JOJOBA HAVE BEEN IDENTIFIED IN SOUTHERN CALIFORNIA, ONLY TWO (TWENTYNINE PALMS AND AGUANGA) ARE LARGE. GROWTH HABITS ARE RELATED TO ENVIRONMENTAL VARIABLES. MORE THAN 2,000 WILD JOJOBA PLANTS WERE HARVESTED IN 1972 BY AMERICAN INDIANS WHO OCCASIONALLY USED A CLAW-PICKER DESIGNED SPECIFICALLY FOR THE HARVEST. YIELD PER PLANT, FOR 138 PLANTS, RANGED FROM 2 TO 12 POUNDS WITH A MEAN OF 5 POUNDS AND A COEFFICIENT OF VARIATION OF 24.8. THE AVERAGE SINGLE SEED WEIGHT RANGED FROM 0.15 TO 1.10 GRAMS WITH A MEAN OF 0.56 GRAMS AND A COEFFICIENT OF VARIATION OF 32.8. THE AVERAGE WAX CONTENT OF THE SEED DETERMINED BY NMR RANGED FROM 43.2 TO 59.8 PERCENT WITH A MEAN OF 53.1 PERCENT AND A COEFFICIENT OF VARIATION OF 5.1. THE PROTEIN CONTENT OF THE MEAL RANGED FROM 26.6 TO 33.42 PERCENT WITH A MEAN OF 29.8 PERCENT AND A COEFFICIENT OF VARIATION OF 14. A SIGNIFICANT NEGATIVE CORRELATION WAS FOUND BETWEEN WAX AND PROTEIN CONTENT OF THE SEED. THE AMINO ACID COMPOSITION OF JOJOBA MEAL WAS DETERMINED. ECONOMICS OF THE 1972 WILD HARVEST INDICATE PROHIBITIVELY OVERPRICED SEED. IF PRODUCTS WERE CHanneled TO SPECIALIZED USES NATURAL POPULATIONS COULD BE A DEFINITE ECONOMIC RESOURCE. TWO MANIPULATIONS OF WILD POPULATIONS ARE UNDER STUDY: 1) TRANSPLANTING OLDER PRODUCING FEMALES, AND 2) PRUNING AND MICROCATCHMENT BASIN FORMATION. CUTTINGS FROM A MALE PLANT WITH A MONOECIOUS TENDENCY HAVE PRODUCED VIABLE SEED. MULTIPLE-SEEDED PLANTS ARE UNDER INVESTIGATION.

PLANTING MANAGEMENT/SEED HARVEST/SEED YIELD/CALIFORNIA/SEED/COST ANALYSIS/SEED MEAL/OIL/PLANT DISTRIBUTION/PROTEINS

YERMANOS, D.M.

1975

WAX AND MEAL CHANGE IN JOJOBA SEED DEVELOPMENT.

CALIFORNIA AGRICULTURE 29(4):12-13.

THE WAX CONTENT OF JOJOBA SEED INCREASED RAPIDLY FROM THE FIRST TO THE FOURTH WEEK OF SEED DEVELOPMENT. THE PROTEIN CONTENT IN THE SEED MEAL INCREASED AT A SLOW, STEADY RATE DURING THE ENTIRE PERIOD. SEED HARVESTED 20 DAYS BEFORE FULL MATURITY HAD ESSENTIALLY THE SAME WAX AND PROTEIN CONTENT AS MATURE SEED, BUT HAD A LOWER DRY SEED WEIGHT AND EXCESSIVELY HIGH MOISTURE CONTENT.

SEED/SEED MEAL/OIL

0450

YERMANOS, D.M.

1975

COMPOSITION OF JOJOBA SEED DURING DEVELOPMENT.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 52(4):115-117.

MATURING JOJOBA SEED WERE EVALUATED FOR QUANTITY AND QUALITY OF WAX AND MEAL. ANALYSES WERE CARRIED OUT FOR 1) SEED WEIGHT, 2) MOISTURE, PROTEIN, AND WAX CONTENTS, 3) FATTY ACID AND ALCOHOL COMPOSITION OF THE WAX, AND 4) AMINO ACID COMPOSITION OF THE MEAL. SEED SAMPLES WERE COLLECTED FROM A NATURAL POPULATION IN AGUANGA, CALIFORNIA, AT WEEKLY INTERVALS FROM JUNE 20 TO MATURITY ON AUGUST 15. WAX CONTENT OF THE SEED INCREASED RAPIDLY DURING THE FIRST FOUR WEEKS (FROM 13.5 TO 40.5 PERCENT) AND MORE SLOWLY LATER (FROM 43.6 TO 49.4 PERCENT). PROTEIN CONTENT OF THE MEAL INCREASED AT A SLOW STEADY RATE DURING THE ENTIRE PERIOD (FROM 22.3 TO 32.6 PERCENT). SEED HARVESTED 20 DAYS BEFORE FULL MATURITY HAD ESSENTIALLY THE SAME WAX AND PROTEIN CONTENTS AS MATURE SEED; HOWEVER, IT HAD LOWER SEED WEIGHT AND EXCESSIVELY HIGH MOISTURE. THE AMINO ACID CONTENT OF THE MEAL INCREASED CONSIDERABLY BETWEEN THE FIRST AND LAST SAMPLING (FROM 13.40 TO 26.18 PERCENT BY WEIGHT). CERTAIN AMINO ACIDS INCREASED AT A FASTER RATE THAN OTHERS. WHEREAS MAJOR CHANGES OCCURRED IN THE FATTY ACID COMPOSITION OF THE WAX, THE ALCOHOL COMPOSITION REMAINED UNCHANGED THROUGHOUT THE SAMPLE PERIOD.

ALCOHOLS/SEED/SEED MEAL/OIL/PROTEINS

0451

YERMANOS, D.M.

1977

JOJOBA--GENETICALLY CONTROLLED BOTANICAL TRAITS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 54(11):545-548.

SEVEN BOTANICAL TRAITS OF JOJOBA WERE ANALYZED FOR THEIR POTENTIAL AS FACTORS THAT COULD BE CORRELATED TO THE AMOUNT AND QUALITY OF OIL STORED IN THE SEED. STUDIES WERE DONE AT A 6-ACRE, FOUR-YEAR-OLD PLANTING IN RIVERSIDE, CALIFORNIA. THREE TYPES OF BRANCHING WERE NOTED: UPRIGHT, SPHERICAL, AND PROSTRATE. VARIABILITY IN MEAN LEAF AREA AMONG PLANTS WAS CONTINUOUS; THEREFORE, PLANTS COULD NOT BE ASSIGNED TO DISTINCT CLASSES. A YELLOW LEAF MUTANT STRAIN WAS IDENTIFIED; ITS WAX COMPOSITION DOES NOT DEVIATE FROM TYPICAL PLANTS. TWO

STRAINS WERE IDENTIFIED IN WHICH FERTILIZATION OCCURS IN OCTOBER-NOVEMBER, BEFORE THE ONSET OF LOW TEMPERATURES. PRELIMINARY OBSERVATIONS INDICATE THAT DEVELOPING JOJOBA SEEDS ARE MUCH LESS SUSCEPTIBLE TO FROST DAMAGE THAN THE FLOWERS. ONE STRAIN CONSISTENTLY PRODUCES CLUSTERS OF TWO TO 10 FRUIT IN MORE THAN 50 PERCENT OF THE INFLORESCENCES OF EACH PLANT. A STRAIN HAS BEEN IDENTIFIED THAT BEARS FRUIT AT EVERY NODE. MALE SEEDLINGS FLOWERED EARLIER THAN FEMALES MOSTLY DURING THE SECOND YEAR OF GROWTH. DATA COLLECTED DURING THE FIRST THREE YEARS OF GROWTH SUGGEST A 1:1 SEX RATIO IN SEEDS. JOJOBA PLANTS DIFFER IN THE LENGTH OF TIME REQUIRED FOR ANTHESIS.

CALIFORNIA/FREEZING/GROWTH FORM/GENETICS/PLANT MORPHOLOGY/SEED

0452

YERMANOS, D.M.

1982

SELF-POLLINATING JOJOBA.

PAGES 345-346 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA JOJOBA, CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

A SELF-POLLINATING STRAIN OF JOJOBA HAS BEEN DEVELOPED. BECAUSE THE POLLEN IS NOT WINDBORNE, MONOECIOUS JOJOBA MAY ELIMINATE MANY OF THE PROBLEMS ASSOCIATED WITH POLLINATION. SUPERIOR HYBRIDS ALSO MAY BE POSSIBLE. SEVERAL MONOECIOUS PLANTS EXIST, BUT ARE NOT YET READY FOR COMMERCIAL USE.

MONOECISM/POLLINATION/GENETICS/HYBRIDS

0453

YERMANOS, D.M.

1977

JOJOBA -- GENETICALLY CONTROLLED BOTANICAL TRAITS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 54(11):545-548.

IN A BREEDING PROGRAM, BOTANICAL TRAITS OF JOJOBA WERE STUDIED AS FACTORS THAT COULD BE CORRELATED WITH THE AMOUNT AND QUALITY OF OIL STORED IN THE SEED. STUDIES WERE DONE AT A 6-ACRE, FOUR-YEAR-OLD PLANTING IN RIVERSIDE, CALIFORNIA. SEVEN TRAITS WERE STUDIED. THREE TYPES OF BRANCHING WERE NOTED: UPRIGHT, SPHERICAL, AND PROSTRATE. VARIABILITY IN MEAN LEAF AREA AMONG PLANTS WAS CONTINUOUS; THEREFORE, PLANTS COULD NOT BE ASSIGNED TO DISTINCT CLASSES. A YELLOW LEAF MUTANT STRAIN WAS IDENTIFIED; ITS WAX COMPOSITION DOES NOT DEVIATE FROM TYPICAL PLANTS. TWO STRAINS WERE IDENTIFIED IN WHICH FERTILIZATION OCCURS IN OCTOBER-NOVEMBER, BEFORE THE ONSET OF LOW TEMPERATURES. DEVELOPING JOJOBA SEEDS WERE MUCH LESS SUSCEPTIBLE TO FROST DAMAGE THAN THE FLOWERS. ONE STRAIN CONSISTENTLY PRODUCED CLUSTERS OF TWO TO 10 FRUIT IN MORE THAN 50 PERCENT OF THE INFLORESCENCES OF EACH PLANT. A STRAIN HAS BEEN IDENTIFIED THAT BEARS FRUIT AT EVERY NODE. MALES FLOWERED EARLIER THAN FEMALES PRIMARILY DURING THE SECOND YEAR OF GROWTH. DATA COLLECTED DURING THE FIRST THREE YEARS OF GROWTH SUGGEST A 1:1 SEX RATIO IN SEEDS. JOJOBA PLANTS DIFFER IN THE LENGTH OF TIME REQUIRED FOR ANTHESIS.

GENETICS/OIL/SEX RATIOS/SEED YIELD/GROWTH FORM/FREEZING

0454

YERMANOS, D.M.

1978

JOJOBA: GENERAL INFORMATION AND PHOTOGRAPHS.

UNIVERSITY OF CALIFORNIA, DEPARTMENT OF PLANT SCIENCES, RIVERSIDE. 24 P.

NO ABSTRACT.

NATIVE POPULATIONS/OIL/CHEMICAL STRUCTURE/PHENOLOGY

0455

YERMANOS, D.M.

1978

MECHANICAL HARVESTING OF JOJOBA.

PAGES 67-70 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

THE POSSIBILITY OF GROWING JOJOBA AS A COMMERCIAL CROP IS LARGELY DEPENDENT ON DEVELOPING A LOW-COST METHOD OF SEED HARVESTING. PRUNING EXPERIMENTS TO FACILITATE MECHANICAL HARVESTING WERE ABANDONED BECAUSE JOJOBA BRANCHES ARE QUITE BRITTLE AND A LARGE SINGLE-STEM TREE MIGHT BE EASILY LOST DUE TO BREAKAGE; ALSO, LATERAL BRANCHING IS SO PERSISTENT AT THE SEEDLING STAGE THAT PRUNING BECOMES A MAJOR CULTURAL EXPENSE AND AN UNENDING CHORE. PLANTATIONS WITH WELL-LEVELED SOIL, SLIGHTLY COMPACTED ON THE SURFACE, WILL ACCOMMODATE CONVENTIONAL SWEEPER OR SUCTION NUT PICKING MACHINES SUCH AS THOSE USED FOR ALMONDS OR WALNUTS. IN AREAS WHERE THE SOIL IS TOO SANDY OR POWDERY FOR SUCH HARVESTING EQUIPMENT, PLASTIC NETTING COULD BE USED TO CATCH THE FALLING SEEDS.

HARVESTING/PRUNING/SOILS/PLANTATION MANAGEMENT

0456

YERMANOS, D.M.

1978

A BIBLIOGRAPHY OF JOJOBA: A CROP WHOSE TIME HAS COME.

UNIVERSITY OF CALIFORNIA, DEPARTMENT OF PLANT SCIENCES, RIVERSIDE. 58 P.

NO ABSTRACT.

BIBLIOGRAPHIES

0457

YERMANOS, D.M.

1979

JOJOBA--A CROP WHOSE TIME HAS COME.

CALIFORNIA AGRICULTURE 33(7-8):4-7, 10-11.



IRRIGATION/PROPAGATION/GENETICS/BREEDING/SEED YIELD/PLANTATION ESTABLISHMENT/  
TEMPERATURE

0458

YERMANOS, D.M.

1979

THE DOMESTICATION OF JOJOBA.

PAGES 387-403 IN D.M. YERMANOS, ED., PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE  
ON JOJOBA. INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND  
PLANT SCIENCE, UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

HIGH YIELDS OF JOJOBA SEED AND WAX WILL BE REALIZED BY DEVELOPING BOTH SUPERIOR  
STRAINS AND OPTIMUM CULTURAL PRACTICES. BREEDING IMPROVED STRAINS WITH  
PERENNIAL CROPS SUCH AS JOJOBA IS AN ESPECIALLY LONG-TERM PROCEDURE. BY  
CONTRAST, DEVELOPING GOOD CULTURAL PRACTICES, EVEN FOR PERENNIALS, IS RELATIVELY  
EASIER AND OFTEN CAN BE ACCOMPLISHED SOONER.

SEED/OIL/SEED YIELD/BREEDING/PLANTATION ESTABLISHMENT/IRRIGATION/TEMPERATURE/  
PROPAGATION

0459

YERMANOS, D.M. ED.

1979

PROCEEDINGS: 3RD INTERNATIONAL CONFERENCE ON JOJOBA.

INTERNATIONAL COMMITTEE ON JOJOBA AND DEPARTMENT OF BOTANY AND PLANT SCIENCE,  
UNIVERSITY OF CALIFORNIA, RIVERSIDE. 419 P.

NO ABSTRACT.

AGRONOMY/GENETICS/TISSUE CULTURE/CHEMICAL STRUCTURE/PLANTATION ESTABLISHMENT/  
PROPAGATION

0460

YERMANOS, D.M.

1982

REVIEW OF SEVEN YEARS OF PERFORMANCE DATA ON JOJOBA UNDER CULTIVATION.

PAGES 22-26 IN M. PUEBLA, ED., MEMORIAS: IV REUNION INTERNACIONAL DE LA  
JOJOBA. CONSEJO INTERNACIONAL DE LA JOJOBA. 493 P.

IN REVIEWING THE SEVEN-YEAR PERFORMANCE OF JOJOBA UNDER CULTIVATION AT THE  
UNIVERSITY OF CALIFORNIA, RIVERSIDE, THE FOLLOWING OBSERVATIONS WERE MADE.  
1) THE CHANGE FROM THE WILD TO THE DOMESTICATED STATE HAS NOT CAUSED ANY ADVERSE  
EFFECTS ON THE GROWTH AND DEVELOPMENT OF THESE PLANTS. 2) SEED SIZE,  
APPEARANCE, YIELD AND OIL CONTENT ARE AS GOOD, IF NOT BETTER THAN NATIVE PLANTS.  
(IN 1980 THE AVERAGE YIELD IN THE NON-IRRIGATED PLANTING WAS 1.3 POUNDS PER  
PLANT; IN THE IRRIGATED SECTION, THE AVERAGE YIELD WAS 9.7 OUNCES PER PLANT.)  
3) PERFORMANCE WITHOUT SUPPLEMENTARY IRRIGATION AND FERTILIZATION WAS  
STRIKINGLY SUPERIOR. 4) NO MAJOR DISEASE OR INSECT PROBLEMS APPEARED. 5) NO  
PROBLEMS RELATING TO WIND POLLINATION WERE OBSERVED. 6) CULTURAL PRACTICES  
CAN MINIMIZE LOSSES DUE TO FROST. 7) A GREAT DEAL OF GENETIC VARIABILITY IS  
AVAILABLE WITHIN THE SPECIES FOR SEVERAL BOTANICAL CHARACTERISTICS AND FOR SEED-  
YIELDING ABILITY.

FUTURE RESEARCH OBJECTIVES INCLUDE: A) EXPLOITATION OF HYBRIDS AND THE USE OF VEGETATIVE PROPAGATION FOR COMMERCIAL PLANTATIONS; B) IDENTIFICATION OF LOW-COST HERBICIDES; C) DETERMINATION OF SUITABLE COMPANION CROPS TO REDUCE THE FINANCIAL BURDEN DURING PLANTATION ESTABLISHMENT; AND D) IDENTIFICATION OF SEED OR SEEDLING TREATMENTS TO ACCELERATE PLANT DEVELOPMENT.

CULTIVATION/NATIVE POPULATIONS/HYBRIDS/SEED YIELD/DOMESTICATION/IRRIGATION/FERTILIZERS/HERBICIDES/POLLINATION/DISEASES/PESTS/GENETICS/FREEZING

0461

YERMANOS, D.M.

1973

JOJOBA, A BRIEF SURVEY OF THE AGRONOMIC POTENTIAL.

CALIFORNIA AGRICULTURE 27(9):10-13.

COSTS AND FEASIBILITY OF ECONOMICALLY HARVESTING NATIVE POPULATIONS AND ESTABLISHING PLANTATIONS OF CULTIVATED JOJOBA ARE EVALUATED. THE COST OF HARVESTING AND CLEANING WILD SEED IS APPROXIMATELY ONE DOLLAR/POUND. A SIMPLE HAND PICKING TOOL HAS BEEN USED EXPERIMENTALLY. PRUNING OF NATIVE PLANTS TO AID IN HARVESTING HAS BEEN STARTED WITH 3,000 PLANTS. ESTIMATES OF SEED PRODUCTIVITY ARE 750 POUNDS/ACRE AT FIVE YEARS AND 3,750 POUNDS/ACRE AT 12 YEARS IT WOULD TAKE 25,000 ACRES OF JOJOBA TO PRODUCE ENOUGH OIL, 5 MILLION POUNDS, TO REPLACE THE PRESENT NEEDS OF SPERM WHALE OIL.

ECONOMIC DEVELOPMENT/SEED/SEED YIELD/CULTIVATION/REPRODUCTION/COST ANALYSIS/IRRIGATION/SPERM WHALE OIL/OIL/PLANTATION MANAGEMENT/NATIVE POPULATIONS

0462

YERMANOS, D.M. ET AL

1968

JOJOBA, A NEW CALIFORNIA CROP. SEED YIELD, COLD TOLERANCE, AND EVALUATION FOR ALUMINUM INDUSTRY.

CALIFORNIA AGRICULTURE 22(10):2-3.

RECORDS WERE MAINTAINED ON SEED CROP YIELD FOR THREE GROUPS OF PLANTS: 1) FROM BAJA CALIFORNIA, 2) FROM ARIZONA, 3) A CLONE NAMED VISTA, DEVELOPED IN CALIFORNIA, FROM SEED FROM SUPERIOR, ARIZONA. EXPERIMENTS WITH IRRIGATION OF SOME PLANTS RESULTED IN INCREASED YIELD OF SEEDS. ANTHESIS WAS MORE UNIFORM IN THE CLONAL MATERIAL. NIGHT TEMPERATURES OF 17 F AND 22 F WERE LETHAL IN EXPERIMENTS: WHILE TEMPERATURES OF 25 F ONLY CAUSED MINOR DAMAGE TO PLANTS. JOJOBA OIL MAY NOT BE SUITABLE FOR USE AS A ROLLING OIL DURING THE COLD ROLLING OF ALUMINUM SHEETS. THE WAX STAINED THE SHEETS AND DROPPED IN VISCOSITY WHEN ITS TEMPERATURE WAS INCREASED FROM 100 F TO 150 F.

SEED/SEED YIELD/OIL/IRRIGATION/TEMPERATURE/PLANTING MANAGEMENT/FREEZING

0463

YERMANOS, D.M./BANIGAN, T.F./VERBISCAR, A.J.

1979

RESPONSE OF JOJOBA SEEDLINGS TO DIFFERENT PHOTOPERIODS.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 56(8):751-752.

LENGTHENING THE JOJOBA SEEDLING PHOTOPERIOD FROM 12 HOURS TO CONTINUOUS LIGHT INCREASES THE AVERAGE NUMBER AND LENGTH OF STEMS, THE NUMBER OF LEAVES AND THE LENGTH OF INTERNODES AND THE DRY WEIGHT OF LEAVES, STEMS AND ROOTS PER PLANT. LEAF SIMMONDSIN CONTENT ALSO IS INCREASED. ROOT SIMMONDSIN CONTENT IS NOT INCREASED.

LIGHT/PLANT GROWTH/SIMMONDSIN/PLANT MORPHOLOGY/ROOTS/LEAVES/PHOTOPERIOD

0464

YERMANOS, D.M./DHILLON, G.S./HOLMES, R.

1977

JOJOBA WAX EXTRACTION AND BLEACHING.

CALIFORNIA AGRICULTURE 31(10):16.

JOJOBA SEEDS WITH LESS THAN 9 PERCENT MOISTURE MAY BE STORED FOR EXTENDED PERIODS OF TIME. ALTHOUGH SEED VIABILITY DECLINES, THE OIL QUALITY REMAINS UNALTERED. OIL MAY BE EXTRACTED BY MECHANICAL PRESSURE, BY SOLVENT EXTRACTION, OR BY A COMBINATION OF BOTH. OIL CAN BE BLEACHED BY FILTERING TO PRODUCE A WATER-CLEAR AND ODORLESS SUBSTANCE.

SEED MEAL/OIL/SOLVENT EXTRACTION/MECHANICAL EXTRACTION

0465

YERMANOS, D.M./DUNCAN, C.C.

1976

QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF JOJOBA SEED.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 53(2):80-82.

THE COMPOSITION OF JOJOBA SEED HARVESTED FROM RANDOMLY SELECTED INDIVIDUAL PLANTS (175 IN 1973, 139 IN 1974) OF THE NATIVE POPULATION AT AGUANGA, CALIFORNIA, WERE ANALYZED. WAX, PROTEIN, AND HULL CONTENT OF THE SEED AND FATTY ACID AND ALCOHOL COMPOSITION OF THE WAX, WERE NOT VERY DIFFERENT IN THE TWO YEARS. SEED YIELD PER PLANT WAS 2.7 TIMES HIGHER IN 1974. SEED WEIGHT AND WAX CONTENT OF THE SEED WERE SIGNIFICANTLY CORRELATED. HIGHLY SIGNIFICANT CORRELATIONS WERE FOUND IN PAIRS OF FATTY ACIDS AND ALCOHOLS EXCEPT WHERE FATTY ACID 20:1 WAS INCLUDED. COMPARISONS OF DATA FROM 22 PLANTS OF KNOWN IDENTITY FOR THE TWO YEARS ALSO SHOWED NO SIGNIFICANT CHANGE IN WAX CONTENT AND COMPOSITION OF THE SEED. CORRELATIONS FOR SEED WEIGHT, PROTEIN, HULL PERCENT, AND YIELD PER PLANT FOR THE SAME PERIOD WERE ALL NONSIGNIFICANT.

ALCOHOLS/CALIFORNIA/FATTY ACIDS/MOISTURE CONTENT/SEED/SEED YIELD

0466

YERMANOS, D.M./DUNCAN, C.C.

1976

JOJOBA SEED: PHENOTYPIC WITHIN PLANT VARIABILITY IN WAX CONTENT AND COMPOSITION.

AMERICAN OIL CHEMISTS' SOCIETY, JOURNAL 53(11):700-703.

THE WAX CONTENT AND COMPOSITION, AND SEED WEIGHT OF SEVEN INDIVIDUAL PLANTS IN AGUANGA, CALIFORNIA WERE STUDIED. MEAN WAX CONTENT WAS 48.5 PERCENT AND AVERAGE RANGE 17.6 PERCENT UNITS. MEAN SEED WEIGHT WAS 0.38 GRAMS AND MEAN RANGE 0.43 GRAMS. THE RANGE IN SEED WEIGHT WAX CONTENT AND COMPOSITION AMONG SEEDS WITHIN SINGLE PLANTS WAS COMPARABLE IN MAGNITUDE TO THAT IN SINGLE PLANT MEANS. MOST OF THE VARIABILITY IS DUE TO ENVIRONMENTAL FACTORS. THUS, SELECTION FOR THESE TRAITS SHOULD BE BASED ON SINGLE SEEDS HARVESTED IN BULK FROM SEVERAL PLANTS. CORRELATIONS BETWEEN FATTY ACIDS AND ALCOHOLS AMONG SEEDS WITHIN PLANTS WERE THE SAME AS THOSE FOUND AMONG SINGLE PLANT SAMPLES. JOJOBA SEEDS CAN BE CUT IN HALF TRANSVERSELY WITHOUT IMPAIRING GERMINATION OF THE BASAL HALF OR THE EMBRYO AXIS. THE UPPER HALF CAN BE USED TO OBTAIN A WAX SAMPLE FOR SINGLE-SEED ANALYSES.

ALCOHOLS/CALIFORNIA/FATTY ACIDS/GERMINATION/OIL/SEED/SEED YIELD

0467

YERMANOS, D.M./DUNCAN, C.C.

1978

QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF JOJOBA SEED OBTAINED FROM THE AGUANGA (CALIFORNIA) POPULATION.

PAGES 113-122 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

DATA ARE PRESENTED ON COMPOSITION OF JOJOBA SEED HARVESTED IN 1973 AND 1974 FROM INDIVIDUAL PLANTS OF THE AGUANGA, CALIFORNIA, POPULATION. EXCEPT FOR PER-PLANT SEED YIELD (2.7 TIMES HIGHER IN 1974), WAX, PROTEIN AND HULL CONTENT OF THE SEED, AND FATTY ACID AND ALCOHOL COMPOSITION OF THE WAX DID NOT VARY SIGNIFICANTLY BETWEEN THE TWO YEARS. A SIGNIFICANT POSITIVE CORRELATION WAS FOUND BETWEEN SEED WEIGHT AND WAX CONTENT. HIGHLY SIGNIFICANT, POSITIVE CORRELATIONS WERE FOUND IN PAIRS OF FATTY ACIDS AND ALCOHOLS EXCEPT WHERE FATTY ACID 20:1 WAS INCLUDED. A TWO-YEAR COMPARISON OF DATA FROM 22 PLANTS OF KNOWN IDENTITY ALSO SHOWED NO SIGNIFICANT CHANGE IN WAX CONTENT AND SEED COMPOSITION. BY CONTRAST, CORRELATIONS FOR SEED WEIGHT, PROTEIN, HULL PERCENT AND PER-PLANT YIELD FOR THE SAME PERIOD WERE ALL NONSIGNIFICANT.

SEED/SEED YIELD/CALIFORNIA/FATTY ACIDS/ALCOHOLS/OIL

0468

YERMANOS, D.M./DUNCAN, C.C.

1978

SINGLE SEED ANALYSIS OF JOJOBA--TECHNIQUES AND OBSERVATIONS.

PAGES 123-133 IN CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, LA JOJOBA: MEMORIAS DE LA II CONFERENCIA INTERNACIONAL SOBRE LA JOJOBA Y SU APROVECHAMIENTO, ENSENADA, BAJA CALIFORNIA NORTE, MEXICO, 10 AL 12 FEBRERO DE 1976. CONSEJO NACIONAL DE CIENCIA Y TECNOLOGIA, COMISION NACIONAL DE LAS ZONAS ARIDAS, CONSEJO INTERNACIONAL SOBRE JOJOBA, MEXICO. 340 P.

A METHOD WAS DEVELOPED TO DETERMINE WAX CONTENT AND COMPOSITION OF SINGLE JOJOBA SEEDS AND TO OBTAIN PROGENY OF EACH SEED ANALYZED. USING THIS TECHNIQUE, STUDIES WERE CONDUCTED ON THE VARIABILITY PRESENT AMONG SINGLE SEEDS HARVESTED FROM INDIVIDUAL PLANTS AND FROM SINGLE SEEDS OBTAINED FROM MANY DIFFERENT PLANTS FROM THE AGUANGA, CALIFORNIA, JOJOBA POPULATION. WAX CONTENT AND COMPOSITION

VARIABILITY AMONG SINGLE SEEDS FROM INDIVIDUAL PLANTS ESSENTIALLY WAS AS LARGE AS THAT IN THE BULK SAMPLE. IN SPITE OF OBSERVED VARIABILITY IN RELATION TO BOTANICAL CHARACTERISTICS, GENETIC VARIABILITY OF WAX CONTENT AND QUALITY APPEARS TO BE SMALL IN THE AGUANGA POPULATION.

SEED/GENETIC VARIABILITY/CHEMICAL COMPOSITION/CALIFORNIA/ANALYTICAL TECHNIQUES/  
GENETICS/PROGENY/OIL

0469

YERMANOS, D.M./FRANCOIS, L.E./TAMMADONI, T.

1967

EFFECTS OF SOIL SALINITY ON THE DEVELOPMENT OF JOJOBA.

ECONOMIC BOTANY 21(1):69-83.

DURING THE FIRST TWO YEARS OF GROWTH, FOUR SALINITY TREATMENTS WERE UTILIZED (CONTROL, LOW, MEDIUM AND HIGH SALT). HIGH-SALT-TREATED LEAVES WERE THICKER AND LONGER THAN CONTROL LEAVES; STEMS ON CONTROL PLANTS WERE CONSISTENTLY THICKER THAN THOSE OF SALT-TREATED PLANTS. SOIL SALINITY INCREASED THE MOISTURE CONTENT OF LEAVES AND STEMS. MINERAL ANALYSIS OF LEAF SAMPLES INDICATED A PROGRESSIVE INCREASE IN CALCIUM, CHLORINE, AND SODIUM AND A DECREASE IN MAGNESIUM WITH INCREASING SALINITY. FLOWER COUNTS SHOWED A SHARP REDUCTION IN TOTAL FLOWER NUMBER ON PLANTS IN THE HIGH SALT TREATMENT. SOIL SALINITY CAUSED ANATOMICAL CHANGES AT A MICROSCOPIC LEVEL IN THE LEAVES AND STEMS. JOJOBA CAN WITHSTAND HIGH LEVELS OF SOIL SALINITY DURING THE FIRST TWO YEARS OF DEVELOPMENT WITHOUT MAJOR INJURY.

PLANT GROWTH/PLANT MORPHOLOGY/FLOWERING/SOIL-WATER-PLANT RELATIONSHIPS/  
WATER USE/LEAVES/STEMS/PLANT CHEMISTRY/SALINITY/SOILS/SALT TOLERANCE/  
PLANT PHYSIOLOGY

0470

YERMANOS, D.M./GONZALES, R.

1976

MECHANICAL HARVESTING OF JOJOBA.

CALIFORNIA AGRICULTURE 30(1):8-9.

MECHANICAL HARVESTING COULD BE ACCOMPLISHED USING CONVENTIONAL NUT-HARVESTING EQUIPMENT. JOJOBA PLANTS WOULD REQUIRE PRUNING TO ACQUIRE THE DESIRED GROWTH FORM.

PRUNING/MECHANICAL HARVESTING EQUIPMENT/SEED HARVEST

0471

YERMANOS, D.M./HOLMES, R.

1973

JOJOBA--AT VISTA, ANALYSIS OF COIT PLANTATION, THE OLDEST DEMONSTRATION PLOT.

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| 0625                                | 0667 | 0670 | 0682 | 0684 | 0685 |
| FLOWERS                             | 0406 | 0407 |      |      |      |
| FOAMING                             | 0066 |      |      |      |      |
| FOODS                               | 0066 | 0076 | 0100 | 0102 | 0121 |
| 0350                                | 0351 | 0473 | 0501 | 0520 | 0560 |
| 0568                                | 0613 | 0620 | 0637 | 0652 |      |
| FORAGE                              | 0036 | 0121 | 0150 | 0245 |      |
| 0473                                | 0523 | 0528 | 0533 | 0535 | 0543 |
| 0545                                | 0546 | 0548 | 0580 | 0588 | 0603 |
| 0604                                | 0605 | 0638 | 0651 | 0657 | 0664 |
| FOUCUIERIA SPLENDENS                | 0281 |      |      |      |      |
| FRACTIONS                           | 0596 |      |      |      |      |
| FREEZING                            | 0020 | 0105 | 0188 | 0247 |      |
| 0368                                | 0451 | 0453 | 0460 | 0462 | 0619 |
| 0667                                |      |      |      |      |      |
| FRUIT DEVELOPMENT                   | 0037 |      |      |      |      |
| FRUITING                            | 0136 | 0246 | 0399 |      |      |
| FUNGI                               | 0230 | 0512 |      |      |      |
|                                     |      |      |      |      |      |
| GAS CHROMATOGRAPHY                  | 0260 |      |      |      |      |
| GAS LIQUID CHROMATOGRAPHY           | 0092 |      |      |      |      |
| 0104                                | 0168 | 0201 | 0202 | 0252 | 0259 |
| 0381                                |      |      |      |      |      |
| GELATION                            | 0066 |      |      |      |      |
| GENETIC VARIABILITY                 | 0081 | 0082 |      |      |      |
| 0136                                | 0145 | 0147 | 0148 | 0150 | 0165 |
| 0194                                | 0253 | 0266 | 0322 | 0395 | 0468 |
| 0630                                |      |      |      |      |      |
| GENETICS                            | 0018 | 0035 | 0081 | 0136 |      |
| 0145                                | 0148 | 0150 | 0165 | 0184 | 0194 |
| 0196                                | 0243 | 0259 | 0321 | 0329 | 0366 |
| 0371                                | 0372 | 0376 | 0395 | 0451 | 0452 |
| 0453                                | 0457 | 0459 | 0460 | 0468 | 0630 |
| 0653                                |      |      |      |      |      |
| GEOGRAPHY                           | 0108 |      |      |      |      |
| GERM PLASM                          | 0151 | 0174 | 0241 | 0627 |      |
| GERMICIDES                          | 0364 |      |      |      |      |
| GERMINATION                         | 0020 | 0021 | 0026 |      |      |
| 0029                                | 0060 | 0095 | 0099 | 0122 | 0136 |
| 0148                                | 0179 | 0231 | 0237 | 0246 | 0247 |
| 0265                                | 0269 | 0270 | 0306 | 0337 | 0338 |
| 0348                                | 0349 | 0359 | 0367 | 0368 | 0406 |
| 0427                                | 0466 | 0495 | 0497 | 0599 | 0668 |
| 0683                                |      |      |      |      |      |
| GLUCONEOGENESIS                     | 0268 |      |      |      |      |
| GLYCOSIDES                          | 0357 |      |      |      |      |
| GRASSES                             | 0606 |      |      |      |      |
| GRAZING                             | 0243 |      |      |      |      |
| GROWTH FORM                         | 0047 | 0099 | 0195 |      |      |
| 0321                                | 0451 | 0453 |      |      |      |
|                                     |      |      |      |      |      |
| HALOGENATION                        | 0430 |      |      |      |      |
| HARDENING-OFF                       | 0188 |      |      |      |      |
| HARDNESS                            | 0251 |      |      |      |      |
| HARVESTING                          | 0384 | 0455 |      |      |      |
| HERBICIDES                          | 0101 | 0125 | 0299 | 0460 |      |
| HERMAPHRODITISM                     | 0184 | 0196 |      |      |      |
| HIGH PRESSURE LIQUID CHROMATOGRAPHY | 0260 |      |      |      |      |
| HOMOJOJOBAMIDE                      | 0365 |      |      |      |      |
| HUMIDITY                            | 0631 |      |      |      |      |
| HYBRIDS                             | 0001 | 0184 | 0452 | 0460 |      |
| HYDROCARBONS                        | 0162 | 0666 |      |      |      |
| HYDROGENATED OIL                    | 0013 | 0044 |      |      |      |
| 0171                                | 0251 | 0351 | 0373 | 0374 | 0387 |
| HYDROGENATION                       | 0044 | 0204 | 0380 |      |      |
| 0426                                | 0427 | 0437 | 0439 | 0440 | 0673 |
|                                     |      |      |      |      |      |
| ICE NUCLEATION                      | 0210 |      |      |      |      |
| IMMUNOLOGY                          | 0042 |      |      |      |      |
| INDIA                               | 0006 | 0026 |      |      |      |
| INDIAN RESERVATIONS                 | 0007 | 0012 |      |      |      |
| 0015                                | 0051 | 0054 | 0071 | 0078 | 0138 |
| 0139                                | 0141 | 0163 | 0197 | 0228 | 0242 |
| 0283                                | 0284 | 0288 | 0289 | 0290 | 0291 |
| 0325                                | 0327 | 0345 | 0383 | 0385 | 0402 |
| 0412                                |      |      |      |      |      |
| INDIANS OF NORTH AMERICA            | 0095 |      |      |      |      |
| 0149                                | 0166 | 0242 | 0395 | 0473 | 0505 |
| 0506                                | 0507 | 0511 | 0513 | 0517 | 0518 |
| 0520                                | 0521 | 0530 | 0550 | 0556 | 0557 |
| 0560                                | 0609 | 0620 | 0623 | 0624 | 0637 |
| 0647                                |      |      |      |      |      |
| INSECTS                             | 0028 | 0145 | 0147 | 0158 |      |
| 0185                                | 0199 | 0200 | 0303 | 0304 | 0395 |
| 0396                                |      |      |      |      |      |
| INTERCROPPING                       | 0073 |      |      |      |      |
| INTRODUCED SPECIES                  | 0030 | 0136 |      |      |      |
| 0415                                | 0491 | 0508 | 0552 |      |      |
| INVENTORIES                         | 0279 | 0280 | 0281 |      |      |
| IRRIGATION                          | 0014 | 0038 | 0046 | 0079 |      |
| 0082                                | 0091 | 0095 | 0097 | 0129 | 0136 |
| 0165                                | 0173 | 0199 | 0200 | 0209 | 0221 |
| 0222                                | 0223 | 0247 | 0295 | 0298 | 0299 |
| 0325                                | 0333 | 0350 | 0354 | 0386 | 0395 |
| 0457                                | 0458 | 0460 | 0461 | 0462 | 0471 |
| 0486                                |      |      |      |      |      |
| ISOMERIZATION                       | 0056 | 0426 | 0427 |      |      |
| 0429                                | 0437 |      |      |      |      |
| ISRAEL                              | 0033 | 0034 | 0035 | 0038 |      |
| 0041                                | 0079 | 0132 | 0133 | 0134 | 0135 |
| 0136                                | 0149 | 0181 | 0228 | 0282 | 0361 |
| 0403                                | 0426 | 0429 | 0431 | 0432 | 0437 |
| 0438                                | 0439 |      |      |      |      |
| ITALY                               | 0212 |      |      |      |      |
|                                     |      |      |      |      |      |
| JAPAN                               | 0208 | 0351 |      |      |      |
| JOJOBAMIDE                          | 0362 | 0365 |      |      |      |
| JOJOBYL                             | 0362 |      |      |      |      |
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 0396 0441 0457 0458 0459  
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 0264 0265 0266 0267 0270 0271  
 0297 0307 0337 0349 0352 0353  
 0355 0367 0379 0382 0384 0391  
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 0450 0451 0458 0461 0462 0465  
 0466 0467 0468 0505 0517 0545  
 0557 0561 0568 0579 0584 0585  
 0588 0594 0599 0602 0605 0613  
 0621 0651 0665 0668 0669 0672  
 0682 0683  
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 0070 0071 0091 0120 0137 0140  
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 0448 0449 0150 0464 0505 0599  
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 0095 0105 0107 0110 0111 0123  
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 0408 0409 0410 0411 0424 0425  
 0463  
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 0091 0128 0173 0238  
 SLOPE EXPOSURE 0060 0399

|                                |      |      |      |      |      |                           |      |      |      |      |      |
|--------------------------------|------|------|------|------|------|---------------------------|------|------|------|------|------|
| SLOPES                         | 0281 |      |      |      |      | TEMPERATURE               | 0020 | 0026 | 0029 |      |      |
| SOCIAL ASPECTS                 | 0051 | 0063 | 0149 |      |      | 0044                      | 0060 | 0106 | 0114 | 0120 | 0130 |
| 0288                           | 0289 | 0290 | 0312 |      |      | 0148                      | 0157 | 0173 | 0188 | 0223 | 0231 |
| SODIUM                         | 0390 |      |      |      |      | 0247                      | 0250 | 0331 | 0332 | 0354 | 0440 |
| SOIL MOISTURE                  | 0060 |      |      |      |      | 0442                      | 0457 | 0458 | 0462 | 0667 |      |
| SOIL NUTRIENTS                 | 0294 |      |      |      |      | TEXAS                     | 0189 | 0285 | 0488 | 0595 |      |
| SOIL-WATER-PLANT RELATIONSHIPS |      |      |      |      |      | THERMAL PROPERTIES        |      |      | 0157 |      |      |
| 0004                           | 0079 | 0136 | 0294 | 0469 |      | THERMAL STRESS            | 0679 |      |      |      |      |
| SOILS                          | 0053 | 0078 | 0101 | 0105 | 0113 | THERMIC BEHAVIOR          |      | 0156 | 0159 |      |      |
| 0120                           | 0134 | 0173 | 0174 | 0243 | 0281 | THIN LAYER CHROMATOGRAPHY |      |      | 0310 |      |      |
| 0294                           | 0331 | 0332 | 0346 | 0354 | 0427 | TISSUE CULTURE            | 0016 | 0017 | 0035 |      |      |
| 0442                           | 0455 | 0469 | 0555 |      |      | 0040                      | 0041 | 0112 | 0186 | 0217 | 0218 |
| SOLUBILITY                     | 0214 |      |      |      |      | 0339                      | 0341 | 0393 | 0441 | 0459 |      |
| SOLVENT EXTRACTION             |      | 0204 | 0379 |      |      | TOCOPHEROLS               | 0100 | 0201 | 0202 |      |      |
| 0380                           | 0464 |      |      |      |      | 0207                      |      |      |      |      |      |
| SOLVENTS                       | 0430 | 0434 |      |      |      | TOURNESOL                 | 0293 |      |      |      |      |
| SONORA                         | 0039 | 0068 | 0099 | 0158 |      | TOXICITY                  | 0027 | 0028 | 0042 | 0090 |      |
| 0209                           | 0220 | 0221 | 0265 | 0266 | 0274 | 0092                      | 0115 | 0116 | 0117 | 0118 | 0286 |
| 0275                           | 0279 | 0280 | 0281 | 0315 | 0320 | 0370                      | 0388 | 0394 | 0401 | 0408 | 0409 |
| 0322                           | 0336 | 0515 | 0518 | 0519 | 0548 | 0410                      | 0411 | 0424 | 0425 | 0427 | 0568 |
| 0549                           | 0550 | 0553 | 0570 | 0578 | 0594 | TRACE ELEMENTS            | 0405 |      |      |      |      |
| 0599                           | 0670 | 0671 | 0675 |      |      | TRANSPIRATION             | 0004 | 0631 |      |      |      |
| SONORAN DESERT                 | 0008 | 0036 | 0060 |      |      | TRICHOMES                 | 0185 |      |      |      |      |
| 0147                           | 0150 | 0245 | 0514 | 0530 | 0559 | TRICOTYLEDONY             | 0348 |      |      |      |      |
| 0570                           | 0591 | 0644 | 0651 | 0667 |      | TRYPSIN INHIBITOR         |      | 0349 |      |      |      |
| SOYBEAN OIL                    | 0076 | 0207 | 0293 |      |      | UNIVERSIDAD DE SONORA     |      |      | 0277 |      |      |
| 0351                           |      |      |      |      |      | USDA NATIONAL SEED BANK   |      |      | 0151 |      |      |
| SOYBEANS                       | 0066 |      |      |      |      | UTAH                      | 0623 |      |      |      |      |
| SPEERM WHALE OIL               | 0006 | 0088 | 0089 |      |      | VEGETATION ESTABLISHMENT  |      |      | 0060 |      |      |
| 0149                           | 0153 | 0161 | 0167 | 0168 | 0193 | VEGETATIVE PROPAGATION    |      |      | 0016 |      |      |
| 0256                           | 0257 | 0258 | 0283 | 0302 | 0316 | 0033                      | 0124 | 0175 | 0219 | 0329 |      |
| 0318                           | 0371 | 0372 | 0412 | 0415 | 0418 | VEGETATIVE REGENERATION   |      |      | 0340 |      |      |
| 0428                           | 0430 | 0461 | 0475 | 0476 | 0477 | VERTICILLIUM DAHLIAE      | 0010 |      |      |      |      |
| 0478                           | 0530 | 0634 | 0646 | 0663 |      | WATER BALANCE             | 0004 | 0059 | 0558 |      |      |
| STEMS                          | 0406 | 0407 | 0469 | 0632 | 0633 | WATER HARVESTING          |      | 0014 | 0078 |      |      |
| 0649                           |      |      |      |      |      | 0079                      | 0080 | 0111 | 0222 | 0345 |      |
| STEROLS                        | 0201 | 0202 |      |      |      | WATER STRESS              |      | 0058 | 0059 | 0083 |      |
| STOMATA                        | 0005 | 0154 | 0442 | 0649 |      | 0110                      | 0235 | 0390 |      |      |      |
| STRESS                         | 0004 | 0008 | 0058 | 0235 |      | WATER USE                 | 0005 | 0009 | 0011 | 0014 |      |
| 0266                           |      |      |      |      |      | 0032                      | 0037 | 0038 | 0046 | 0058 | 0080 |
| SUDAN                          | 0199 | 0200 |      |      |      | 0105                      | 0110 | 0111 | 0113 | 0120 | 0134 |
| SULFURIZATION                  | 0206 | 0256 | 0314 |      |      | 0142                      | 0143 | 0154 | 0164 | 0173 | 0222 |
| 0330                           | 0418 | 0420 | 0427 | 0431 | 0432 | 0295                      | 0312 | 0320 | 0346 | 0358 | 0386 |
| 0433                           | 0434 | 0435 | 0551 | 0663 | 0673 | 0390                      | 0414 | 0442 | 0469 |      |      |
| SULFURIZED JOJOBA OIL          |      |      | 0153 |      |      | WEED CONTROL              | 0091 | 0174 | 0209 |      |      |
| 0249                           | 0257 | 0258 |      |      |      | 0298                      | 0320 |      |      |      |      |
| SURFACE WATER RUNOFF           | 0079 |      |      |      |      | WHALE CONSERVATION        |      | 0283 |      |      |      |
| SURVIVAL                       | 0223 | 0264 | 0265 | 0266 |      | WILDLIFE                  | 0053 | 0147 | 0150 | 0243 |      |
| 0370                           |      |      |      |      |      | 0371                      | 0372 | 0397 | 0473 | 0505 | 0508 |
| SYNECOLOGY                     | 0008 | 0036 | 0060 |      |      | 0523                      | 0545 | 0546 | 0580 | 0597 | 0603 |
| SYNTHETIC OILS                 | 0006 | 0645 |      |      |      | 0604                      | 0638 | 0657 | 0669 |      |      |
| SYSTEMATICS                    | 0057 | 0069 | 0145 |      |      | WOODY PLANTS              | 0022 |      |      |      |      |
| 0148                           | 0185 | 0234 | 0245 | 0287 | 0356 | XEROPHYTES                | 0060 | 0509 | 0528 | 0529 |      |
| 0366                           | 0369 | 0372 | 0406 | 0407 | 0473 | 0541                      | 0542 | 0589 | 0591 | 0656 |      |
| 0510                           | 0527 | 0534 | 0547 | 0549 | 0552 | XYLOGLUCAN                | 0417 |      |      |      |      |
| 0553                           | 0554 | 0562 | 0567 | 0569 | 0571 | ZENAIDA ASIATICA          |      | 0597 | 0669 |      |      |
| 0572                           | 0582 | 0583 | 0593 | 0600 | 0601 |                           |      |      |      |      |      |
| 0605                           | 0608 | 0610 | 0614 | 0625 | 0632 |                           |      |      |      |      |      |
| 0642                           | 0652 | 0654 | 0659 | 0660 | 0661 |                           |      |      |      |      |      |
| 0671                           | 0682 | 0683 |      |      |      |                           |      |      |      |      |      |



Cover design: Paul Mirocha



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