



# PROCESSING OF CARDAMOM

(Ellettaria Cardamomum)

Elevation:	Above 600m
Rainfall:	1500-2500mm
Spacing:	2 x 2.5m
Plants per hectare:	2000

## Agricultural and botanical aspects

A branching perennial herbaceous plant that grows to a height of 3m. As it requires shade it is usually grown under natural forest cover. The inflorescence is on a panicle which arises from the rhizome. The flowers develop in groups of two or three and into oblong green capsules.

Pre-bearing age two - three years

## Harvesting

By definition, 'processing' does not involve harvesting. However, one cannot produce a good product from badly harvested materials. Correct harvesting techniques could be said to be the most important factor in the production of a high quality final product. One of the main reasons very little cardamom from Sri Lanka is of the top quality grade (Lanka Green) is because of poor harvesting practices. The main problem is immature harvesting.

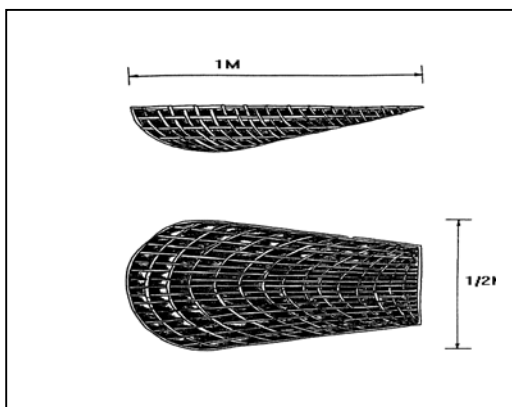
## Immature harvesting

The main reasons for immature harvesting is the fear of theft. If the crop is picked correctly when it is mature the higher yields and higher value of the final product may offset the losses due to theft.

Another reason for immature harvesting is that people cannot wait to pick the crop at the correct time, as they need money urgently.

Through extension officers, correct harvesting should be encouraged.

## Correct harvesting



If a cardamom capsule is ripe, it can be detached from the panicle (stem) without undue force. One should work from the base of each panicle until the capsules cannot be removed without applying undue force. A ripe capsule has black seeds inside compared to the white seeds of an immature capsule.

Figure 1: winnowing basket

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## Cleaning

The crop should be cleaned before processing. The first stage is to remove dust and dirt using a winnowing basket, see Figure 1. This can be made locally from bamboo, palm or other leaves. Someone used to this work can remove the dust, dirt and stones quickly and efficiently (eg they could clean 100kg of cardamom in an eight hour day). Small machines are available for cleaning but they are rarely cost effective.

After winnowing the crop needs to be washed in water, all that is needed is two or three 15 litre buckets. For larger quantities a 1m<sup>3</sup> sink/basin with a plug hole needs to be constructed, this can be made out of concrete.

However, the water must be changed regularly to prevent recontamination by dirty water. Only potable water should be used.

## Pre-treatment

After the cardamom capsules have been washed, the stalks are removed.

Soaking the cardamom capsules in 2-5% sodium bicarbonate for ten minutes improves colour retention. Sodium carbonate is also used in Sri Lanka but there is much dispute whether this method works.

## Drying

This is by far the most important section in the process. The inability to adequately dry the produce will, at the very least slow down the whole process and possibly lead to mould growth. Any cardamom with even a trace of mould cannot be used for processing. The sale value of mouldy cardamom can be less than 50% the normal value. In extreme cases the whole crop can be lost.

Green dried cardamom receives a premium in West Asia so drying has to be done in such a way as to preserve the green colour. The drying temperature is 50°C. The present system involves allowing the humidity of the drying chamber to build up for 2 hours and then to bring the humidity down. It is thought the initial high humidity 'cooks' the cardamom and inactivates the enzymes that break down the chlorophyll. Also no light is allowed in the drying chamber.

There are specially designed cardamom barns for the drying of cardamom. Various cardamom driers can be seen in Figures 2 & 3.

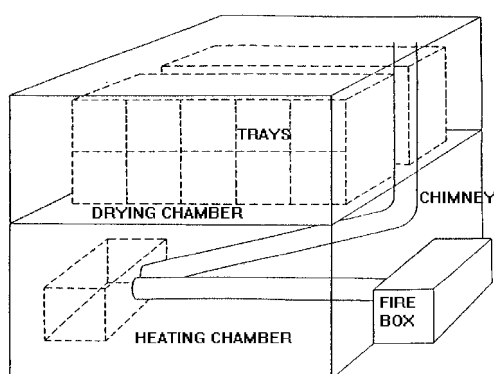


Figure 2: Drier

## Grading

In some cases the crop needs to be graded, eg high quality packaged products for export.

Cardamom is graded by colour and size and this is done by hand. The deeper the green colour and the larger the capsule, the higher the grade for cardamom.

## Grinding

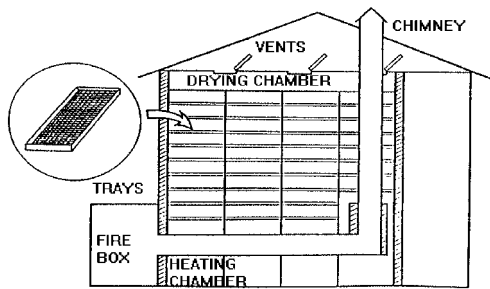


Figure 3: Tray drier

Grinding is a means of adding value to a product. However, it is fraught with difficulties. With a whole product it is easy to assess its quality, whereas with a ground product it is very hard. The fear of adulteration and the use of low quality produce is justified.

Because of this there is a great deal of market resistance. This market resistance can only be overcome by consistently producing a good product.

## Packaging

Packaging material

Packaging of cardamom, especially if it is ground requires polypropylene. Polythene cannot be used as the flavour components diffuse through it.

Simple sealing

The bags can be sealed simply by folding the polypropylene over a hacksaw blade and drawing it slowly over the flame of a candle. This is extremely uncomfortable as the hacksaw blade heats up and burns the hands of the operator. However, this is a very common technique

Sealing machines

A sealing machine will speed this operation up considerably and produce a much tidier finish (which is very important).

The cheapest sealing machines have no timing mechanism to show when the bag is sealed and they have a tendency to overheat.

Sealing machines with timers are desirable. The machines come in many sizes. For most work an 8 inch (20cm) sealer is sufficient. Eye catching labels should be sealed above the product in a separate compartment and holed so the package can be hung up in the shop.

## Storage

A well designed and secure store is essential. The optimal conditions for a store are: low temperature, low humidity and free from pests. The store should be located in a shaded, dry place. To keep humidity as low as possible only fully dried products should be stored in it. The produce should be checked regularly and if it has absorbed too much moisture it should be dried again.

To prevent pests entering, the roof should be completely sealed. Mosquito netting should be placed over the windows, and the doors should be close fitting.

### Standards

	US Government requirements & ASTA	British standard
Moisture %	<11.0	<13.0
Volatile oil %	< 3.0	< 4.0
Extraneous matter (% by weight)	0.5	
Mould (% by weight)	1.0	

### Trade

	Consumption of world product %
West Asia	60
Scandinavia	16
Other European countries	14
USA	2.5
Japan	3.0
Rest	4.5

### Uses

The major use for cardamom is to make 'Kahwa' coffee in West Asia. In Scandinavia it is used to flavour bread.

### Equipment suppliers

Note: This is a selective list of suppliers and does not imply endorsement. by Practical Action

Sealing machines  
Doboy Limited  
2 Blaydon Road  
Sandy  
SG19 1RB  
United Kingdom  
Tel: +44 (0)767 82911  
Fax: +44 (0)767 291763

Hulme Martin Limited  
6 Brownlow Mews  
Guilford Street  
London  
WC1N 2LD  
United Kingdom  
Tel: +44 (0)20 7242 5448  
Fax: +44 (0)20 7242 2044

Thames Packaging Equipment Company  
Senate House  
Tyseen Street  
London  
E8 2ND  
United Kingdom  
Tel: +44 (0)20 7254 7132  
Fax: +44 (0)20 7241 0559

Gardners Corporation  
6 Doctors Lane  
P B No 299  
New Delhi 110 001  
India  
Tel: +91 11 334 4287/334 3640  
Fax: +91 11 371 7179/684 1886

Kaps Engineers  
831 GIDC  
Makapura  
Vadodara 390 010  
India  
Tel: +91 43178

Shaco Enterprises  
161/163 R R Mohan Roy Road  
Pharthana Samaj  
Mumbai 400 004  
India  
Tel: +91 (0)22 364646

FMC Corporation  
Machinery International Division  
P O Box 1178  
San Jose  
California  
95108  
USA

Doboy Iberica SA  
Rio Escalona 25  
Valencia  
46023  
Spain  
Tel: +96 3619412  
Fax: +96 3693239

Al Packaging Materials Limited  
85-105 Stainsley Road  
London  
E14 6JT  
United Kingdom  
Tel: +44 (0)20 7987 6361  
Fax: +44 (0)20 7987 3050

### References and further reading

*Spice Processing* Practical Action Technical Brief  
*Cinnamon* Practical Action Technical Brief  
*Coriander* Practical Action Technical Brief  
*Cumin* Practical Action Technical Brief  
*Nutmeg and Mace* Practical Action Technical Brief

Samarpan Fabricators Pvt. Limited  
Plot A 182/A 183 Lane Z  
Road 16  
Wagle Industrial Estate  
Thane 400 604  
India  
Tel: +91 594842

Chinar (Pvt) Limited  
Plot 33  
St 10  
Sector 1-9  
Islamabad  
Pakistan  
Tel: 51 411181

China Light Corporation  
Economic and Technical Co-op  
Tianjin Company  
10 Youyi Road  
Tianjin  
China  
Tel: 756287 / 750360

Adelphi Manufacturing Company Limited  
Olympus House  
Mill Green Road  
Haywards Heath  
RH16 1XQ  
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Fax: +44 (0)444 440272

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