

Subject: Food Technology

Production of Courseware
e-Content for Post Graduate Courses



Paper No. : 10 Technology of Spices and Condiments

Module : 14 Chillies: Drying of chillies



Development Team


Principal Investigator Prof. (Mrs.) Vijaya Khader, Ph.D
Former Dean, Acharya N G Ranga Agricultural University

Paper Coordinator Prof. Dharmesh Chandra Saxena
SLIET, Longowal

Content Writer Miss Syed Insha Rafiq & Prof. Dharmesh Chandra
Saxena SLIET, Longowal

Content Reviewer Prof. (Mrs.) Vijaya Khader, Ph.D
Former Dean, Acharya N G Ranga Agricultural University
Dr. MC Varadaraj , Chief Scientist CSIR-CFTRI, Mysore

Description of Module	
Subject Name	Food Technology
Paper Name	10 Technology of Spices and Condiments
Module Name/Title	Chillies: Drying of chillies
Module Id	
Pre-requisites	
Objectives	
Keywords	

 **Pathshala**
पाठशाला
A Gateway to All Post Graduate Courses

14.1. Harvesting

By definition 'processing' does not involve harvesting. However, one cannot produce a good quality 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. For processing, chillies should not be picked until it starts going red.

14.2. Cleaning

The crop should be cleaned before processing. The first stage is to remove dust and dirt using a winnowing basket. 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 chillies 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 are two or three 15 litre buckets. For larger quantities a 1m³ sink/basin with a plughole 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.

14.3. 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 or discolouration. Any produce with even a trace of mould cannot be used for processing. The sale value of mouldy chilli can be less than 50% the normal value. In extreme cases the whole crop can be lost.

14.4. Drying during the dry season

During the dry season, sun drying is usually adequate to dry the produce. The simplest and cheapest method is to lay the produce on mats in the sun. However, there are problems associated with this method. Dust and dirt are blown onto the crop and unexpected rain storms can re-wet the crop.

A solar dryer avoids these problems. The simplest type is the cabinet solar dryer, which can be constructed out of locally available materials (eg. bamboo, coir fibre or nylon weave). For larger units (over 30kg/day an 'Exell Solar Dryer' could be used, However, the construction costs are greater and a full financial evaluation should therefore be made to ensure that a higher income from better quality spices can justify the additional expense.

14.5. Drying during the wet season

During the wet season or times of high humidity, which often coincides with the harvest of the spices, a solar dryer or sun drying can not be used effectively.

An artificial dryer, which uses a cheap energy source, is necessary. This may be a wood or husk burning dryer or a combined wood burning and solar dryer. Figures 3-6 show a combined wood burning and solar drier which is based on the McDowell Dryer and has been used in Sri Lanka.

14.6. Over drying

Care needs to be taken to prevent over drying of the crops. A drier operator will soon learn how to assess the moisture content of the crops by hand. The final moisture content should be 10% wet basis.

14.7. Grading

In some cases the crop needs to be graded, e.g. high quality packaged products. Chillies are graded by colour and size this is done by hand. The brighter the red colour the better is quality.

14.8. Grinding

Grinding may also add value but must be done carefully as there are difficulties. A whole, intact product can be easily assessed for quality whereas a ground product is more difficult. There is a market resistance to ground produce due to fear of adulteration. This can only be overcome by producing a consistently high quality product and gaining the confidence of customers. There are basically two types of grinders - manual grinders and mechanical grinders. A grinding mill has to be placed in a separate and well-ventilated room because of dust.

14.9. Manual grinding mills

There are many manual grinders that could be used to grind chilli. An experienced operator can grind about 20kg in an eight hour day. However, this is hard and boring work. A treadle or bicycle could easily be attached to the grinder which will make the work easier. With this system one person could grind about 30kg in one day. Work needs to be done to find out the degree of fineness the consumer wants. The grinding mills then need to be set so that they produce the desired ground product. For small-scale production, (up to 100kg/day) a series of these grinders is all that is needed. For larger scale production units, a mechanical grinder would be required.

14.10. Mechanical grinding mills

Horizontal plate, vertical plate or hammer mills are suitable for grinding chillies. A grinding mill has to be placed in a separate and well-ventilated room because of the dust. As above the grinding mill needs to be adjusted so that it grinds the chillies to the desired fineness.

14.11. Packaging

Packaging of these products, especially if they are ground requires polypropylene. Polythene cannot be used as the flavour components diffuse through it.

14.12. 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. However, this is extremely uncomfortable as the hacksaw blade heats up and burns the hands of the operator. However, this is a very common technique.

14.13 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.

14.14. 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 doors should be close fitting.