COPRA
Dryers

Ensure
Quality copra,
Quality oil and
Remunerative price

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Introduction

Copra is the dried kernel of coconut, which is a highly valued commodity in the world market for oil seeds, oils and fats. With an oil content of about 65-70%, copra is the richest source of fat. The quality of milling copra determines the quality of oil and the residual meet.

Basic requirements for obtaining good quality of copra are fully matured nuts from selected varieties with proper storage, seasoning of nuts for a few days and adequate drying to bring down the moisture content to 5-6%. The commonly used methods for coconut drying are sun drying, conventional drying and indirect hot air drying.

Sun drying , the traditional system of copra drying, is by spreading the cups (split open coconut) on any open surface. It takes about eight days for sun drying of copra. Deposition of dirt and dust on wet meat during drying results in deterioration of copra quality. Cloudy weather and low temperature also reduce the quality of copra.

Further, during rainy season, conventional drying using copra atti is being followed for drying copra . However, this method requires more fuel and more drying time (60 hrs). The drying copra contacts with smoke leading to discolouration which affects the quality of copra and oil. Hence fetches less remunerative price in the market.

In this direction, CPCRI has developed a series of copra dryers with various sizes and capacities. The drying method of copra has been standardised through the principle of indirect hot air drying using these dryers. Of which, small holders copra dryer and shell fired copra dryer are widely popular among the coconut growers. The characteristics of these dryers are given below:

Small holders copra dryer

- Simple in design and safe to operate
- Capacity is 400 nuts/batch
- Coconut shell, husk and any dry agricultural waste can be used as fuel
- Controlled combustion ensures economic use of fuel
- Time required for drying is 34-36 hrs
- Useful during monsoon season when sun drying is not possible
- Temperature control ensures uniform and perfect drying
- Portable and fabricated locally
- Can be used to dry arecanut, cardamom, cocoa, pepper etc.
- Quality of dried produce is good, as smoke does not come in contact with the produce
- Requires only three sq.m. area and carry easily by 2-3 persons
- Drying cost Rs. 2.00 per kg copra

Shell fired copra dryer

- Natural convection dryer with unique furnace
- Capacity is 1000 nuts/batch
- Require less fuel
- Time required for drying is 24 hrs.
- Same coconut shell used as fuel other wise wasted
- Less expensive when compared with other dryers
- Once ignited, the shell produces heat for about six hours
- Labour requirement is less
- Drying cost Rs. 1.25 per kg copra

Drying principle

The dryer comprises of a drying chamber, plenum chamber, burning cum heat exchange unit and chimney with regulators. The produce to be dried is kept in the drying chamber. As the fuel is burnt in the drying chamber, the GI sheet surface becomes hot by conduction. This heat is transferred to the surrounding fresh air entering from the bottom, by radiation and convection. This generates a convection air current and the hot air moves up through the wet produce in the drying chamber. The hot air laden with moisture escapes through the top of the drying chamber. A dial thermometer fixed just below the drying platform will help to monitor the drying temperature.

Drying method

The step by step procedure for operation of the dryers is as follows:

(a) Small holders copra dryer

- Load the split cups into the drying chamber with the first 2-3 bottom layers facing up and the rest facing down.
- Keep coconut shell as fuel in the wire mesh tray in the center of cylinder, ignite and close.
- Feed fuel as and when required and maintain the drying temperature at 70°C by adjusting the valves in the chimney.
- Remove the shells after 8-10 hrs. of drying.

Small holders copra dryer loaded with split cups

- Continue drying after a few hours of tempering, as the migration of internal moisture to the surface of the kernel is slower.
- Keep cups from which shell could not be removed at bottom layers facing upwards and the kernels freed from shells over that.
- Remove shells from remaining cups at the end of 15 hours.
- Rake the copra cups every two hours for uniform drying.
- Carry out drying for four days with overnight breaks till the moisture content of copra reaches 6% for safe storage.

(b) Shell fired copra dryer

- Load the split cups in two chambers (1000 cups each) with cups facing upwards in lower chamber and cups facing downwards in the upper chamber.
- Arrange the coconut shells facing downward one over the other in one layer towards the sides of both fuel trays, then fire and close. About 80 coconuts shells are required in a tray at a time.
- Remove the shells from the cups after 12 hours of drying.
- Place the cups in chambers again and carry out drying for 12 hours with overnight break till the moisture content of copra reaches 6% for safe storage.
- Reduce fuel to half for the third loading onwards.

- Thermal efficiency of the dryer is in the range of 25.25 to 26.48%.

Scope for enterprises

Economic viability per unit per month of small holders copra dryer and shell fired copra dryer for quality copra making is as shown below :

Small holders copra dryer

Number of batches	: 8
Number of nuts used for drying	: 3200
Production of copra (Kg)	: 640
Selling price of dry copra/Kg	: Rs. 32
Sales turnover	: Rs. 20480
Total expenditure	: Rs. 19200
Net profit	: Rs. 1280

Shell fired copra dryer

Number of batches	: 12
Number of nuts used for drying	: 12000
Production of copra (Kg)	: 2400
Selling price of dry copra/Kg	: Rs. 32
Sales turnover	: Rs. 76800
Total expenditure	: Rs. 72000
Net profit	: Rs. 4800

The above data indicate that enterprises on quality copra making using above dryers will be viable employment and income generating units for rural youth and women self help groups.

Availability of dryers

Small holders dryer is available with Kerala Agro Industries Corporation @ Rs 8000/dryer. Shell fired dryer will be made available through ATIC, CPCRI as per order @ Rs.28000/dryer (service tax extra).

For further details contact :

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Extension publication : March 2006

Compiled by : T.Vidhan Singh, B.T. Rayudu and Smt. S. Leena

Photo credit : K. Shyama Prasad

Published by
Dr.V. Rajagopal,
Director,
CPCRI, Kasaragod-671 124,
Kerala, India