COPRA PRODUCTION

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It appears that copra production has been practised in Sri Lanka from the early times of the establishment of coconut plantations by Europeans. Copra is the dried Kernel, and preservation of various food times such as paddy, chillies, fish, meat and spices by drying was well known then.

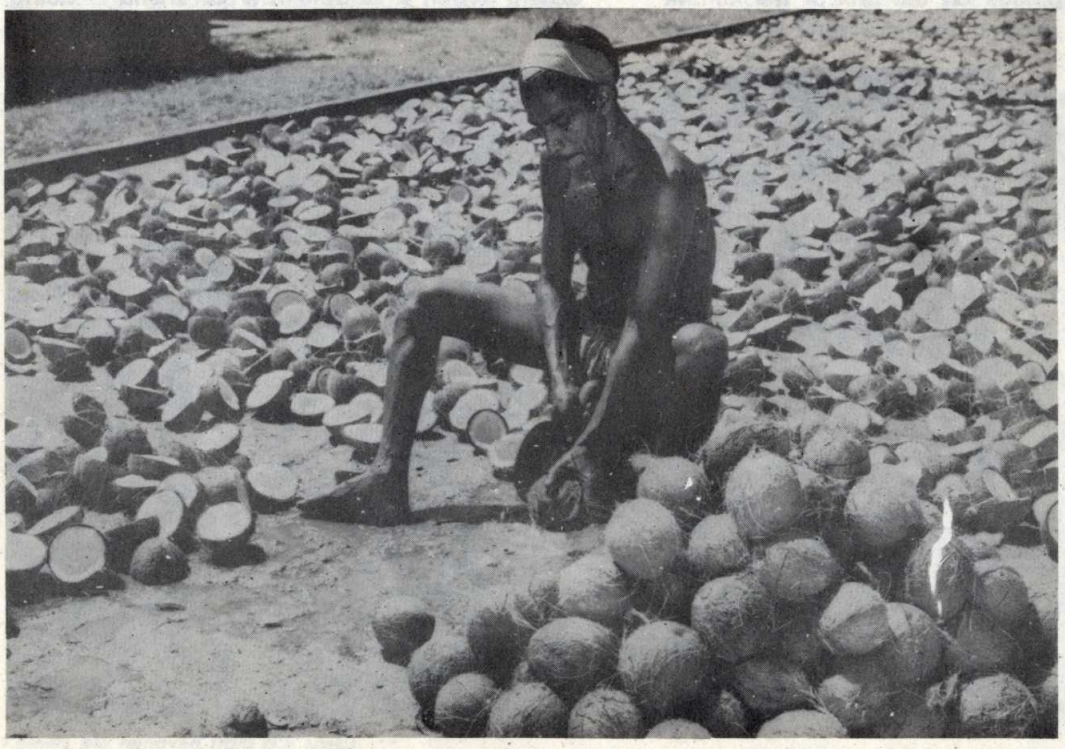
The fresh coconut kernel contains about 35–45% of water, 37% of oil while the balance is composed of proteins, carbohydrates and minerals. The kernel is firmly attached to the shell and cannot be dried intact. Also, it has to be dried within about two months of harvesting to obtain best copra.

Basically, there are two types of copra manufactured in Sri Lanka. They are: (a) estate copra which is mass produced and then milled to obtain oil and (b) edible copra (also called white copra) which has a limited foreign market.

(a) **Milling Copra**

Normally milling copra is graded according to the quality of production, the best being the (Milling Superior) grade used in the production of high-quality oil. Ordinary milling grade copra is divided into Milling ordinary No. 1 and milling ordinary No. 2 Milling ordinary No. 1 copra usually contains less than 10% moisture. Milling ordinary No. 2 is the copra cured from immature, germinated or spoilt nuts.

The basic requirements to produce good quality copra are: (i) well-matured ungermi-



Splitting of nuts begins by about 6 a.m.

nated coconuts, (ii) a copra kiln constructed to standard specifications and (iii) cemented or concreted platform for sundrying the split nuts. This platform or the brick paving should be constructed so as to receive optimum sunlight for drying. A platform of 9 m×9 m (30′×30′) would be suitable for a producer with a daily outturn of 5000 nuts.

The copra kiln recommended by the Coconut Research Institute gives very good results. The details of this kiln can be supplied on request.

Curing of milling copra

Well-matured nuts are husked and brought to the platform. Normally splitting of nuts begins by about 6 a.m. The split nuts are then spread on the platform and allowed to dry until about 3 p.m. Splitting of nuts early in the day has been found to be advantageous as 7–hour sundrying could reduce the moisture content by about 2%–4%. In addition, if the split nuts are carefully laid face upwards, the ultraviolet rays of the sun reduce discoloration, making the copra whitish. Sundrying also reduces the cost of firing.

Around 3 p.m. the coconut halves are collected and placed on the grill of the kiln. A grill built on a fire chamber of 3.5 m×1.5 m (12′×5′), can accommodate 2200–2500 split nuts. After spreading, the height of the split nut heap should be about 30 cm.

The firing should begin by 5 p.m. Coconut shells are lit to produce heat. Some kiln owners use coconut husks and fronds to obtain heat, but these produce excessive smoke which affects the quality of copra thus produced. Coconut shell is considered an ideal firing agent due to its minimal smoke and optimum heat production.

Shells from about 250 nuts are used for the first firing, These shells are arranged in two double rows 30 cm apart with each double row 15 cm away from the centre of pit. Thus the two double rows are 30 cm apart. Each row is about 3.35 cm (11 feet) long.

While arranging the shells, each shell is fitted into the cavity of the next, with the inner side of the shells facing the back wall of the fire pit. The row of shells is lit from the end closest to the back wall and it takes about 5–6 hours to complete the burning of these rows. Once this is over, the fire pit is left undisturbed until 6 a.m. the next day, during which time it cools down. When a double row of shells is being

By about 3 p.m. coconut halves are transferred to the kiln.

burnt the temperature on the grill normally rises to about 60–70°C.

The second firing starts at 6 a.m. on the second day again with two double rows of shells. The shells are lit by 6 a.m. and continue burning for 5–6 hours. In the evening, the cups are turned over so that those on top of the layer are brought to the bottom and *vice versa*. Immediately afterwards, the third firing is done, once again using two double rows of shells. The fourth firing is done on the morning of the third day.

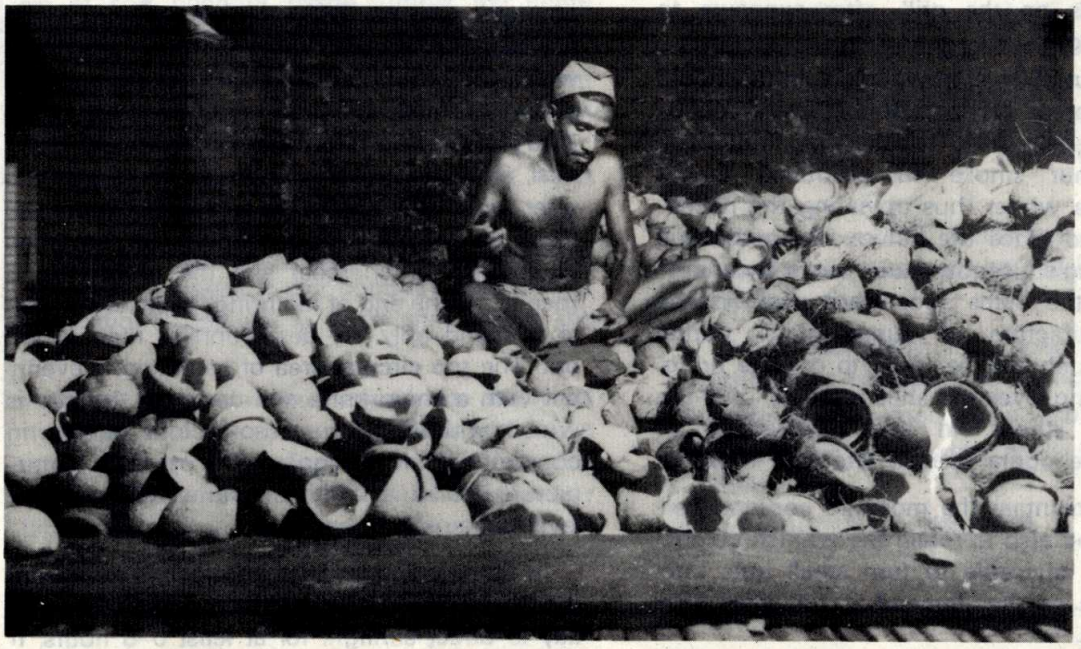
The partly dried kernels are removed from the shells either in the evening of the third day or in the morning of the fourth day. These cups are then placed on the grill, and the fifth firing is done with one double row of shells. Five hours after the completion of the fifth firing, the sixth firing is done using a single double row of shells. Afterwards, the cups are turned over, and depending on the degree of dryness, the seventh firing could be done using either a single or a double row of shells. About 6 hours after the completion of the seventh firing, well made copra is removed from the grill while any partly cured copra is left on the grill to be given another firing using either a single or half a row of shells as required.

In milling superior grade copra the moisture content should remain below 6%, cups of this copra are hard, crisp and smooth and break cleanly with a snap exposing a sharp straight edge with a uniform pearly lustre, indicating uniform drying. Underdried copra tends to be flexible when pressed.

The entire firing procedure requires about 1300 shells. One of the most important aspects of copra curing is the turning of copra, which will ensure uniform drying and prevent charring and discolouration. The amount of partially dried copra can be further reduced by re-arranging kernels at the time of turning so that these near the wall are relocated in the centre and *vice versa*.

Strong blowing burns the shells much quicker and reduces the heat. Under such circumstances the pit door should be partially blocked.

Generally, about 90% of the copra manufactured by this method remains uniformly dried. Well-dried copra with a moisture content of 6% or below could be safely stored up to a period of three months. The Fatty acid content of oil extracted from this type of copra conforms to the export standards. Imperfectly dried copra cannot be kept for long periods. Oil extracted



Kernels are removed from the shells.

from such copra does not meet the export standards with regard to the fatty acid content etc. This type of oil is not at all suitable for edible purposes but could be used for soap manufacture.

Manufacture of edible copra

Edible copra can be manufactured using one of the three methods described below:

(i) **Sundrying:**

This can be done in areas of high sunlight intensity and longer duration such as Kalpitiya and Puttalam. The coconuts will only have to be split and sun dried. It is advisable to cover the split nuts with netting to protect them from birds and other animals. At dusk the coconut halves will have to be transfered to a temporary shed to prevent exposure to dew during the night.

(ii) **Kiln drying:**

Edible copra could also be made using an ordinary copra kiln, using the method described earlier for the manufacture of milling superior grade copra. Changes that will have to be effected in the manufacture of edible copra are:

(a) The cups should be placed face downwards on the grill, after exposure to sunlight.

(b) About 300 g of powdered sulphur should be spread on each double row of coconut shells used for the first firing. The sulphur smoke so produced makes copra whiter thus obviating the necessity to place the halves facing the grill during subsequent turn-overs. By adopting the same procedure used in the manufacture of super grade copra, steps should be taken to operate firing, turning-over and shell removal, until the final stages. In the manufacture of edible copra special attention must be

be paid to maintain the moisture content well below 6% and also to retain the whitish colour. It is mostly advisable to turn small nuts into edible copra as the demand is for small size copra halves.

(iii) **Manufacture of edible copra using coconut shell charcoal:**

In this method, shell charcoal is used instead of coconut shells for heat generation. As charcoal produces intense heat without smoke, the copra is not discoloured. As described earlier, nuts split in the morning are sun dried. The cups are then sorted and only the well-matured halves are spread on the grill for manufacture of edible copra. The cups should be placed facing downwards to enable them to receive optimum heat and the thickness of the layer should be 30–45 cm (1–1½').

About 45 kg of shell charcoal are arranged in two rows, similar to the arrangement of double rows of shells, for the first firing. The charcoal row should be about 15–20 cm (6–8") wide with an elevated centre sloping towards either side.

A metal tray of size 45×22×5 cm containing 2kg charcoal mixed with 300 g powdered sulphur is kept between the two rows of charcoal at the centre of the fire chamber. Then the rows of charcoal and the charcoal in the tray are both lit simultaneously. The first firing takes about 24 hours to completely burn the charcoal rows. When the firing chamber has cooled sufficiently for a person to enter, another two rows using 40 kg of charcoal will have to be arranged, and the copra on the grill has to be turned. The second firing is then activated, which too would last 24 hours, after which the copra is turned again, and then exposed to the third firing using two rows with 40 kg of charcoal. This firing too continues for 24 hours after which the shells are removed. Then with least delay, two shorten rows are arranged with 20 kg of charcoal and the fourth fire is then lit. At the end of the firing, copra is allowed to cool and only the best copra is then sorted out. The top circular area of each cup is evenly cut with a sharp knife and cavity of the cup is wiped with a piece of soft cloth dipped in coconut oil before bagging. The copra so manufactured is of a whitish lusture and moisture level remains below 6%.

In order to obtain best results, it is necessary that the split nut halves are exposed on the first day to direct sunlight for at least 6–8 hours. If

however, adequate sunlight is not available on certain days 45 kg of charcoal could be used in the second firing instead of 40 kg to obtain good copra.

Turning of copra on the grill during manufacture is very important as otherwise drying will be uneven. If the above steps are followed edible copra conforming to export standards can be obtained without difficulty. Trials are being conducted at Coconut Research Institute to reduce the period taken to cure copra by the present method and to reduce the number of fuel shells now being used.