Preservation of Fresh Arecanut

P. P. Pillay, Professor of Applied Chemistry and
V. T. Gopalakrishnan, Research Assistant (Arecanut Scheme).

(Division of Applied Chemistry, University of Kerala, Trivandrum)

The arecanut palm, according to the results of botanical methods of investigation, appears to have had its original home in South East Asia or in the Philippines. It may have been introduced into India in ancient times from these countries, through ports used in ancient sea borne commerce. Kerala has some of these most famous ports and by virtue of its climatic conditions, has now the largest acreage under arecanut in India.

The chewing of arecanuts with betel leaf and lime has a very ancient history and is referred to in the Jataka tales and in ancient Pali and Jain scriptures. Nearly 2,000 years back, Susruta refers to chewing and gives the opinion that it is 'aromatic, stimulant, carminative, astringent, aphrodisiac and antiseptic". In Somadeva's Katha saritsagama, the chewing of pan, betelnut and lime along with "Panchasugandhikam" (camphor, long pepper, nutmeg and cardamoms) is referred to. Later, the Arab and early European travellers in India, also refer to betel chewing in appreciative terms. In Ceylon, the ancient Singhalese kings used pan with ignited pearls instead of lime, an extravagence reminding one of the costliest drink ever mbibed which was given by Cleopatra to Mark Antony by dissolving her finest pearl in vineger.

Popular methods of preservation in Kerala

From published records, it appears that Kerala is the only place, where arecanuts gathered during the season of plenty is kept under water almost in every home for daily use during off seasons. Even the rich people of Kerala use Supari or Kalipakku only during social functions and prefer the moist preserved nuts for daily use. In very old Malayalam literature, the "Vadakkan pattu", reference is made to the use of preserved arecanuts.

"Vayanadan vettilaem neettadakaem
Pothyakki madiyilum vekkunnuhdaem".

(Betel leaves from Wayanad and preserved betelnuts were made into a small bundle and kept in the cloth).

Its odour is referred to as follows :—

"Neettakaddade nattom kattu vannlattum".

(The smell of the preserved arecanut is intense when the wind blows).

The commonest method adopted throughout Kerala is preservation of ripe arecanuts under well or river water in earthenware pots covered with a lid. The size of the pot varies according to circumstances, one which the author saw was six feet in height and was said to preserve nearly 10,000 nuts Some people use glazed vessels. Bigger collectors dig small wells in moist places near their house, where even lakhs of nuts can be preserved. Another method, not so common, is to preserve the nuts under a wet mixture of sand and rice husk, which is more prone to sprouting and spoilage of nuts. Enquiries from shop keepers show that some people prefer so use slightly putrefied nuts. However, it is possible that they do so because they are cheaper. No one appears to like using dry nuts.

Analysis of arecanuts

Some of our simpler findings may be of general interest. Out of more than 100 ripe nuts bought in the open market at Trivandrum, in February 1958, not a single one sank in water. Out of nearly 200 nuts bought in July, 18% was found to be heavier than water and out of 200 bought in November, only 2% sank in water. The average density of the lighter nuts was found to be 0·9024 (limits, 0·8878 to 0·9172) and it was not due to occlusion of air. Half ripe nuts bought at any time were all heavier than water and had an average density of 1.037 (limits, 1.011 to 1.09). There was an unconfirmed suggestion that nuts which were not fully ripe were sometimes cut down and stored for a few days, when it has the appearance of fully ripe nuts and are sold as such. This might explain the heaviness of some of the ripe nuts.

The average weight of the fully ripe arecanut in this series was 24.5 gms (limits, 17.9 to 29 8 gms.) The average weight of the nut alone was 7.5 gm. (limits, 6.5 to 8.2 gms.) and that of the husk 17 gms. (limits 15 to

18 gms.) The half ripe nuts have an average weight of 11.7 gms. (limits 10 to 17 gms). The nut alone has an average weight of 4.5 gms (limits 3 to 5 gms), while the husk weighs 7 gms. (limits, 6 to 10 gms).

Chemical Analysis of Arecanut on dry basis.

	Ripe nuts average %.		Half ripe nu	average %
	Nut.	Husk.	Nut.	Husk
Tannin.	11.8%	2.4	11.4	2.8
Sugars.	20.1	9.3	17.9	4.6
Alkaloids.	0.47	Nil	0.43	Nil
Ash:	1.23	5.15	1.48	5.23
Ash as Sulphate.	1·97	5.82	2.01	5.96
Water content of fresh nut.	42.1	68.1	73.3	79·7

Suggested method for the preservation of Arecanuts.

The handicaps of the present methods of preservations are putrefaction and spoilage with consequent bad smell and taste and the development of mosquito larvae. This leads to economic loss and some danger to health. It was found from small scale pilot experiments that those portions of the ripe nuts, which float above water begins to develop fungus, bad odour and putrefaction from the third day onwards even if kept closed with a lid. Wriggling worms develop on the exposed surface and if kept open occasionally the water soon becomes a fertile breeding ground for mosquitos. So, the nuts have to be kept completely under water for better preservation

In our small scale experiments, we tried cold storage which was found to be quite efficient. But this method cannot be used except on a large scale and it may perhaps be questioned whether it would be sound economics in the case of a fairly cheap commodity like arecanut. In the case of half ripe nuts, we found that below 15°c. the central core develops ice crystals due to its great water content.

As regards the pots bought from the market for storing arecanuts, we found that all the fresh pots leaked considerably, even after being smoked or heated fairly well. It is better, therefore, to use either glazed pots or "Bharanies". We found that by warming the pots well and brushing with paraffin wax (which is a cheap commodity enough), the melted wax soaked into the pores of the pot, so that after cooling the pot becomes completely water tight. Such pots were used for large scale experiments.

In order to keep the nuts completely immersed in water, a feasible method for house holders or small shop keepers is to place above the nuts and under the water surface a clean cloth bag of washed sand.

In order to rectify the putrefactive changes in the nut, we have tried out the addition to the water, of small quantities of antiseptic and disinfectants (like formaldehyde, B-naphthol, Borav etc.). Out of 15 of them, we selected benzoic acid, which is easily the best, being cheap, easily available in any drug store and non-poisonous. For preserving 200 nuts in a pot, slightly less than 3/4 of an ounce of benzoic acid costing about 20 nP. at drug store rates, will have to be dissolved in 7 litres of hot water (o 25%), The nuts are put in first, the cloth bag of washed sand placed above it and then the solution poured into the pot. The whole thing will have to be closed with a lid. We have found that nuts kept in this manner, for 10 months remained quite odourless and well preserved although the water develops colour and there is some putrefaction in the husk alone. Unless the lid is tight fitting, there appears to be enough space for mosquitos to get in. To be completely free from mosquito larvae, another bag of dry sand over the lid is desirable. We found also that fully ripe nuts under benzoic acid solution are much more resistant to mosquito larvae than half ripe nuts under the same conditions.

As regards the colour of the preserved nuts, phenolic preservatives are found to be the worst, the colour being lost fairly quickly. Benzoic acid keeps the colour fairly well, but borax preserves it even better and has an alkaline pH. It has long been known to the vegetable canners in U. S. A. that in the preservation of the green colour of vegetables an alkaline pH is advantageous as it keeps the magnesium within the mucleus of chlorophyll, thus, preserving the green colour.

It was also found that often when there is a layer of top fungus, at one particular stage it stops growing and sinks down, perhaps through the lack of nutrients or through the action of a bacteriophage. This does not prevent the growth of top fungus at a later stage.

We are trying to induce householders and small shop keepers to try out this method and to give us the benefit of their findings. On analysis of nuts preserved in benzoic acid solution (0·25%) for 10 (ten) months, we found 0·00002 gms. in each gram of the kernel which is absolutely negligible.

At a time when the Government is trying its best to apply rigorously pure food laws, it is very desirable that this method is used voluntarily, out of considerations of health and wholesomeness as well as economic advantage.