

## Kalparasa to boost rural economy

'Kalparasa', fresh coconut sap (neera), if kept at room temperature for a couple of hours undergoes fermentation. Fresh sap is golden in colour, with a pH > 7 and has no foul odour. The traditional way of tapping, i.e. collecting sap in a mud pot kept at the top of the palm under atmospheric temperature for 8-12 hour, ferments the sap before collection itself. We have developed 'coco-sap chiller' with ice cubes inside, which maintains the temperature at 2-3°C for 10-12 hour, and also keeps the sap fresh and unfermented. It can be sold as a ready-to-serve health drink under refrigerated condition or can be processed into value-added natural products like sugar, jaggery, honey, syrup, kalpa chocolate (kalpa bar), kalpa drinking chocolate and kalpasugar-based milk sweets without addition of chemicals.

**K**ALPARASA (coconut sap), normally called as *neera*, is the phloem sap from the unopened coconut spadix. Kalparasa in sanskrit means 'life essence' of coconut tree is a very good health drink, rich in sugars, protein, amino acids, minerals, antioxidants, and vitamins. The sap is highly amenable to fermentation and, therefore, collection of fresh and unfermented sap is a challenging task in coconut. The lack of proper method of collection and suitable inhibitors to prevent fermentation led to the inclusion of both fermented (toddy) and unfermented (neera) sap under the category "toddy". Coconut is included as an excise tree (Section 11A) and the unfermented juice of coconut tree from which toddy can be produced is also interpreted as toddy. However, unfermented neera and toddy are two different products, chemically and nutritionally. Collection of hygienic and unfermented sap is a major challenge, and that has been resolved with the development of **Coco sap chiller**. The sap collected by coco-sap chiller at low temperature is observed to be entirely different from the neera collected by traditional method with or without preservatives; hence it was christened as "Kalparasa". Sap collected using the coco-sap chiller is golden brown in colour, delicious and free from contaminants like insects, ants, and pollen and dust particles.

### Coco-sap Chiller

Coco-sap chiller is a portable device characterized by a hollow PVC pipe of which one end is expanded into a box shape to house a sap collection container bound by ice cubes and the other end is wide enough to insert and remove a collection container of 2-3 litre capacities. Each side walls of the pipe from outside are covered with an insulating jacket excluding the portion of spadix holder which retains the internal cool temperature for a longer period. This coco-sap chiller is lighter in weight, water proof, easy to connect to the spadix, requires less ice, and retains low



Coco-sap chiller

temperature for longer period as compared to commercially available ice boxes.

Kalparasa collected by coco-sap chiller under low temperature meets the Codex Alimentarius (International Food Standards WHO/FAO) definition of juice as "unfermented but fermentable juice, intended for direct consumption, obtained by the mechanical process from extractable fluid contents of cells or tissues, preserved exclusively by physical means". Thus, it is amenable to be sold as fresh juice under local market with the adherence to quality standards. It does not require lot of machineries but requires cold chain or refrigerated system.

### Quality Standards

Simple quality standards have been developed to



Sale of Kalparasa in one of the Kiosks

check the quality of sap. The pH of the sap can be easily measured by hand held commercial pH meters. Fresh sap has anything above 7-7.5 pH. Depending on the pH sap, it can be used for different purposes.

- pH >7, ideal for promotion to health drink
- pH >6.5, good for preparation of sugar
- pH >6.0, can be used for jaggery
- pH >5.5, for concentrate.

Below pH 5.5 it is not good for value-added products, but can be used for preparation of vinegar. Other quality parameters easily judged are brix around 14; colour golden brown; and taste sweet and delicious.

### Product Diversification

The collected sap can be stored under sub zero temperature for long time. Deep freezers are used. The sap gets frozen and just before use; it is thawed to get original liquid form. However, under refrigerators, the quality gets deteriorated within few hours.

The hygienic, zero alcoholic sap collected by CPCRI method is easy to process in a natural way without the use of chemicals into various value added products which fetches premium prices both in domestic and international markets. Very good quality coconut sugar, jaggery, nectar or syrup can be produced in double jacketed cookers with temperature regulation and stirring facility.

Coconut sugar is the best natural sweetener also has several health benefits and thus has a high market potential. It contains all essential amino acids required for protein synthesis; contains considerable amount of minerals like calcium, magnesium, zinc, iron and copper; rich in electrolytes like sodium and potassium; abundant in dietary fibers which normalizes bowel movements and digestion; rich



Coconut sugar

source of phenolics which are potent and important contributors in reducing oxidative stress due to their antioxidant activity. Moreover its glycemic index is low and is in the range of 35 to 54 Gi/serving and eating a low glycemic index diet reduces the risk of chronic diseases such as Type 2 diabetes.

Kalpa bar, a coconut sugar based chocolate purely from plant based ingredients without milk is prepared. It is a joint venture between ICAR-CPCRI and CAMPCO (Central Arecanut and Cocoa Marketing and Processing Cooperative Ltd.). It contained cocoa powder, coconut sugar, natural vanilla extract and GMO



Kalpa bar-dark chocolate from coconut sugar

free sunflower lecithin. It is low in glycemic index. It does not contain any added artificial ingredients. It is delicious dark chocolate for a healthy life and can be stored under room temperature and does not melt. It is available in 30g slabs.

Kalpa drinking chocolate is an instant blend of low GI coconut sugar, crafted from fine cocoa powder formulated to produce the delicious drinking chocolate. It is to titillate the taste buds of

drinking chocolate lovers who want a healthier life style. It does not contain any artificial ingredients. The product is produced by a unique technology of instantisation and agglomeration technique that makes the product soluble instantly in hot or cold milk releasing the chocolate aroma. The product is filled in 200g PET jars duly sealed, case corrugated.

A Rich Source of

- Essential amino acids
- Electrolytes K and Na
- Dietary fiber
- Minerals and antioxidants
- Vitamin E and B Complex



ICAR - CENTRAL  
PLANTATION CROPS  
RESEARCH INSTITUTE  
Kasaragod - 671 124, Kerala  
Phone: 04994 232333,  
232894/5/6  
Web: www.cpcri.gov.in



Kalpa drinking chocolate from coconut sugar



Sweets prepared from Kalparasa

Methodology for the preparation of fresh coconut inflorescence sap (Kalparasa) based milk sweets have been standardized at West Bengal. The advantage is, it is another way of transporting neera to long distance in the form of sweets. These sweets impart the minerals, vitamins, valuable fiber which will not be available in the normal cane sugar based milk sweets and their glycemic index is low and hence good for healthy life.

Various value-added products can be prepared from Kalparasa which have huge demand in both domestic and international markets. As these products are nutritious, they fetch premium prices which will in turn empower farmers/growers who are dependent on coconut for their livelihood.

#### Value Chain

Complete package of technologies and machineries have been developed for the production to consumption value chain either for Kalparasa (neera) to be sold as

health drink or to be processed into value added products viz. coconut sugar, jaggery, concentrate, syrup etc.

On campus training module has also been developed for a minimum period of 2-3 days for those entrepreneurs who wish to collect Kalparasa and market it as juice or process into value-added products. The training includes the following aspects:

- Preparation of spadix (tree climbing, selection of spadix, threading, stroking, massaging, slicing of spadix)
- Connector fixing to the spadix
- Preparation of coco-sap chiller
- Connection of spadix to coco-sap chiller
- Collection of sap and its transport
- Quality analysis
- Precautions to be followed for the sale of fresh juice through the dispenser
- Pasteurization and bottling
- Processing to value added products
- Packaging
- Labelling.

#### Prospects

- Apart from assuring stable and lucrative income to the coconut farmer, switching to Kalparasa tapping provides multiple advantages to economy, environment, farmer and consumer. At present, Kalparasa is sold @ ₹125-150/litre. From this, about 30% goes to coconut farmer who offers his tree for tapping; the farmer income will get a big boost. A coconut tree annually could produce 500 litre of Kalparasa which is @ ₹30/litre is equivalent to ₹15,000. If the same tree was allowed for nut production it would have produced maximum of 200 nuts/annum which at the present price of ₹10/nut equivalent works out to ₹2,000/palm. Thus, there is a huge income advantage for the farmer.
- From collection till the Kalparasa reaches the consumers, involves lot of men and material. In this Kalparasa tapping, tappers or technicians are the most important. A tapper can tap 15-20 medium height trees per day. He earns anywhere between 20,000 to 25,000/month and it is a regular job. Similarly, skilled personnel are involved in transport, processing and marketing. Thus, it creates lot of employment opportunity.
- It is estimated that even if 10% of the 2 million ha coconut trees in the country are tapped, with conservative yield of a litre a day, ₹36,000 crores can be generated annually of which 25 to 30% will be the farmer's share. It is expected to improve the livelihood of coconut farmers, generate employment opportunity to youth and provide nutritional security.

For further interaction, please write to:

Drs K.B. Hebbar and M.R. Manikantan (Scientists), Dr. P Chowdappa (Director), CPCRI, Kasaragod, Kerala 671 124.