

Mouth-watering coconut products

Product diversification of coconut and development of value-added products have become very important in the coconut industry. The country has been successful in evolving appropriate processing technologies for the profitable utilization of some of the value-added products of the coconut palm. The products like packed coconut milk, coconut creams, spray dried coconut milk powder, sweet coconut chips, coconut water-based products like snow ball tender coconut, coconut water concentrate, vinegar and nata-de-coco, etc. have good commercial potential.

COCONUT tree fulfils the basic needs of people such as food, drink, shelter, fuel, furniture, medicine, decorative materials and much more. The coconut palm is the most useful palm in the world. Every part of the tree is useful to human life for some purpose or the other. Hence, the coconut palm is endearingly called “kalpavriksha” meaning the tree of heaven. It is the “heavenly tree”, “tree of abundance” and “nature’s supermarket”.

VALUE-ADDED PRODUCTS OF FRESH COCONUT

Desiccated Coconut

Desiccated coconut is the white kernel of fresh mature coconuts, shredded and dried down to about 2.5 % moisture content under strict hygienic conditions. It is used for human consumption, and it retains the original oil and protein of a fresh nut. Four standard grades based on particle size are produced: extra fine; fine (macaroon); medium and coarse. A limited amount of fancy cuts such as flakes, threads and chips are also produced for special markets. The main uses of desiccated coconut are for the confectionary industry, as a filling for chocolates and candies; the bakery industry for biscuits, cake and nut filling products; direct usage to decorate cakes, biscuits and ice cream and preparation of various snacks.

Major importing countries are the USA, Canada, Europe (UK, the Netherlands, Germany, France, Spain), South Africa, the Middle East and Australia. The major exporting countries are Philippines, Sri Lanka and Malaysia, together accounting for export 90 % of the world demand for desiccated coconut.

Coconut Chips

Coconut chips can be prepared by dehydrating the intermediate moisture coconut kernel. Intermediate moisture coconut kernel is the mature coconut kernel after

removing the moisture content of the kernel partially by osmotic dehydration by using osmotic mediums like sugar syrup. Coconut chips is crispy and can be packed and marketed in laminated aluminium pouches, which have shelf-life of 6 months. Since it is in ready-to-eat form, it could be used as snacks at any time. Coconut chips with different flavour can be prepared by adding the required flavour essence in the osmotic medium. Instead of sweet, salted coconut chips and medicated coconut chips can also be prepared by suitable change in the osmotic medium.



Coconut chips

Coconut Milk and Other Products

Bottled coconut milk: The processing technology involves extraction of milk from coconut, straining the milk in a cheese cloth into an aluminium kettle with 0.1 per cent benzoic acid before placing the kettle in an autoclave at 117°C for three minutes with steam injection. The temperature of milk in the pot is then brought down to 80-85°C, by running tap water. The milk is then

homogenised for about five minutes and bottled at 70°-80°C. The final product is as good as cow's milk and is highly nutritious.

Coconut cream. Coconut cream is a white, smooth, liquid cream with excellent coconut flavour and 20-30% fat, aseptically packed. The product is easily pourable and ready for direct serving or to be used in other food preparation. Coconut cream is essentially used as a fat source for the reconstitution of the skimmed dairy milk and as a component of infant milk powders.

Dehydrated coconut milk. This is produced on a commercial scale in the Philippines, Malaysia and India. In the Philippines, the fresh coconut milk is blended with small amount of additives such as maltodextrin or casein and is spray dried. The final product is marketed in laminated foil bags. The powder easily dissolved in water to form a milky white liquid with the flavour and texture of coconut milk.

Virgin coconut oil. The VCO is the oil obtained from fresh, mature endosperm (kernel-meat) of the coconut by mechanical or natural means, with or without use of heat, no chemical refining, bleaching or deodorizing and maintains the natural aroma and nutrients. It is called "virgin" because the oil obtained is pure, raw and pristine. Virgin coconut oil is suitable for human consumption in its natural form. It is the purest form of coconut oil, crystal clear, contains natural vitamin E and with very low, free fatty acid content (0.1 %). It has a fresh coconut aroma ranging from mild to intense depending on extraction process.

Edible coconut flour. After expelling the milk, the protein rich residue is dried and powdered to obtain a product called coconut flour. The flour so obtained typically contains 7-8 per cent protein, 3-5 per cent moisture and 17 per cent oil. It can be used as an ingredient in weight control foods because of its high fibre content. The protein contained in the flour is identical to that contained in the original fresh kernel. After blanching the residue has to dry. The dried coconut residue is passed through a special type of screw press under a specified expeller setting to reduce oil content of the residue. The de-fated flakes are dried to reduce its moisture content to 2.5-3.0 per cent.

Ready-to-Eat Food Items

Processes for preparation of ready-to-eat food items

such as coconut pickle and coconut chutney powder have been developed and standardized by CPCRI, Kasaragod. These products can be prepared from the byproducts obtained while preparing the coconut chips and virgin coconut oil.

PRODUCTS OF TENDER COCONUT WATER

Tender Water

The water of tender coconut, technically the liquid endosperm, is the most nutritious wholesome beverage that nature has provided for the people of the tropics to fight the sultry heat. It has caloric value of 17.4 per 100 g. "It is unctuous, sweet, promoting digestion and clearing the urinary path," says Ayurveda on warm coconut water. Most coconut water is still consumed fresh in tropical coastal areas. Once exposed to air, the liquid rapidly loses most of its organoleptic and nutritional characteristics, and begins to ferment. Tender coconut water is at its optimum level of acceptability and economic viability for commercial use when nuts are in 6-7 months maturity.

Snow Ball Tender Coconut

The tender coconut kernel is good for convalescing patients. It contains good amount of nutrients. Snow ball tender coconut is tender coconut without husk, shell and testa, which is ball in shape and white in colour. This white ball contains tender coconut water, which can be consumed by just inserting a straw through the top white tender coconut kernel. In this process coconut of 8-month



Coconut pickle

maturity is more suitable for making snow ball tender coconut. Making groove in shell before scooping out the tender kernel with water is one of the important unit operations. For this a suitable machine has been developed. It is nutritive and is a drink and a snack at the same time. Since there is no refuse after consumption, there is no scope for littering of the premises. Since snowball tender nut can be individually packaged and refrigerated under hygienic conditions, the shelf-life of this product is prolonged and therefore this ready-to-serve product is found to become popular.

Tender Coconut Kernel

The kernel of tender coconut is a good source of carbohydrate, fiber and other nutrients. Protein content is high in eight months old fresh coconut meat. The fresh

kernels left after the use of tender nut water is not put to effective use though it has high nutritional qualities. An effort on value-addition and product diversification has resulted in the development of new products such as tuty-fruity and candy from fresh kernels. Processed young tender coconut kernel could be in the form of sweetened dehydrated/dried (or) young tender coconut kernel in syrup (or) dried chips. These young coconut kernel products are ideal for dessert (or) snack food. Freshly made preserves are wholesome and attractive. The fruits mixed with cane sugar and subsequently drained and dried are called candied fruits. Candied fruit covered with a thin transparent coating of sugar is called a glazed fruit. When candied fruit is coated with sugar or sugar crystals are allowed to deposit on it, it is called crystallized fruit.

Tender Coconut Kernel-Candy

Young coconut is washed and split open to remove the water. The soft kernel is scooped out and cut into cubes. Pricking should be done with stainless steel forks. In the case of crystallized candy, after pricking, immerse the fruit pieces in dilute limewater (1.5 %) or alum (2 %) for few minutes before further processing. The pieces are washed 3-4 times with fresh water and blanched for 5 minutes in boiling water to make them soft. This assists in absorption of sugar and prevents enzymatic browning. Sugar (50 %) was spread on blanched fruit pieces in alternative layers. Syrup is drained on next day and enough sugar is added to raise the concentration of syrup to about 60°Brix. Citric acid is added as preservative. Coconut pieces are added, boiled and kept for 24 hours. The process is repeated every day until the Brix of residual syrup reaches 70-75°. The syrup is drained and pieces are dried in hot air and stored in glass bottles/polyethylene bags. In case of crystallized candy the concentrates of sugar syrup is continued till Brix value reaches 70-78°. Syrup is drained off and the pieces are rolled in finely ground sugar. Crystallized candy can be stored for 3 months.



Coconut chutney powder

Canning of Tender Kernel

A technology has been developed for canning/bottling of the kernel of tender nuts of different age groups. It is now possible to preserve kernels of 8 to 10 month old

nuts and also jelly-like formations obtained from 6 to 7 months old nuts. For canning, meat from 8-10 months old nuts is first scooped out, the adhering testa removed by using a sharp knife and the pared meat cut into stripes 0.5 cm thick and 6 cm long after washing. The stripes are put in cans to which is added 50° Brix syrup with 0.01 per cent sodium metabisulphite. The filled cans are then exhausted at 78°C, sealed and processed at 110°C for about 20 minutes. In the processing of jelly like meat obtained from tender nuts 6-7 months old, the meat is scraped out and to every part of the meat a corresponding amount of refined sugar is added. The mixture is cooked in low heat until the sugar is totally dissolved, hot packed in sterilized bottles and closed tightly. This product is likely to meet with widespread consumer acceptance.

Tender Coconut Punch and Cutter

Tender coconut water is a delicious and nutritious refreshing drink provided by the nature. Though the artificial soft drinks once tended to reduce the importance of tender coconut water, the propaganda in favour of tender coconut water by the Government, the Coconut Development Board and the proponents of naturopathy has now paved the way for its increased consumption. But the main factors deterring the large-scale adoption of 'tender coconut parlour' is the absence of simple tools for the easy extraction of tender coconut water. After drinking the tender coconut water some people like to eat the soft meat. For extracting the meat the tender coconut is placed on a wooden block or held in the left hand and a heavy machete is used to break it into two halves. The meat is then scooped out with a spoon. Considerable practice is necessary before acquiring the skill for cutting it open with least number of cuts and also for avoiding injury. People having this skill are only a few in number. Because of the risk involved, only a few people learn this craft. In view of this, a simple device has been developed by CPCRI, Kasaragod, for making a small hole in the coconut and a cutter to cut open into two halves.

Dressed Tender Nuts

It is a partially dehusked cool tender coconut. Since husk constitute major portion of the volume of tender coconut, partial portion of the husk is removed. The 7-8

months old green tender nuts are machine shaved to an attractive and uniform hexagonal shape, the smallest size possible that can retain the fluid safely inside. After removal of husk, tender coconut is wrapped with food grade polyethylene for aesthetic and hygienic purpose. These machine-shaved nuts are kept in cold rooms before serving. This will be the natural drink for several occasions like marriages, rituals, ceremonies, social functions, conferences, seminars, symposia, exhibitions, trade fairs etc.

PRODUCTS OF WATER OF MATURED COCONUT

In most of the countries coconut water is now a waste product of the coconut industries. As the nut matures, the composition of water especially the sugar content, also undergoes significant changes. During the early stages of development, invert sugar present in the water increases and reaches a maximum at 220 days. After this stage, sucrose appears in the water and the concentration of total sugars falls. Similarly the concentration of total solids also declines and subsequently disappears during germination.

Bottled Coconut Water

Bottling of coconut water for use as a soft drink is gaining popularity. Coconut water can be marketed as natural soft drink if preserved and packed. Non-carbonated beverage can be produced from the coconut water of mature nuts. The process involves collection of water, upgradation and pasteurisation, filtration and bottling. Coconut vinegar and nata-de-coco are prepared from coconut water, which has got industrial demand.

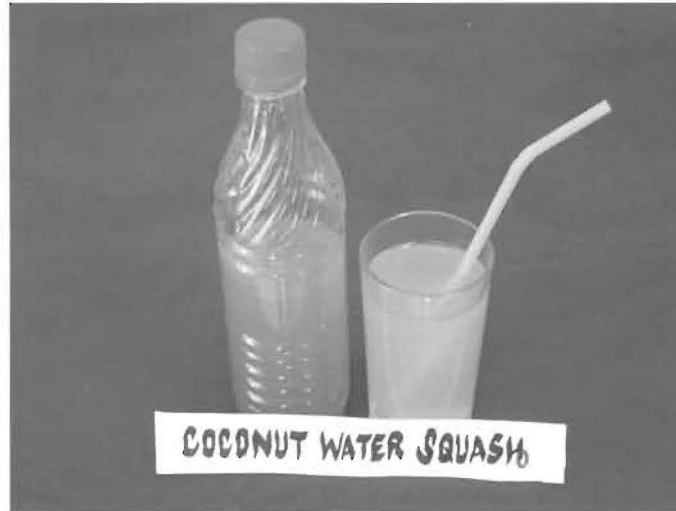
Nata-de-Coco

Nata-de-Coco is a gelatinous dessert delicacy formed by the action of a microorganism, *Acetobacter xylinum*, in a culture medium of sugared coconut water. The organism can be cultured either in coconut water or skimmed coconut milk. The culture solution is prepared by mixing coconut water with sugar and acetic acid at a stipulated proportion, which is inoculated with *Acetobacter xylinum* through a culture liquid made from pineapple waste. The cultured solution is distributed either in wide mouthed glass jars or plastic basins and is kept undisturbed for about 2-3 weeks.

Fermentation is completed in 2-3 weeks depending on the environmental conditions. Optimum temperature for nata production is in the range of 23-32°C. During this period a white or cream colored jelly-like substance forms and floats on top of the culture medium. At this stage the jelly-like substance or Nata would be about an inch thick. This surface growth is harvested, sliced into cubes, approximately 1x3 cm or according to requirement. Washed thoroughly to remove the acid taste smell. Drain the nata and add sugar equal to the weight of drained nata, mix thoroughly and kept over night. The next day stir the mixture to disperse any undissolved sugar. Add small amount of water. Heat the mixture to the boiling point, stirring occasionally. Add flavouring if desired. Set aside overnight and repeat the heating process until the nata is fully penetrated with sugar as evident by the clear and crystalline appearance of the sweetened nata and preserved in either tin containers or bottles.

RTS Coconut Water Beverage

Delicious beverages can be made from matured coconut water on blending with lemon juices or other fruit juices. These beverages could be an alternate for synthetic beverages, which are not good for health.



Coconut water squash

Coconut Water Squash

Coconut water squash can be prepared from mature coconut water using the ingredients sugar, citric acid, lemon juice, ginger and sodium benzoate. It contains sodium, potassium, vitamin C and carbohydrate with calorific value of 300 Kcal.

PRODUCTION OF COPRA AND COCONUT OIL

The dried coconut endosperm is called copra. The copra and the oil it contains are the principal products of coconut palm. With oil content of 65-70 per cent, copra is the richest source of fat. The essential requirement of copra drying is to bring down the moisture content of the wet fresh kernel from 45-55 per cent to 5-6 per cent. There are two types of copra – edible copra and milling copra. Edible copra is available in two forms – ball copra and cup copra. The production of edible copra in India is around 50,000 tonne per annum and the produce is utilised for sweet snacks preparations in households and as an ingredient in the processed foods.

Coconut Oil

In most of the coconut producing countries, copra crushing has become a traditional industry. Power driven 'Chekkus' or rotary mills, expellers and hydraulic presses are used for crushing on a commercial scale. The quality of copra is related to the quality of coconut oil. Copra is cut into small chips in a copra cutter. The chips are fed into steam jacketed kettles and cooked mildly at a temperature of 70°C for 30 minutes. After proper cooking, the cooked material is fed into the expeller continuously to extract oil. This oil is filtered by means of a filter press and stored in MS tanks. Bulk packaging is done in tin containers. HDPE containers and polymeric nylon barrier pouches are used for small consumer packing.



The farmer using tender coconut cutter

Coconut Sap Sugar

Coconut sap sugar is obtained by boiling freshly harvested toddy/sap in moderate heat to evaporate the water. It has a high potential for use as natural sweetener. This product is already exported to Australia, Japan, United Kingdom, France, Canada, Saudi Arabia, Germany, Hongkong, and Malaysia. Thailand is the major producer of coconut sap sugar.

Coconut sugar which is the main product of sap is good for both diabetics and non-diabetics. It does not induce hyperglycemia or high blood sugar because it has a low glycemic index (GI). Tests conducted by the Food and Nutrition Research Institute and Department of Science and Technology reveal that glycemic index (GI) of coconut sugar is only 35, much lower than that of cane sugar that is 50. According to Dr Trinidad P. Trinidad, a scientist at FNRI, GI is the glucose response of an individual from food relative to a standard glucose solution. Low GI is good for proper control and management of diabetes mellitus and has been shown to lower total and LDL. It is also good for weight maintenance, therefore preventing obesity.

Sap-based food products are rich in total solids, sugar (sucrose), protein, carbohydrates, phosphorous and amino acids, and more over income obtained from sap based products is 8-10 times that obtained from sale of nuts.

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OTHER VALUE-ADDED PRODUCTS

Coconut Sap

Coconut Sap is a sugar-containing juice, obtained by tapping the unopened spadix / inflorescence of coconut palm. It contains sugar, minerals and proteins. Sap yield is highly variable and it varies from day to day, season to season, spadix to spadix and tree to tree. Average yield of sap is 1.59 litres (0.6-3 litre) per palm per day. It is a rich source of ascorbic acid and carbohydrate with sucrose as the major sugar. It cools the body and known as refrigerant drink / health drink. Coconut sap contains high amounts of essential elements such as N, P, K, Mg and micronutrients (B, Zn, Fe, Cu).

Handbook of Rock Gardening on the Hills

by P. Kachroo and Priya Zarabi

Price: Rs 50; Postage: Rs 30

The small book consists of all useful information on rock gardening.
An amateur rock gardener should go through this publication

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