Publication No. : 151

COCONUT
PRODUCTS

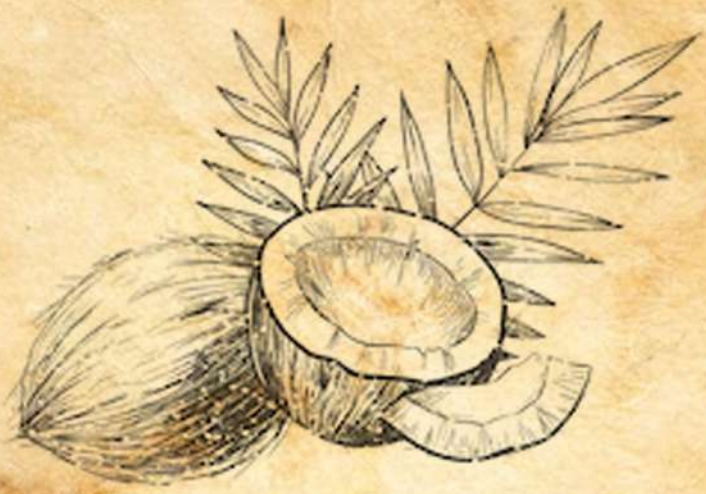
नारियल विकास बोर्ड
(कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार)
Coconut Development Board
[MINISTRY OF AGRICULTURE & FARMERS WELFARE, GOVERNMENT OF INDIA]

Published by: *Dr. B. Hanumanthe Gowda,*
Chief Coconut Development Officer, Coconut Development Board,
Ministry of Agriculture and Farmers Welfare, Government of India.

Published in: *September 2023 (Revised)*

Printed at : *M/s. KBPS, Kakkanad*

नारियल विकास बोर्ड
(कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार)
Coconut Development Board
[MINISTRY OF AGRICULTURE & FARMERS WELFARE,
GOVERNMENT OF INDIA]
KERA BHAVAN, KOCHI, KERALA. PH : 0484-2377266, 67
E-mail : kochi.cdb@gov.in
Web: www.coconutboard.gov.in



“Coconut is a food, beverage and an oil seed. In tender form it is consumed as a beverage and the kernel of matured coconut is an ingredient in many food preparations.”

Coconut Kernel
Based Food Products

- Virgin Coconut Oil
- Desiccated Coconut
- Coconut Milk
- Flavoured Coconut Mllk
- Spray Dried Coconut Milk Powder
- Coconut Cream
- Coconut milk yoghurt
- Coconut Chips
- Coconut Oil
- Copra

Coconut Water
Based Food Products

- Tender Coconut Water
- Vinegar
- Coconut squash
- Nata-de-coco

Coconut Inflorescence Based Food Products

- Neera
- Coconut Jaggery
- Coconut Palm Sugar
- Coconut Flower Syrup

Coconut Convenience Food Products

- Coconut Chunks
- Coconut Cluster
- Coconut Biscuit
- Coconut Candy
- Coconut Chocolate
- Coconut Burfi

Coconut Haustorium Based Products

- Haustorium Candy
- Haustorium based Ice Cream
- Haustorium Crunches
- Haustorium Cookies
- Haustorium Clusters

Coconut Shell Based Products

- Coconut Shell Powder
- Coconut Shell Charcoal
- Activated Carbon

Coconut Kernel Based Products

Virgin Coconut Oil

Virgin coconut oil is obtained from fresh and mature kernel of coconuts which are 12 months old. The oil is extracted from the kernel by mechanical or natural means with or without the application of heat. It is expressed using the hot process through the desiccated coconut route or extracted from coconut milk through fermentation or centrifuging which is often referred as the wet process resulting in production of cold pressed oil. Virgin coconut oil is suitable for human consumption in its natural state without refining. It is a very clear product and free from rancidity. Good quality virgin coconut oil does not have any suspended or other foreign matter or separated water. It doesn't contain any added coloring or flavouring substances.

Virgin coconut oil is rich in medium chain triglycerides including lauric acid. The unique composition of medium- chain fatty acids, antioxidants, and other bioactive compounds adds to the health and nutritional attributes of virgin coconut oil. Lauric acid content ranges from 45% to 55% of its total fatty acid composition. The high lauric acid content and MCTs in VCO contributes to the health benefits which have been proven by conclusive clinical studies.

The technology for production of virgin coconut oil through wet process is developed by CSIR-CFTRI in association with Coconut

Development Board and available for technology transfer for a fee of Rs.50,000/- plus GST. The technology for production of traditional virgin coconut oil is available with CDB Institute of Technology, Aluva.

ICAR-Central Plantation Crops Research Institute (CPCRI) has standardized the process technology and developed the machineries for the production of both hot and fermentation processed VCO, which is available for technology transfer.

Virgin coconut oil shall conform to the following standards as per FSSAI:	
Parameters	**Values**
Moisture	Not more than 0.5%
Acid Value	Not more than 4.0
Iodine Value	4.0 to 11.0
Saponification Value	Not Less than 250
Unsaponifiable matter	Not more than 0.5 %
Refractive Index at 40°C	1.4480 to 1.4492
Insoluble impurities	Not more than 0.05%
Polenske Value	Not Less than 13
Peroxide value	Not more than 15 milli equivalent /kg of oil
Test for Argemone oil	Negative
Test for Mineral oil	Negative

Installed Capacity - 5000 nuts/day	**Investment - Rs. 1.03 crore**
Incentive - 25% of the project cost subject to a maximum of Rs. 50 lakhs	

Desiccated Coconut

Desiccated coconut is obtained by drying the grated and shredded white meat of fresh mature coconut. Mature coconuts are dehusked, pared, shredded and dried. The product may be in the form of thin flakes, chips or shreds. The product shall be white in color, free from foreign matter, living insects, mould, dead insects, insect fragments and rodent contamination. The drying process reduces the moisture content of the coconut meat to below 3 - 5%.

Desiccated coconut powder is naturally vegan and gluten-free, making it suitable for those with dietary restrictions. Desiccated coconut powder is a versatile and convenient ingredient in the kitchen, providing a concentrated coconut flavor and texture without the need for fresh coconuts. It is widely available in grocery stores and can be used in a variety of sweet and savory recipes to enhance the coconut taste in dishes. It is available in different grades based on the fineness and granule size of the material.

FSSAI standards of desiccated coconut	
Parameter	Value
Moisture	Max 3.0%
Fat/Oil content	Min 60.0% (For DC - without oil extraction)
	35 to 60.0% (For Reduced Fat DC- with partial oil extraction)
Total Ash	Max 2.5%
Free Fatty Acid as Lauric Acid	Max 0.3%
Extraneous Vegetable matter	Max 15 units/100g
Foreign matter in 100g	Absent

Installed Capacity - 20,000 nuts/day	**Investment - Rs. 2.0 crore**
Incentive - 25% of the project cost subject to a maximum of Rs. 50 lakhs	

Coconut Milk

Coconut Milk is obtained by squeezing fresh grated coconut kernel. The fresh coconut kernel is disintegrated, macerated and comminuted and expelled to produce coconut milk, which is further processed and packed in containers. It has been used as a vital ingredient in a variety of Asian foods and desserts especially in India, China and Southeast Asia. This is an instant product, which can either be used directly/diluted with water to make various preparations such as fish & meat dishes, curries, sweets, deserts, puddings, cocktails, cakes, cookies, coconut jam, ice creams etc. Coconut milk can be used as a dairy-free alternative in recipes for those who are lactose intolerant or following a vegan diet. It can be used in place of regular milk in many recipes. There are different types of products based on the dilution and fat content viz light coconut milk and coconut milk.

The coconut milk shall have characteristic colour, flavor and odour. It may be processed by heat, in an appropriate manner, before or after being hermitically sealed in a container, so as to prevent spoilage.

The technology of coconut milk (flavoured and culinary) developed by CDB Institute of Technology, Aluva is available for transfer to prospective entrepreneurs. The technology transfer fee is Rs.50,000/- plus GST.

The product shall confirm to the following standards as per FSSAI:		
	Light Coconut Milk	**Coconut Milk**
Parameters	Values	Values
Moisture %	Max 93.4	Max 87.3
Total Solids %	6.6-12.6	12.7-25.3
Solids Not-Fat %	Min 1.6	Min 2.7
Fat %	Min 5.0	Min 10.0
pH	Min 5.9	Min 5.9

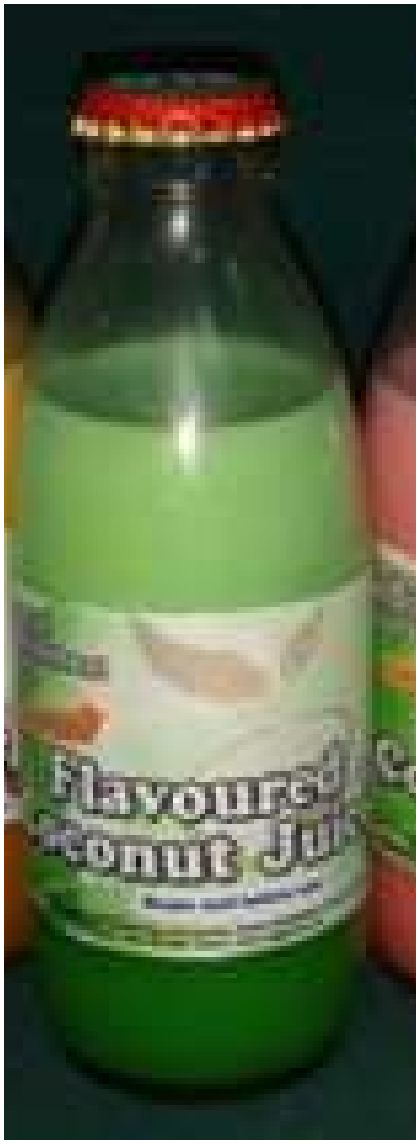
Installed Capacity - 10,000 liters/day

Investment - Rs. 1.37 crore

Incentive - 25% of the project cost or maximum Rs. 50 lakhs

Coconut Kernel Based Products

Flavoured Coconut Milk



Coconut milk has been used as a vital ingredient in a variety of Asian foods and desserts especially in China, India and Southeast Asia. Coconut milk can be processed as a nutritional health beverage with varying flavours according to consumer acceptability. Unlike cow's milk, coconut milk is lactose free so can be used as a milk substitute by those with lactose intolerance. The product has a shelf life of 6 months at ambient temperature.

Nutritional value of flavored coconut milk	
Parameter Value	Amount (%)
Energy Value (per 100 ml)	103.0 Kcal
Total Fat	4.62%
Saturated Fat	4.45%
Monounsaturated Fatty Acids	0.16%
Poly Unsaturated Fatty Acids	0.006%
Lauric Acid	2.42%
Total Carbohydrates	15.0%
Total Minerals	0.32%
Protein	0.5%
Total Solids	21.0%
Sodium	224 ppm
Potassium	56 ppm
Phosphorus	170.5 ppm
Calcium	28.6 ppm

(Source: Data generated at QTL-CDB)

Coconut Cream

Coconut cream is a rich, creamy substance that is extracted from the grated flesh of mature coconuts. It is thicker and more concentrated than coconut milk. Coconut cream is often used as a key ingredient in various culinary dishes, especially in Asian and tropical cuisines. Thus, coconut cream is a delightful and versatile ingredient that adds a distinct tropical flavor and creaminess to a wide variety of dishes.

Coconut cream is prepared by: using a significant amount of separated, whole, disintegrated, macerated or comminuted fresh endosperm (kernel) of coconut palm and expelled, where most filterable fibres and residues are excluded;

The product shall have characteristic colour, flavor and odour. It may be processed by heat, in an appropriate manner, before or after being hermitically sealed in a container, so as to prevent spoilage. The product shall be any of the following styles:

i. Coconut cream- It is the emulsion extracted from matured endosperm (kernel) of the coconut fruit with or without any addition of coconut water or water;

ii. Coconut cream concentrate- coconut cream concentrate is the product obtained after the partial removal of water from coconut cream.

FSSAI standards for coconut cream and coconut cream concentrate		
	Coconut Cream	**Coconut Cream Concentrate**
Parameters	Values	Values
Moisture %	Max 74.6	Max 62.6
Total Solids %	25.4 -37.3	Min 37.4
Solids Not-Fat %	Min 5.4	Min 8.4
Fat %	Min 20.0	Min 29.0
pH	Min 5.9	Min 5.9

Installed Capacity - 10,000 nuts/ day
Investment - Rs. 2.5 Crores
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs

Coconut Milk Powder

Coconut milk powder is a convenient and versatile product made from dehydrated coconut milk. Coconut milk powder refers to the dehydrated or spray dried product obtained by removal of water from the coconut milk obtained from fresh, wholesome kernels. It is commonly used as a substitute for fresh coconut milk in various culinary applications. Coconut milk is extracted from the grated flesh of mature coconuts, and then it is processed and dried to coconut milk powder. The product shall be smooth and free flowing in texture and creamish to white to off white in colour.

Installed Capacity - 40,000 nuts/day
Investment - Rs. 3.27 Crores
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs

The product shall conform to the following standards as per FSSAI:	
Parameters	**Values**
Moisture %	Not more than 2.5
Fat, on dry basis %	Not less than 60.0
FFA (of extracted fat as lauric acid)%	Not more than 0.2
Bulk density g/ml	0.3-0.45

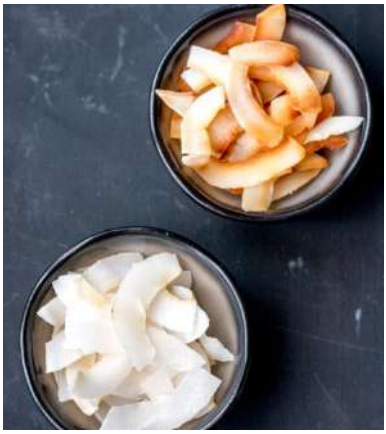
The technology for coconut milk powder by spray drying developed by CSIR- CFTRI in association with Coconut Development Board is available for technology transfer fee of Rs.5,00,000/- plus GST. The foam mat dried coconut milk powder technology is developed by ICAR-Central Plantation Crops Research Institute.

Coconut Chips

Coconut chips are thin slices or shreds of coconut meat that have been toasted or dried to a crisp and crunchy texture. They are a popular and delicious snack that offers the natural sweetness and flavor of coconut in a convenient and portable form. Coconut chips are commonly used as a healthy and satisfying alternative to traditional snacks like potato chips or sugary treats. Coconut chips retain the rich, tropical flavor of fresh coconut, and the toasting process enhances their nutty and slightly sweet taste.

Coconuts of the age 8-10 month old with reasonable water inside are selected for the production of coconut chips. Variant types of chips can be prepared by adding different types of essences and flavours such as Vanilla, Pineapple, Mint, Lemon Spicy etc. The technology for Coconut Chips in 6 different flavours developed by CDB Institute of Technology, Aluva is available for technology transfer . The technology transfer fee is Rs 1000/- per unit.

The technology for Coconut Chips in six different flavours developed by CDB Institute of Technology, Aluva is available for technology transfer



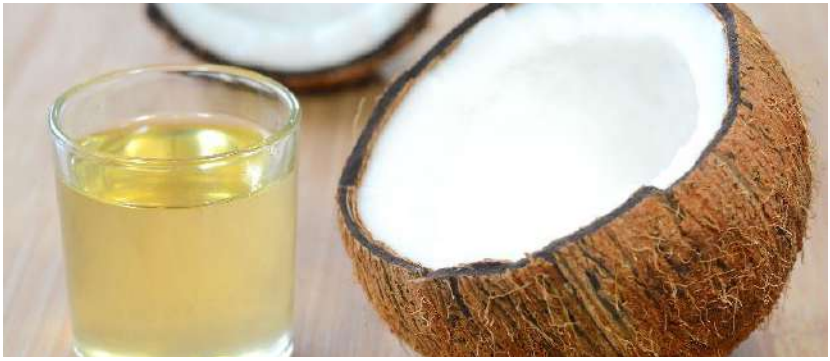
Nutritional Information of Coconut Chips

Sl. No	Parameters	Value
1	**Total Fat**	**43.95 %**
a)	Mono Unsaturated Fatty Acid(Oleic)	3.040%
b)	Poly Unsaturated Fatty Acid(Linoleic)	0.352%
c)	**Saturated Fatty acids**	**40.558%** (out of which 21.07% is Lauric acid)
2	**Total Minerals**	**0.14 %**
3	**Protein**	**3.72 %**
4	**Total Sugar**	**48.63 %**
5	**Dietary Fibre**	**12.06 %**
6	**Moisture**	**2.50 %**

(Source: Data generated at QTL-CDB))

Installed Capacity - 100 kg of chips per shift
Investment - Rs. 25.75 lakhs
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs

Coconut Oil



Coconut oil is a unique cooking oil as it contains the short and the medium chain saturated fatty acids. It finds extensive use in the food industry due to its characteristics such as easy melting behaviour, resistance to oxidative rancidity, pleasing flavour and good digestibility. Coconut oil is extracted from the kernel or meat of mature coconuts. It has gained widespread attention for its potential health benefits and various uses in cooking, skincare, and other applications. Good quality coconut oil shall be clear and free from rancidity, suspended or other foreign matter, separated water, added coloring or flavouring substances, or mineral oil.

Coconut oil is an important cooking medium in Southern parts of the country especially in Kerala State. Besides, the oil has varied industrial applications. It is used in the manufacture of toilet soaps, laundry soaps, surface active agents and detergents, hair tonics, cosmetics etc. It is used throughout the country as a hair oil as it helps growth of the hair. As a massage oil it has a cooling effect on the body. Owing to these qualities, coconut oil has a potential market in the country. Coconut oil is extracted from copra or the dried kernel using expellers which is very efficient with more recovery of oil. Traditionally it is extracted by using rotary chucks.

Installed Capacity - 15,000 nuts per day
Investment - Rs. 1.28 crore
Incentive: 25% of the project cost or maximum 50 lakhs

The coconut oil shall confirm to the following standards as per FSSAI:		
Parameters	**Expressed**	**Solvent Extracted**
Moisture and Volatile matter	-	Max1.0
Acid Value	Not more than 6.0	Max10.0
Iodine Value (Wijs)	7.5 to 10	7.5 to 10
Saponification Value	Not Less than 250	Min 250
Unsaponifiable matter %	Not more than 1.0	Max 1.0
Polenske Value	Not Less than 13	-
Refractive Index at 40oC	1.4480 to 1.4500	1.4481-1.4491
Flash Point (Pensky-martens),closedoC	-	90
Butyro-refractometer reading at 40oC	34.0 to 35.5	-
Test for Mineral oil	Negative	-
Test for Argemone oil	Negative	Negative
Peroxide Value	Max 10 milliequivalents of active oxygen/Kg oil	Max 10 milliequivalents of active oxygen/Kg oil
Odor	-	-
Lead	Max 0.1mg/kg	-
Arsenic	Max 0.1mg/kg	-
Caproic acid	ND -1.0%	-
Caprylic acid	4.0 - 10.0%	-
Capric acid	5.0- 10.0%	-
Lauric acid	44.0-53.2%	-
Myristic acid	13.0-21.9%	-
Palmitic acid	7.5-11.0%	-
Stearic acid	1.0-4.9%	-
Oleic acid	5.0-10.0%	-
Linoleic acid	1.0-2.5%	-
Linolenic acid	ND -0.2%	-
Eicosanoic Acid	ND-0.2%	-
Eicosenoic Acid	ND - 0.2%	-

Copra

Copra is the dried coconut kernel or endosperm processed from fully matured (12 month old) freshly harvested coconuts. Copra contains the highest percentage of oil compared to other oil seeds. It contains 15-20 percent carbohydrates, 9 percent protein and 4.10 percent crude fibre besides 65-68 percent fat. The copra made in India may be classified into two groups, edible and milling. Edible copra is the superior class copra which is raw consumed as a dry fruit and used for religious purposes, while milling copra is used for extraction of coconut oil. Edible copra is made both in the form of balls and cups while milling copra is made in the form of cups only.

The drying process may be done using traditional methods, i.e., sun- drying, or the use of mechanical dryers, such as kiln, flatbed and channel dryer. For sun drying of copra, splitting operation should be done within 4 hours and should be done early in the morning. Freshly split coconut should be dried immediately in a clean pavement with appropriate under lays. Fungal or microbial growth will set in on the meat surface when drying is delayed. Hot air dryers produce high quality grade copra. Hot air dryers prevent direct exposure of fresh coconut meat to fire since these utilize heat exchangers to transfer the heat energy from the firing chamber to the drying chamber. These dryers produce dried copra that is white, clean and free of smoke, mold and dirt. Copra should be dried uniformly to 6% moisture content.

Installed Capacity - 10,000 coconuts /day	**Investment - Rs. 30 lakh**
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs	

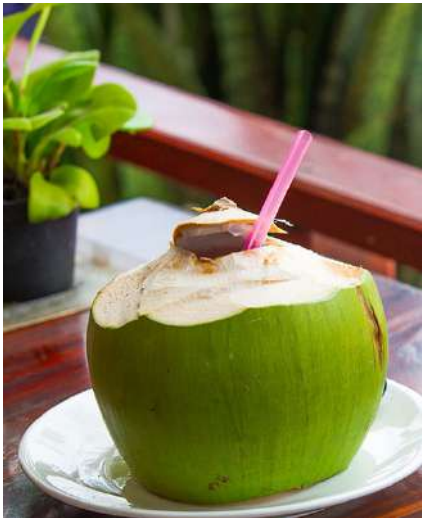
Coconut Water based Products

Packed Tender Coconut Water

Tender coconut water is the undiluted, natural, aqueous liquid endosperm of 6–8 month old coconut without addition of the solid endosperm. Tender coconut water is a natural and refreshing beverage; an excellent natural source of hydration due to its high water content and presence of electrolytes such as Potassium, Sodium and Magnesium. Tender coconut water is low in calories and fat. It also contains essential nutrients such as vitamin C, calcium and potassium.

Tender coconut water processing involves extraction, filtration, processing and packaging. It shall be packed either in hermetically sealed open top sanitary cans or in food grade plastic material or glass bottles or flexible packs or aseptic packages. The technology for processing of packed tender coconut water developed by Defence Food Research Laboratory(DFRL), Mysore in association with Coconut Development Board is available for technology transfer for a fee of Rs.3,50,000/- plus GST. The packed tender coconut water should comply to the following standard as per IS 18252 : 2023:

Quality standards for tender coconut water IS 18252 : 2023:	
Parameters	**Values**
Total soluble solids, g per100 ml, Max.	4.71
Reducing sugar, g per 100ml Min.	0.8
Sucrose, g per 100 ml, Min.	1.28
Total sugar, g per 100 ml, Min	2.08
Ash, percent by mass, Max.	0.62
pH	4.3 - 6.25



Installed Capacity - 15000 Tender coconuts /day	**Investment - Rs. 3.2 crore**
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs	

Vinegar

Coconut water vinegar is the natural vinegar that is made from fermented coconut water. It is a product derived from the natural fermentation of coconut water, resulting in a tangy and slightly acidic liquid that can be used for culinary and other purposes. The natural sugars present in coconut water are converted into alcohol by yeast, and then acetic acid bacteria further ferment the alcohol into vinegar. Coconut water vinegar can be used as a substitute for other types of vinegar in recipes, especially for a milder flavor profile.

The standard of vinegar should conform to the following FSSAI standard:	
Parameters	**Values**
Total Acid content (as acetic acid)	Not less than 3.75 %
Total Solids %	Not less than 1.5%
Total Ash %	Not less than 0.18%
Contaminants	It shall not contain sulphuric acid or any other mineral acid. It shall be free from any foreign substances or colouring matter except caramel.

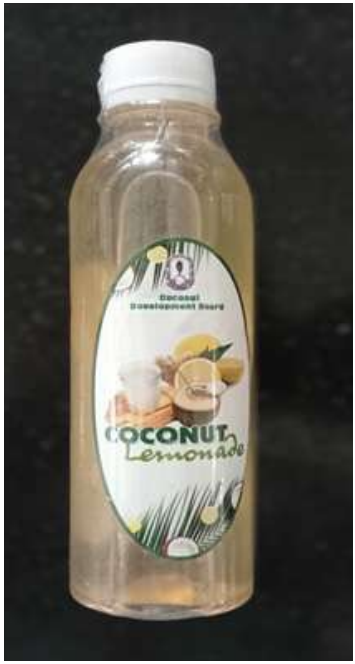
Installed Capacity - 1000 liters/day	**Investment - Rs. 10 lakhs**
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs	

Nata-de-coco

Nata de coco is produced through the fermentation of coconut water using Acetobacter xylinum, a type of bacteria that creates a cellulose substance. The cellulose forms a gel-like structure that gives nata its characteristic chewy texture. Nata thus produced should be harvested between 12 to 14 days. Nata that is allowed to grow more than 14 days is usually very tough and fibrous. Nata de coco has a distinct, chewy and slightly crunchy texture. It resembles small, translucent cubes that can be easily bitten into. Nata de coco has a subtle and mildly sweet flavor with a hint of coconut. Its flavor is not overpowering, making it a versatile ingredient in various dishes and desserts. Nata de coco is usually white, but it can also be found in other colors, often achieved by adding natural fruit flavors or food coloring. Flavored varieties, such as strawberry or lychee, are also available. Nata de coco is relatively low in calories and fat, making it a healthier option compared to some other desserts.

Installed Capacity - 50 kg/day
Investment - Rs. 10 lakhs
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs

Coconut Squash/Lemonade



Coconut lemonade is a refreshing and delicious drink that combines the tropical flavor of coconut with the tangy taste of lemons. It is a nourishing and refreshing, healthy soft drink concentrate prepared by mixing coconut water, sugar and natural preservatives like lemon and ginger. It is rich in vitamins and minerals with low calorie. The product has a shelf life of three months under ambient conditions. The product is a new item and is gaining popularity in Asia and Pacific countries

Installed Capacity - 1000 litres/day
Investment - Rs. 8 lakhs
Incentive: 25% of the project cost or a maximum of Rs. 50 lakhs

Coconut Inflorescence Based Food Products

Neera

The vascular sap collected from immature unopened coconut inflorescence is popularly known as Neera in fresh form. It is a delicious health drink and a rich source of sugars, minerals and vitamins. It is sweet and translucent. It is tapped from the coconut inflorescence and is filtered, pasteurized and bio preservatives are added to preserve the product. Treated Neera can be preserved in cans upto two months at room temperature. It can also be packed in tetra packs or glass bottles. It is an abundant source of minerals, vitamins and has a nearly neutral pH.

Quality Standards of Neera as per FSSAI		
Parameter	Fresh Coconut Neera	Processed Coconut Neera
Brix Min.	14.0	12.0
pH	6.0 - 7.5	5.0 - 7.5
Alcohol % Max	0.5	0.5
Total sugars % Min	13.0	12.0
Reducing sugars % min	1.0	1.0

Installed Capacity - 1000 litres/day	Investment - Rs. 2.5 Crores
Incentive: 25% of the project cost or a maximum of Rs. 50 lakhs	

Coconut Jaggery

Coconut jaggery is prepared by boiling fresh neera to 118-120° C and further cooled for solidification. The solid mass is known as coconut jaggery or 'gur'. Coconut jaggery is made in traditional coconut growing tracts in the country on a cottage scale. Calcium and phosphorus are the important minerals contained in coconut jaggery.

Nutritional value of jaggery		
Sl No	Parameters	Amount (%)
1	Moisture	9.1
2	Carbohydrate	87.54
3	Protein	0.72
4	Minerals	1.97
5	Fibre	0.46

Installed Capacity - 200 Kg/day	Investment - Rs. 15 lakhs
Incentive: 25% of the project cost subject to a maximum of Rs. 50 lakhs	

Coconut Palm Sugar

Coconut palm sugar is the crystallized form of sugar prepared from Neera concentrate. Coconut sap sugar is very delicious, has more nutrients and does not spike the blood sugar like other types of sweeteners. Compared with refined cane sugar, coconut palm sugar has a lower glycemic index, which makes it suitable for use by diabetic patients. Being a low GI food, people who consume coconut sugar will not experience sudden spikes in their blood glucose or blood sugar levels. This makes coconut sugar a healthy option as a healthy sweetner and is particularly beneficial for diabetic patients.

Coconut Flower Syrup

This is a product similar to jaggery with high mineral content and is a rich source of potassium. It has good content of sodium and is free from total fats and cholesterol. It is produced when fresh Neera is heated and concentrated into syrup. The syrup has comparatively low glycemic index, which indicates that low levels of sugar gets absorbed into the blood thus making it safe for diabetic patients.

Nutritional Value of Syrup		
Sl No	Parameters	Amount (%)
1	Total Soluble Solids	81.44
2	Carbohydrate	65.43
3	Protein	0.39
4	Minerals	2.00
5	Acidity	0.04

Installed Capacity - 200 litres/day
Investment - Rs. 15 lakhs
Incentive: 25% of the project cost or a maximum of Rs. 50 lakhs

COCONUT CONVENIENCE FOOD PRODUCTS

Coconut Chunks

Nutritional value of coconut chunks	
Parameters	**Value (%)**
Carbohydrate	64.14
Protein	1.84
Fat	24.5
Total minerals	0.38
Dietary Fibre	19.83
Moisture	4.2
(Source: Data generated at QTL-CDB)	

Fresh Coconut Kernel is a complete food rich in calories, vitamins and minerals. Fresh meat provides an abundance of vitamins, minerals, antioxidants and fiber. It also functions like a probiotic. Probiotics are very beneficial for the digestive system because they feed the good bacteria in the intestines. The fresh kernel can be eaten in many ways. It is a major ingredient in most of the sweets, desserts and savory dishes in India and in other Asian region. Fresh coconut slices or chunks can be eaten as a snack. Dehydrated coconut makes a nice chewy, squeaky snack. If it is dehydrated a little further, it becomes quite crunchy.

Coconut Milk Yoghurt

Yoghurt, which is the best probiotic food supplement, can be prepared from coconut milk by inoculating it with suitable starter cultures. Fat is partially removed and suitable fillers are added to make the consistency ideal for yoghurt. In addition to being vegan, coconut yoghurt also supplies several key vitamins and minerals and have live and active cultures just like milk-based yoghurts.

Nutritional Information of Coconut Milk Yoghurt	
Parameters	**Value (%)**
Carbohydrate (%)	18.1
Total Solids (%)	25.42
Fat (%)	4.89
Protein (%)	0.87
Ash (%)	0.68
Acidity (%)	0.69
Crude fiber	0.19
(Source: Data generated at QTL-CDB)	

Coconut clusters

Coconut clusters are naturally sweet, crispy and a healthy snack. It is prepared by combining coconut chips with edible healthy seeds. In addition to being delicious, the pumpkin seeds, sunflower seeds, and chia seeds will provide protein. They have a fresh, sweet, and slightly nutty taste. Seeds give more nutritional benefit to the product

Nutritional Information of Coconut cluster	
Parameters	**Value (%)**
Carbohydrate	56.18%
Moisture content	3.00%
Fat	21.49%
Protein	15.39%
Ash	1.61%
Fiber	1.69%

(Source: Data generated at QTL-CDB)

Coconut Biscuit

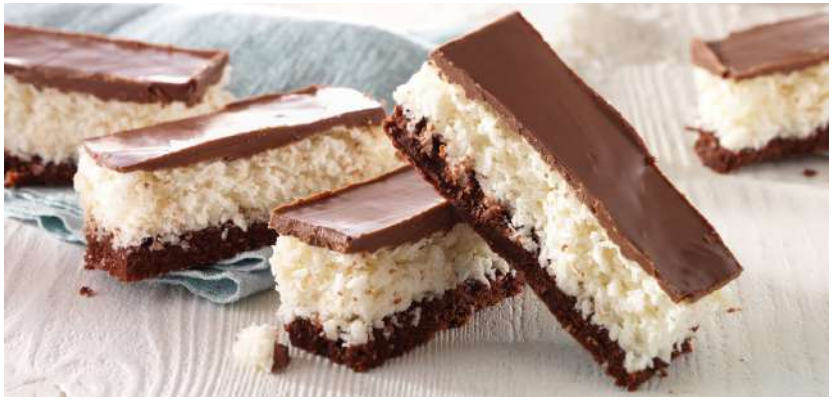
Coconut biscuits are ready to eat snack products prepared from maida and coconut powder. It can be prepared in different varieties through addition of cocoa, butter, ginger etc. The product has a shelf life of three months under ambient conditions. It is mainly consumed as a snack item. Coconut biscuits are highly nutritious and delicious with low calories and high fiber content and is one of the healthiest snack items which is quite popular and is in great demand in Asia and Pacific countries, USA, European countries, Middle East and African countries.

Coconut Candy

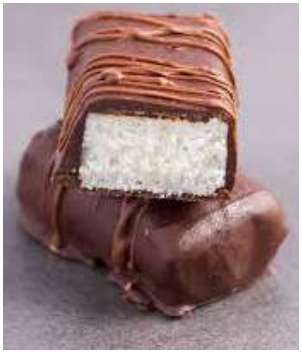
Coconut candy is prepared from caramelized sugar and grated desiccated coconut. Ingredients like ghee, milk etc adds to the delicacy of the product. The product is mainly produced in Asia and Pacific countries.

Hands on training for the preparation of candy is available at CDB Institute of Technology.

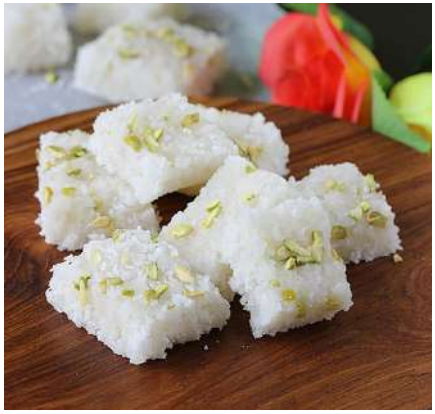
Coconut Chocolate



It is a sweet confectionery item prepared from coconut gratings, sugar, milk butter with a coating of chocolate. It is rich in protein, carbohydrate and fiber. It can be made more delicious through addition of cashew, badam and other dry fruits. The product has a shelf life of three months under refrigerated conditions. The product is having extensive demand in Europe, North America, Australia, Middle East and China.



Coconut Burfi

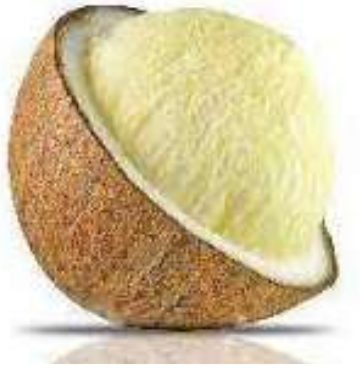


It is a snack prepared by roasting coconut gratings. A procedure for preparation of coconut burfi was standardized. Coconut gratings (after extraction of fat) is roasted, followed by addition of fat at the rate of three percent and sugar at ten percent. The product has a good nutritive value with protein (10.23%), Ash (2.1%) and carbohydrates (60.87%).

COCONUT HAUSTORIUM BASED PRODUCTS

Coconut haustorium with enormous nutrients is used as a natural edible product. The coconut sprouts are spongy in nature, creamish or white or light yellowish in colour.

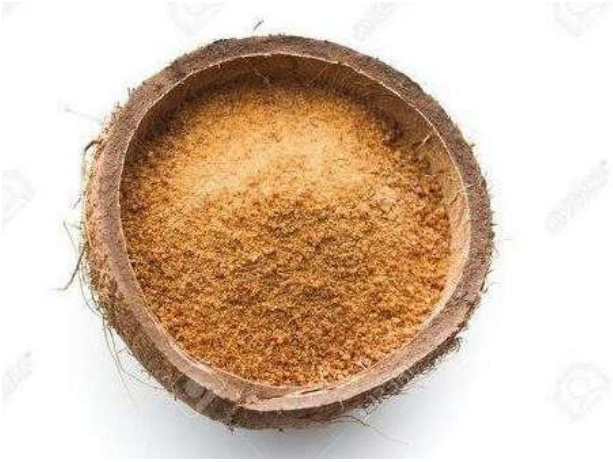
Haustorium is mostly used fresh but has a low shelf life. To overcome this constraint, the product has to be processed to more durable products thus adding value to coconut haustorium. Many novel value added products can be prepared with haustorium like haustorium candy, haustorium based ice cream, haustorium powder, haustorium crunches, cookies incorporating haustorium powder, fresh haustorium juice/ shake etc. and thus increase the consumption of haustorium by children and adults



Nutritional Value of Coconut Haustorium	
Parameters	**Value (%)**
Ash	1.05 ± 0.2%
Soluble sugar	44.2 ± 4.6%
Starch	24.5 ± 3.2%
Protein	5.50 ± 0.3%
Fat	1.99 ± 0.9%
Soluble dietary fibre	5.72 ± 0.4%
Insoluble dietary Fibre	20.3 ± 1.9%
Phenolics	146 ± 14.3 mg

Coconut Shell Based Products

Coconut Shell Powder



Coconut shell powder is a versatile and environmentally- friendly material produced from the outer shell of coconuts. It has various applications in industries.

Coconut shell powder is predominantly composed of cellulose, lignin and hemi-cellulose. It also contains small amounts of minerals, proteins and fibers.

Coconut shell powder is obtained by grinding or pulverizing dried coconut shells into a fine powder. The shells are first cleaned and further broken down into smaller pieces using crushers or grinders. The crushed shell fragments are then finely ground to create coconut shell powder. The powder from the pulverizer is fed into a cyclone and the parallel product is collected in bag filters. The level of fineness can vary based on the intended use of the powder. The ground coconut shell powder is sifted or sieved in a vibrating sieving machine to remove any larger particles or impurities, ensuring a consistent particle size.

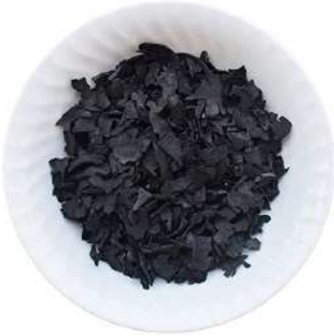
Installed Capacity - 20 Tons of shell/day
Investment - Rs. 2.46 crore
Incentive: 25% of the project cost or maximum Rs. 50 lakhs

Coconut Shell Charcoal

Coconut shell charcoal is a type of charcoal made from the shells of coconuts. Coconut shell charcoal's unique properties make it versatile and suitable for a wide range of applications, including cooking, grilling, air and water purification, cosmetics, pharmaceuticals, agriculture, and industrial processes. It has a higher porosity and larger surface area compared to other types of charcoal. This property is essential for adsorption processes, making it highly effective for removing impurities, contaminants, and toxins from air, water, and other substances. Coconut shell charcoal has a longer burning time compared to some other types of charcoal, such as wood charcoal and produces less smoke and minimal odor during combustion.

The manufacturing process of coconut shell charcoal involves several steps to transform coconut shells into a usable and marketable product. Carbonization, also known as pyrolysis, is the process of heating the dried coconut shells in the absence of oxygen to break down the organic materials and convert them into charcoal. This process involves subjecting the shells to high temperatures (typically around 600-900°C or 1112-1652°F) in a controlled environment, such as a kiln or a retort. The volatile components are driven off, leaving behind carbonized coconut shell. After carbonization, the charcoal is allowed to cool down gradually to avoid spontaneous combustion. Some manufacturers quench the hot charcoal with water to rapidly cool it and prevent further burning. This step helps preserve the integrity of the charcoal. Coconut shell charcoal shall be of the following two types: Type I – Coconut shell charcoal – pieces and Type II – Coconut shell charcoal – granulated.

International Coconut Community (ICC) quality standards for coconut shell charcoal	
Parameters	**Values**
Moisture	<10%
Volatile Matters	15% Maximum
Ash	<2% Maximum (m/m)
Fixed Carbon	75% Minimum
Foreign Matter	0.5% Maximum
Color	Black



Type I –
Coconut shell charcoal – pieces

Type II –
Coconut shell charcoal - granulated

Installed Capacity - 20 Tons of shell/day
Investment - Rs. 2.46 crore
Incentive: 25% of the project cost or maximum Rs. 50 lakhs

Activated Carbon

Activated carbon is obtained from the coconut shell charcoal through physical or chemical activation processes. Coconut shell activated carbon tends to be microporous and adsorbs the low molecular weight organic pollutants that are present in well water in an efficient manner. The process of activation is carried out in two stages. Coconut shell is converted into shell charcoal by carbonization process and then it is activated by reaction with steam at a temperature of 900-1100°C under controlled atmosphere in a rotary kiln. The reaction between steam and charcoal takes place at the internal surface area, creating more sites for adsorption. Temperature plays a significant role in the production and performance of activated carbon. Pore size and distribution influence the adsorption capacity and selectivity of the activated carbon. Below 900°C, the reaction becomes too slow and very uneconomical. Above 1100°C, the reaction becomes diffusion controlled and therefore takes place on the outer surface of the charcoal resulting in loss of charcoal. There are two types of activated carbon namely, powdered and granular. Powdered activated carbon is used for decolourizing vegetable oils, sugar solutions. pharmaceuticals etc. Granular activated carbon is used for absorption of obnoxious gases in industry, water purification, solvent recovery, in respirators and cigarette filters and as catalyst carrier.

Installed Capacity - 3 tons activated carbon/day	**Investment - Rs. 3.75 crore**
Incentive: 25% of the project cost or maximum Rs. 50 lakhs	

Requirements for Granular Activated Carbon as per IS 2752 : 1995 is as follows:		
Parameter	Values	
	*Type 1	**Type 2
Adsorption capacity for carbon tetrachloride, percent by mass, Min	55	-
Moisture, percent by mass, Max	5	5
Ash, percent by mass, Max	5	0
Hardness number, Min	90	90
Retentivity index, percent by mass, Min	45	-
Adsorption capacity in terms of iodine number, Min	900	450
Half dechlorination value, cm, Max	4	7
Surface area, m2/g, Min	900	550

* Type 1 - For use as a base for respirator carbons and solvent recovery
**Type 2- For use in water treatment

Requirements for Powdered Activated Carbon as per IS 8366 : 1989 is as follows:			
Parameter	Values		
	*Type 1	**Type 2	***Type3
Moisture, percent by mass, Max	15	15	15
Ash, percent by mass, Max	60	40	20
Matter soluble in water, percent by mass, max	-	1.5	0.5
Matter soluble in acid, percent by mass, Max	6	6	2.5
pH	5 to 8	5 to 8	6.5 to 7.5
Decolorizing power,mg/g, Min	50	70	205
Oil retention, percent by mass,max	30	-	-
Filterability, minutes, Max	46	-	-
Particle size(percent by mass, Min)			
passing through ISO-micron IS Sieve	100	100	95
passing through 125-micron IS Sieve	95	95	95
passing through 75-micron IS Sieve	80	80	80
Iron (as Fe), percent by mass, Max	-	-	0.05
Chlorine (as Cl), percent by mass, max	-	-	0.35
Sulphate(as S02), percent by mass, max	-	-	0.8
Cyanogen compounds	-	-	To pass the test

*Type 1 - for decolorizing vegetable oils, fats and waxes
**Type 2 - for decolorizing sugar solution, corn sugar solution
***Type 3 - for decolorizing pharmaceuticals

Technologies available with CDB

S. No	Technology Developed	Technology Developed by Board in association with
1	Spray died milk powder	Central Food Technological Research Institute, Mysore
2	Coconut spread based on matured coconut water concentrate and coconut dietary fiber	
3	Production of virgin coconut oil through cold press	
4	Production of cheaper and healthier blends of coconut oil with other vegetable oils	
5	Preservation and packing of tender coconut water	Defense Food Research Laboratory, Mysore

Technologies developed by CDB Institute of Technology,

S.No	Products /Type of training
1	Processing and packing of flavoured coconut milk and culinary milk
2	Coconut vinegar production from matured coconut water
3	Nata de coco
4	Preservation and packaging of Neera and other value added products
5	Coconut Chips in 6 different flavours
6	Coconut Wraps in 3 different flavours (Plain, Spicy, Chocolate)
7	Tender Coconut Ice cream
8	Coconut chunks
9	Coconut Milk based Yoghurt
10	Coconut Haustorium based products (Haustorium candy, Haustorium based ice cream, Haustorium powder, Haustorium crunches, cookies incorporating Haustorium powder, fresh Haustorium juice/shake)

Contact: CDB Institute of Technology (CIT), Technology Development Centre and Quality Testing Laboratory
Dy. Director, Technology Development Centre, Quality Testing Laboratory and CIT,
Coconut Development Board, Keenpuram, South Vazhakkulam,
Aluva, Ernakulam District. Pin - 683 105. Kerala
Ph: (0484) 2679680 Email: cit-aluva@coconutboard.gov.in, citaluva@gmail.com

List of coconut product manufacturers is availabile in
https://coconutboard.gov.in/CoconutProductManufactures.aspx

Make

Coconut Milk and Milk powder

a part of your daily diet

Vegan alternative to dairy milk
Suited for lactose intolerant people

Use coconut milk and milk powder regularly. It enhances the taste of your daily diet and cooking is no more dreary.

अधिक जानकारी के लिए बोर्ड की वेबसाइट देखें: www.coconutboard.gov.in

नारियल विकास बोर्ड

(कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार)

कोची, केरल, फोन: 0484-2377266, 67

For more details, visit Board's website: www.coconutboard.gov.in

Coconut Development Board

[MINISTRY OF AGRICULTURE & FARMERS WELFARE, GOVERNMENT OF INDIA] KOCHI, KERALA. PH : 0484-2377266, 67

Virgin Coconut oil *for* All ages

Consuming
Virgin Coconut oil
in nominal quantity
makes your body
fit & healthy

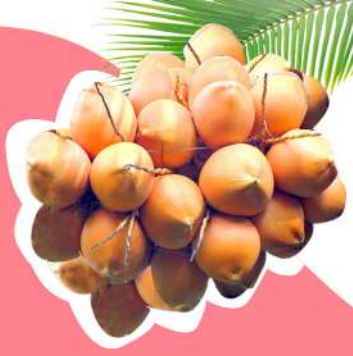
Helps to protect your
body from skin ailments

Keeps skin soft and supple •
Retains moisture •
Anti microbial •
with anti ageing property •

अधिक जानकारी के लिए बोर्ड की वेबसाइट देखें: www.coconutboard.gov.in
नारियल विकास बोर्ड
(कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार)
कोची, केरल, फोन: 0484-2377266, 67

For more details, visit Board's website: www.coconutboard.gov.in
Coconut Development Board
[MINISTRY OF AGRICULTURE & FARMERS WELFARE,
GOVERNMENT OF INDIA] KOCHI, KERALA. PH : 0484-2377266, 67

नारियल क्षेत्र में सफल स्टार्ट अप के लिए



नारियल प्रौद्योगिकी मिशन (टीएमओसी) के अधीन नाबिबो की क्रेडिट बद्ध वित्तीय सहायिकी प्राप्त करें

नारियल प्रसंस्करण इकाइयाँ स्थापित करने हेतु वित्तीय सहायता उद्यमियों के लिए परियोजना लागत का 25 % अधिकतम 50 लाख रुपए तक और अनुसूचित जाति/अनुसूचित जनजाति की महिला उद्यमियों के लिए परियोजना लागत का 33.3 % अधिकतम 50 लाख रुपए तक।

अधिक जानकारी के लिए बोर्ड की वेबसाइट देखें: www.coconutboard.nic.in

नारियल विकास बोर्ड

(कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार)

कोची, केरल, फोन: 0484-2377266, 67

For more details visit Board's website: www.coconutboard.nic.in

Coconut Development Board

[MINISTRY OF AGRICULTURE & FARMERS WELFARE, GOVERNMENT OF INDIA] KOCHI, KERALA. PH : 0484-2377266, 67