



Diversification of Coconut Based Products in India

Dr. Prabodh Halde, Nidhi Agarwal*

Head, Technical Regulatory Affairs, * Exe. Technical Regulatory Affairs , Marico Ltd.
7th floor, Grande Palladium, 175, CST Road, Kalina, Santa Cruz (East) , Mumbai

Abstract

Coconut is a member of palm family and is widely acclaimed as “Kalpavriksha or Gift from Heaven” because of it’s a great boon for healthy life of mankind in terms of nutritional and economical benefits. India is the third largest producer among the top four coconut producing countries. The country ranks first in productivity among all member countries of Asian and Pacific Coconut Community (APCC). The wide scope of application of coconut oil offering new opportunities to coconut oil market tends to verify its growth potential in India as well as globally. Global coconut oil market is anticipated to grow at the CAGR of 6.37% from 2018 to 2025. However, it is expected that the global virgin coconut oil market will be growing steadily at a CAGR of around 10% by 2021. Key factor influencing this growth is the increasing interest in nourishing lifestyle. Though India has huge domestic demand of coconut and coconut products in line with higher productivity, extensive efforts are still lacking for its effective utilization. Integrated development of cultivation as well as industry only would lead to the growth of coconut sector sustainably.

Coconut is a boon crop for farmers which help in generating revenue and improve the socio-economic life. Coconut plays an important role in contributing to India's GDP of about Rs. 15,000 crore. India contributes significantly a high percentage of world's coconut production and the coconut productivity is also high in India.

Introduction

Coconut is a versatile crop coupled with numerous nutritional benefits. In addition to its abundance of nutritional profiling, it is an absolute source of food, medicine, cosmetics and natural fiber. Its by-products are utilized for producing various other varieties

of goods. Therefore, it is a boon crop for farmers which not only help in generating better revenue but improve the socio-economic life with its fruits throughout the year. Coconut plays an important role in contributing to India's GDP of about Rs. 15,000 crore India contributes significantly high percentage of world's total production and the productivity of the country is also high. In India, Tamil Nadu tops in the productivity of coconut, but production is high in Karnataka and Kerala tops in the area under coconut cultivation.

Table 1: Area, Production, Productivity of Coconut in India (2016-17)

	Area (*000 ha)	Production (million nuts)	Productivity (nuts/ ha)
India	2082.11	23904.10	11481
Tamil Nadu	461.06	6570.63	14251

Source: Coconut Development Board

The global production of coconut is significantly high, wherein Indonesia, Philippines and India are three major coconut producing countries. Indonesia and Philippines tops in coconut production, while India occupies a premier position, ranked at 3rd position, as is depicted in table 2.

Table 2: Top four coconut producing countries in 2017

Countries	Production (tonnes)	Area Harvested (ha)
Indonesia	18983378	3260015
Philippines	14049131	3612304
India	11469837	2081000
Brazil	2342942	215683

Source: FAO.org/FAO/STAT With an annual production of around 17,000 million nuts, coconut

Import & Export Trend of Coconut Sector

As we all aware various forms of coconut based products available in market tends to play a vital role in the growth of Indian market economy. It has been anticipated that the export of India's coconut product would be above Rs. 2000 crore by FY 2019. Among diverse range of coconut products, 80,467 tonnes of activated carbon, valued at Rs. 1,123.64 crore has been exported till January while Rs. 1,812.55 crore total exports has been reported in this year. Year on year, soaring demand is recorded for coconut products. The elevated demand of activated carbon leads to fetching higher price of Rs.140/kg in FY2019 vis-a-vis Rs.100/kg in FY2018, and this is specifically attributed to its utilization for purification of gold, water & air. However, the trend

is not positive for export of raw coconut and its few products. Coconut product exports stood at Rs.2,300 crore two years ago.

With the continuous efforts of Coconut Development Board to improve the overall productivity and product diversification, exports have been poised to reach upto Rs. 20617 million till 2017. The more elaborative data of incessant growth has been recorded for every year as enlisted below:

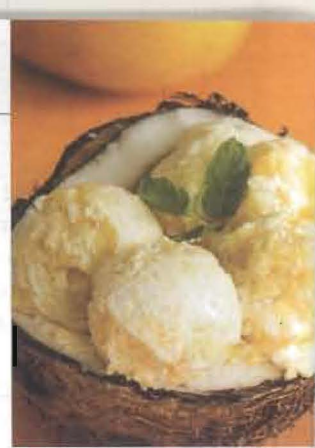
Year	Export value (Rs. million)	Import Value (Rs. million)
2007-08	690.1	559.3
2008-09	1798.0	1030.8
2009-10	2197.5	1071.6
2010-11	4959.2	1207.7
2011-12	9432.9	2098.8
2012-13	10223.6	1919.0
2013-14	11561.2	2311.1
2014-15	13123.8	4216.6
2015-16	14502.4	3832.6
2016-17	20617.0	2705.9

Source: Coconut Development Board

Coconut Market Growth Potential

Coconut Oil Market is poised to touch USD 8,403.3 million by 2025 at an impressive 6.37% CAGR during the forecast period (2018-2025). Rising demand for edible oils in Europe and North America combined with its scope across industrial sectors such as cosmetics & personal care, biofuels, and pharmaceuticals can spur the market demand over the forecast period. In spite of its increasing demand in all sector, there is a challenge of higher level of saturated fatty acid which is a greater concern among international organization. This concern display impact on Indian coconut market. Coconut Development Board has been providing immense support for producers and providing platform for disseminating awareness about its health benefits.

Based on the processing method, refined and virgin are classified into two major segments to determine forecasting valuation. As Market Research Future Report 2019, virgin oil segment is expected to reach to US 2,413.6 million and quantity demanded is upto 1,750.4 KT which is attributed to the high purity level of virgin edible oil. The major drive for ever increasing growth of segment is the supportive government policies and capital addition by value added producers that leads to overall encouragement of production.



Diversified Market of Coconut

Wide range of coconut based products are available in the market which can be derived from each and every part of coconut tree. Its roots can be used for extracting dye stuff while trunk can be used for make lumber and furniture. Coconut shell is usually being discarded, which can be utilized for decoration items, or can be converted into shell powder to be used for making desired mesh size of sieving machine. The same shell can also be transformed into coconut shell charcoal and activated carbon, used in the filtration system.

Apart from the non edible portion, the edible portion is also utilized to manufacture. Various edible products from coconut like coconut milk, dried coconut or copra, desiccated coconut, coconut oil,

coconut water, Nate-de-coco, coconut flour, vinegar, jaggery etc. Coconut is considered as food and also as an oil seed crop.

Dried Products

This category is segmented into a number of products among which desiccated coconut is the most popular one, obtained by separating the white kernel from brown testa which is being followed by the process of drying of shredded, ground coconut. The final moisture content present in desiccated coconut is 1.3-2.5%.

Application of Desiccated coconut:- It is used to add flavor to curries or for food decoration. It is widely used in Indian dishes; especially in South Indian. The shredded coconut can be used to make coconut burfi, coconut biscuits, cookies, candies, coconut based toffees or chocolates.

Coconut chips is another lip smacking product being produced using coconut meat by slicing it thinly, cooked in syrup and then dried to obtain either sweetened or salted snack.

Coconut milk based Yoghurt is a fermented product made from coconut. *Streptococcus thermophiles* and *Lactobacillus delbrueckii* spp. *Bulgaricus*. are the lactic acid bacteria used for fermentation process of coconut milk to obtain yoghurt. The yoghurt does not contain lactose and is rich in various vitamins and minerals transformed from coconut milk.

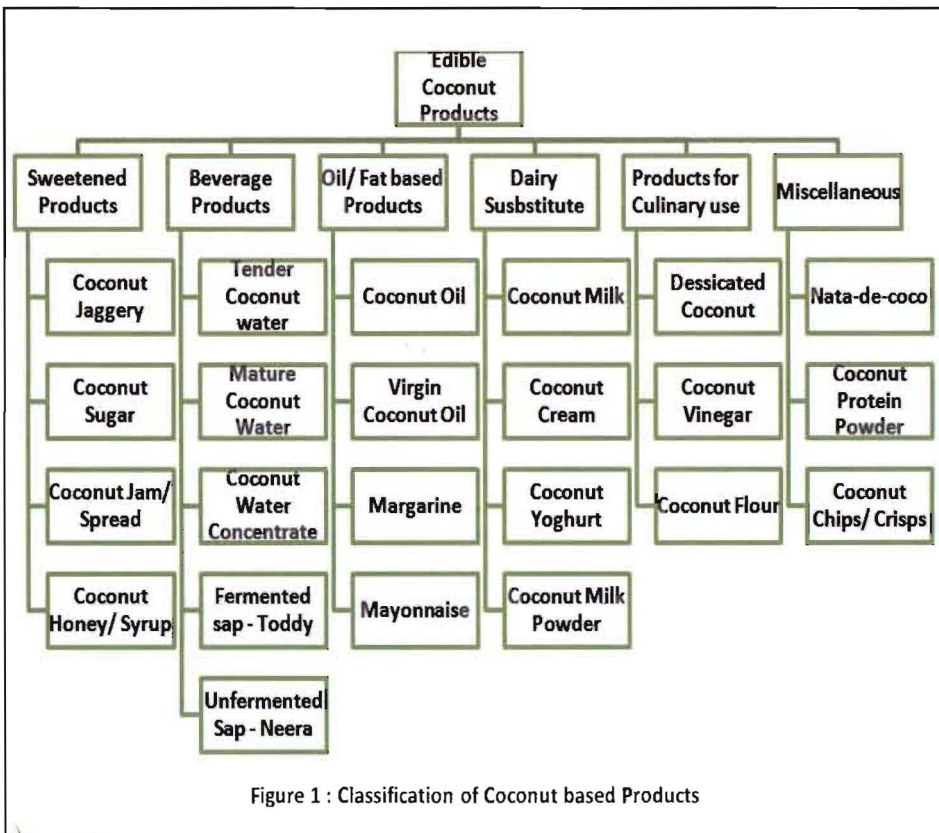


Figure 1 : Classification of Coconut based Products

Therefore, this can be even used as a best alternative to cater to lactose intolerant people.

Similar to dairy milk, Coconut milk is an oil-water emulsion obtained from the aqueous extract of coconut meat, which can be used as a substitute for cow milk. Coconut milk is also available in another form which is called skimmed coconut milk.

Fresh coconut water is obtained from freshly opened shell while coconut water concentrate is produced using spray evaporation techniques which reduces the moisture content.

Coconut Cream is the fat portion of coconut milk. The total fat content is approximately 23%. Unlike other fat sources, coconut cream does not contain trans fatty acids, but consists of monoglycerides. Monoglycerides are readily digested and absorbed by body. Since it gets converted into energy immediately after consuming in short while; it does not transform into bad cholesterol.

Coconut flour is a gluten free alternative of wheat, rice and potato flour. It is considered as a healthy source of dietary fiber, loaded with numerous nutrients.

Nata-de-coco is a fermented food which is chewy, translucent, jelly like food stuff. This is commonly consumed as sweetened candy or dessert, and can be added with various stuffs like drinks, ice cream, puddings and fruit mixes. Coconut water is fermented using culture *Acetobacter xylinum* which produces microbial cellulose for gel formation.

Coconut vinegar is obtained from fermenting coconut water. Similar to synthetic vinegar, it

involves alcoholic as well as acetic fermentation of sugar enriched coconut water. It can be a substitute of synthetic vinegar. And it can also be used for other applications as a preservative or flavoring agent in pickles and sauces and is used for improving the quality of cooked fish and meat.

Tender Coconut Water is a refreshing drink obtained from freshly opened shell. Coconut water is also known to be a rich source of dietary fiber, enzymes, vitamin C, amino acids, minerals such as magnesium and potassium. However, it doesn't add calories into diet and is recommended for heart patients as it has low cholesterol level as compared to other dairy products. Coconut water is a new generation energy drink that helps keep hydrated by balancing electrolyte in blood. The tender coconut water has several other health benefits such as anti-carcinogenic, antimyocardial infarction, hepatoprotective, antioxidant, antiageing, and anti-thrombotic effects.

Coconut Oil & Virgin Coconut Oil: Coconut oil is extracted from copra and virgin coconut oil is the oil produced from the kernel of coconut by mechanical or natural means with or without application of heat. If virgin coconut oil is subjected to high temperatures, solvents or refining process and therefore retains the fresh scent and taste of coconuts. The virgin coconut oil can be produced from fresh coconut meat or milk. It can be extracted from fresh meat by grating, drying and pressing.

Irrespective of the process being followed to manufacture coconut oil or virgin coconut oil, lauric acid is the fatty acid being present significantly





in it. It mainly contains medium chain fatty acids which are not covered under fat as a stored fat, while it burn easily and release energy. Hence, coconut oil in either forms are associated with health benefits. Further, the shelf life is extended, since it contains more amounts of saturated fat leading slow down of oxidation process resulting resistant

to rancidity.

Coconut based protein powder: This protein powder is obtained through the process of enzyme treatment followed by centrifugation. The coconut milk from fresh and mature coconut undergoes protease treatment. Enzyme-treated milk is subjected to centrifugation at 7,000 rpm to obtain cream, coconut skim milk, and solid protein. In place of skim milk protein, coconut based protein powder is an alternative option, which has good emulsifying properties and also has more water retention and swelling capacity than other dietary fibers.

Neera & Toddy: The vascular sap obtained from immature unopened coconut inflorescence is popularly known as Neera in fresh form. It is a rich source of sugar, minerals, and vitamins which makes it an ideal energy drink. Neera is the unfermented form while Coconut toddy is the fermented form obtained from young coconut inflorescence. Treacle is another product manufactured from sweet toddy. It is obtained by boiling toddy. Alcoholic content of toddy is about 4-6%. Alcoholic liquid prepared from toddy is called coconut arrack, which is generally distilled between 33% and 50% alcohol by volume.

Coconut Jaggery: Unfermented coconut sap is collected and undergoes the process of evaporation, which results into a concentrated form. After evaporation, a thick mass is obtained, which on further heating leads to crystallization and on cooling sets to a solid form. Coconut Jaggery which can be used in place of sugarcane based jaggery, is a rich source of calcium, iron and many other vitamins and minerals.



Coconut Refined Sugar: coconut sap is treated with lime to remove aluminous unwanted impurities, followed by the process of filtration to get the

clarified liquid which is evaporated to the extent of 75% sugar content. Thereafter crystallization changes it to crystal sugar. Coconut sugar is considered to be healthier than refined cane sugar, which has low glycemic index. Therefore, coconut sugar is an ideal sugar for the control of diabetes mellitus. Likewise,



coconut palm sugar or

jaggery can be obtained from coconut palm syrup.

Coconut Jam & Coconut Syrup: Similarly as fruit jam is produced, coconut jam is prepared by boiling the coconut pulp with other ingredients, preservatives, coloring, and flavoring materials to a consistency firm enough to hold the fruit tissues in position and no water syneresis is observed. Coconut syrup is a liquid form obtained from coconut milk which is heated along with sugar and citric acid till the sufficient consistency is obtained. These products are sugar based products which can be used as bread spread or for other applications.

Coconut Honey & Coconut Candy: Similar to coconut syrup, coconut honey is a free-flowing viscous liquid, prepared by blending skimmed coconut milk, refined sugar, and glucose. The mixture is heated till the TSS of coconut honey reaches to 75%. The final product is a golden





coloured thick viscous liquid with nutty flavor.

Coconut candy is another product for which coconut milk/ cream along with sugar and malt syrup is heated for caramelization of the liquid. The thick mass is transferred to the mould and then cools it to get the candies in their

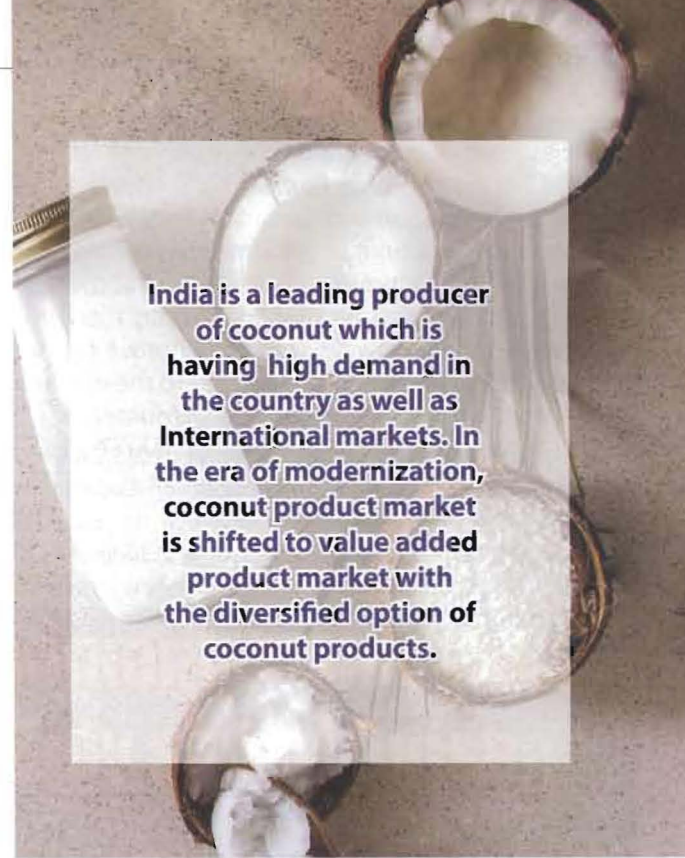
shapes.

Activated Carbon & Shell Charcoal: Activated



carbon is obtained by burning coconut shells which is mainly produced by the steam activation process. The process enhances the adsorptive capacity of the activated carbon. However, coconut shell charcoal is obtained by burning the shell of fully matured coconuts with a limited supply of air so that they do not burn away to ash but are only carbonized.

Coconut which is abundant with beneficial components, holds numerous health benefits. Lauric



India is a leading producer of coconut which is having high demand in the country as well as International markets. In the era of modernization, coconut product market is shifted to value added product market with the diversified option of coconut products.



acid present in higher proportion in coconut acts as antiviral and antibacterial agent. 10 to 20 grams of lauric acid per day is considered an appropriate amount which can be obtained from roughly 6 to 12 ounces of good quality coconut milk.

Conclusion

India is a leading producer of coconut and coconut is having high demand in India as well as in the International markets. In the era of modernization, coconut product market is shifted to value added market with the diversified option of coconut products. Taking into consideration the wide range of coconut products, coconut product market has great potential for growth of Indian economy. Coconut industry is well supported by various government

agencies such as Coconut Development Board, Kerafed, State Trading Corporation, Kerala State Marketing Federation and Karnataka State Marketing Federation etc. Coconut Development Board provides support for the continuous improvement of coconut industry. Though well developed coconut market is a strength, there is always scope to improve further and explore new technologies to cater to the demand of domestic as well as international consumer.

References: ● 1. Raghavi Md et. al. (2019), Review on Area, Production and Productivity of Coconut in India, International Journal of Research in Business Management, Vol. 7, Issue 1, Jan, 1-6 ● 2. Sangamithra A et.al. (2013), Coconut: An extensive review on value added products, Indian Food Industry Magazine, Vol 32, No. 6, Dec, 29-36 ● 3. Aduja Naik et. al. (2015),

Downstream Processing for Production of Value Added Products from Coconut, Current Biochemical Engineering, 2015, 2, 168-180 ● 4. S. Jayasekhar et.al. (2019), Coconut sector in India experiencing a new regime of trade and policy environment: A critical analysis, Journal of Plantation Crops, 2019, 47(1):48-54 ● 5. S. M. Hazelman, Coconut Processing Technology: A Manual of Procedures. Coconut Extension Training Center, 1997. ● 6. H. Ingram, Health Benefits of Coconut Oil. Dobimick Publishing, 2014. ● 7. Codex Stan 240, "Codex standard for aqueous coconut products - coconut milk and coconut cream." FAO/WHO, 2003. ● 8. FSSAI Regulation related to Food Product Standard and Food Additives ● 9. K. S. M. S. Raghavarao, N. K. Rastogi, and A. Hrishikesh, "Value added products from coconut," Indian Coconut J., pp. 11-14, 2011.

Advertisement Tariff of Coconut Journals

Indian Coconut Journal (English monthly), Indian Naliker Journal (Malayalam monthly), Bharatiya Nariyal Patrika (Hindi quarterly), Bharatiya Thengu Patrike (Kannada quarterly) and Indhia Thennai Idazh (Tamil quarterly) are the periodicals of the Coconut Development Board. These journals regularly feature popular articles on scientific cultivation and other aspects of coconut industry. The journals are subscribed by farmers, researchers, policy makers, industrialists, traders, libraries, etc.



Position	Indian Coconut Journal (English monthly) (Rs.)	Indian Naliker Journal (Malayalam monthly) (Rs.)	Indhia Thennai Idhazh (Tamil quarterly) (Rs.)	Bharatiya Nariyal Patrika (Marathi Bi-annual) (Rs.)	Bharatiya Kobbari Patrika (Telugu Bi-annual) (Rs.)	Bharatiya Thengu Patrike (Kannada quarterly) (Rs.)	Bharatiya Nariyal Patrika (Hindi quarterly) (Rs.)
Full page - B & W	No B&W pages	No B&W pages	5000	5000	5000	5000	No B&W pages
Full page - Colour	20000	20000	10000	10000	10000	10000	5000
Half page - B & W	No B&W pages	No B&W pages	3000	3000	3000	3000	No B&W pages
Quarter page - B & W	No B&W pages	No B&W pages	1500	1500	1500	1500	No B&W pages
Back inner cover - Colour	25000	25000	10000	10000	10000	10000	8000
Back cover - (Colour)	30000	30000	15000	15000	15000	15000	10000

Special package : A rebate of 10% will be allowed on advertisements inserted in any two editions of the journal at a time and 12% discount if inserted in three or more editions at a time. 15% discount will be given to bonafide advertising agents.