



Integrated approach in the processing of coconut products and byproducts and market prospects in India

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Introduction

An integrated approach for processing and marketing of coconut and its products is essentially needed to make inroads in the export market.

Adherence to globally accepted quality standards is also of paramount importance not only for India but for all coconut producing countries.

Coconut occupies a position of significance in the Indian economy by virtue of its role as a horticultural crop providing food and livelihood security to over 10 million farm families. It also enjoys a high socio-religious importance. The country produces 14811 million nuts from an area of 1.93 million hectares, as per the official release of 2005-06. India is estimated to contribute about 15.5 per cent in area and 21 per cent in production of coconut in the world.

Almost all parts of the coconut palm are put to extensive and multifarious uses in the daily routine of many households in India. As far as its commercial usage is concerned, coconut oil is the most prominent commercial product, accounting for about 6 per cent of the vegetable oil pool in the country, followed by copra. The market prices of these commodities determine the price of the coconut in the country. The crop contributes US\$ 2075 million to the country's GDP and earns foreign exchange to the tune of nearly US\$ 168 million by way of export of coconut products and by-products, the major items of

export being coir and coir products.

In India, the pattern of coconut cultivation is distinctly different from that of other important commercial crops. Thus, in Kerala, which is amongst the major coconut growing state, the crop is generally grown in small holdings and in homestead gardens mixed with other crops. As the coconut growers are essentially small and marginal farmers, multi-cropping has to be adopted by them. Large holdings constitute a very small percentage of the total coconut holdings in every state. There are more than 5 million coconut holdings in the country, of which 98 per cent are below 2 ha in size.

The Coconut Processing industries and other related activities provide employment opportunities to over 2 million people in the country. The changes in climate, monsoon, international crop distribution, domestic consumption pattern, and other external factors play a vital role in the coconut supply chain market.

The area under coconut cultivation in India, production and yield is shown in Table-I.



Table 1. Trend in Area, Production and Productivity of Coconut in India for the last 10 Years

YEAR	ALL INDIA		
	Area '000 ha	Production Million Nuts	Productivity Nuts/ha
1995-96	1830.90	12952.30	7074
1996-97	1892.50	12987.50	6863
1997-98	1861.00	12717.30	6834
1998-99	1754.50	12535.90	7145
1999-2000	1768.10	12129.00	6860
2000-2001	1823.90	12678.40	6951
2001-2002	1932.30	12963.20	6709
2002-2003	1921.80	12535.00	6523
2003-2004	1933.70	12178.20	6298
2004-2005	1935.00	12832.90	6632
2005-2006	1946.80	14811.00	7608
Annual Growth rate	0.62	1.35	0.73

Demand and Consumption Pattern

India is a country where almost the entire production of coconut is consumed in one form or the other. Compared to the other major coconut producing countries, India has so far been able to absorb its entire domestic production, to meet the indigenous demand, besides exporting a modest quantity. The utilization pattern of coconut in the country has undergone a perceptible change of late due to need based programmes implemented in the country. Of the total production, about 42 per cent is utilized for edible, religious and seed nuts purpose, 15 per cent as tender coconut, and 35 per cent for conversion of milling and 8 per cent for edible copra. Of the 42 per cent of raw nut consumption, 90 per cent is consumed in the edible sector or for the purpose of seed nut and 10 percent in the industrial sector for the production of value added products like desiccated coconut, milk powder and other convenience foods. The intake in the industrial

sector was only 5 percent till recently. Recent advancements in product development through various initiatives of the government have witnessed an increasing utilization of coconut in the processing sector.

The total coconut oil production in the country is 4.6 lakh tons. It has a variety of uses including a cooking

medium, a raw material for industrial products in the toiletry sector, cosmetics, hair oil, body oil and in the food industry and coconut oil cake is used in the manufacturing of cattle-feed. Though the cultivation of coconut is mainly confined to certain geographical locations, the demand for coconut and its products is wide spread through out the country. India produces about 1.7 lakh MT of edible copra. Kerala State accounts for 90 per cent of the total production of milling copra in the country and also for consumption of major portion of coconut oil, both for edible as well as non-edible purposes.

The post WTO period has witnessed a shift in consumer preferences in respect of edible oil and cooking medium to variety of oils other than coconut oil, which are now easily available and are also more affordable, like safflower oil, sunflower oil, rice bran oil, palm oil and soyabean oil.

Table 2. Export of coconut products from India

(Quantity in tonnes, Value-Rs. in lakhs)

Item	2005-2006		2006-2007		2007-2008 (upto June 2007)	
	Quantity	Value	Quantity	Value	Quantity	Value
Coconut (Fresh)	1402.84	133.03	1043.41	161.16	158.66	22.13
Coconut (Dried)	608.71	233.25	622.39	241.15	112.57	23.93
Desiccated coconut	652.16	113.05	312.06	72.17	106.16	32.21
Other Coconuts excluding Fresh/Dried	678.02	227.71	758.63	240.59	255.54	65.84
(c) Coconut Oil (Crude)	79.56	60.90	92.09	48.90	55.25	22.94
(d) Coconut Oil (Refined)	5298.27	2741.00	3584.74	2248.95	1198.86	580.29
Other Residues of Coconut or copra	110.11	6.37	46.20	6.03	35.00	5.06
Oilcake (Defatted/Expeller)	161.70	8.73	19.00	2.95	-	-
Coconut Shell (Raw)	601.84	192.64	673.20	205.44	66.75	17.66
Shell Charcoal	4869.00	641.38	10707.00	1327.41	8360.00	170.46
Shell hukah	8.06	7.09	22.27	43.59	-	-
Copra	-	-	1356.84	521.67	337.88	90.92
Total		4365.15		5120.01		1031.44



Export and Import

Exports: Though India is a major producer, its performance in the export front, barring the coir and coir products, is quite insignificant. Only a few coconut products like shell charcoal, activated carbon, refined coconut oil and desiccated coconut in limited quantities are in the export basket. During the year 2007-08 (up to June 2007) export of coconut products (excluding coir items) was valued at Rs. 1031.44 million as against Rs.967.25 million during the corresponding period of previous year. In terms of value, exports increased by 8.79 per cent. Coconut oil (refined), shell charcoal and coconut based activated carbon were prominent items of export. About 92 percent of the export was to Spain, Sri Lanka and the Netherlands.

Imports : During 2007-2008 (upto July 2007), India imported coconut products (excluding coir items) worth Rs.665.48 million. There was a decrease in import by

67.58 per cent in the terms of value compared to the corresponding period in 2006-07. There was a steep decline in the import of coconut oil (refined). The decline in the quantity of oil imported is attributed to the increase in the prices of coconut oil in international markets.

The export/import of coconut products are given in Table 2 and 3.

Challenges before the Indian Coconut Industry and Strategies

The diminution in the size of operational land holdings, lack of economies of scale in operations, high incidence of senile and unproductive palms are some of the main hindrances in increasing productivity and profitability. Besides, due to lowering of tariffs and increased access to the Indian market by virtue of Free Trade Agreements, there is possibility of increase in imports. In order to strengthen the overall competitive ability of the Indian Coconut

Industry, especially of the small farmer, the Government of India through the Coconut Development Board has made several strategies for farm diversification, providing backward and forward linkages, adoption of cluster approach and vigorous promotion of new technologies for value added processing of traditional coconut products. Cooperative Societies also play an important role in integration of the farmer with the markets.

Programmes of the Government of India in support of Processing and Marketing

Government of India has launched a programme called Technology Mission on Coconut (TMOC) in 2001-02, which is implemented by the Coconut Development Board, for providing renewed thrust to product diversification and value addition. This Mission addresses the issues on productivity improvement through management of pests and diseases, market research and promotion. The mission mode approach of the programme has helped overcome many production constraints to a great extent, besides popularizing large scale adoption of many newly developed technologies. Focussed efforts made on awareness creation and market promotion have increased the demand and consumption of value added coconut products especially desiccated coconut, coconut spray dried milk powder, coconut water, vinegar etc. This, in turn, has ensured remunerative prices to the farming community.

Several Schemes for providing financial assistance to encourage

Table 3. Import of Coconut Products into India

(Quantity in tonnes, Value-Rs. in lakhs)

Item	2005-2006		2006-2007		2007-2008 (upto July 2007)	
	Quantity	Value	Quantity	Value	Quantity	Value
Coconut Fresh	3.50	0.35	-	-	-	-
Coconut (Dried)	52.00	15.19	-	-	-	-
Other Coconut excluding Fresh /Dried	2.06	0.38	-	-	-	-
Desiccated Coconut	715.66	312.75	-	-	-	-
(a) Coconut Oil (Crude)	1106.00	281.55	46.00	16.78	-	-
(b) Coconut Oil (Refined)	2963.47	864.47	14050.00	5169.40	103.00	40.94
Other Residues of Coconut or copra	3807.53	245.82	14.93	0.45	47.03	3.88
Oilcake (Solvent extracted and Expeller variety)	90542.42	4898.79	42417.53	2531.51	9086.46	614.56
Coconut Shell Charcoal	2106.00	243.74	388.00	10.15	383.00	4.63
Hookah of Coconut Shell	0.13	0.39	0.118	0.27	0.58	1.47
Copra	-	-	-	-	-	-
Total		6863.43		7728.56		665.48



processing and product diversification are being implemented, such as :

(a) Development of technologies: Assistance is provided to the extent of 100 per cent of the project cost limited to Rs.75 lakhs for all the Govt. institutions and cooperative societies. 50 per cent of the project cost limited to Rs.35 lakhs for Non-Governmental Organisations (NGO) individual entrepreneurs and other research organizations.

(b) Demonstration of technologies: Assistance provided is 100 per cent of the cost to all the Govt. institutions and cooperative societies. 50 per cent of the cost for NGOs, individual entrepreneurs and other organizations.

(c) Adoption of technologies: Back-ended credit capital subsidy limited to 25 per cent of the cost not exceeding Rs.50 lakhs is provided for NGOs, individual entrepreneurs and other organizations.

Financial assistance is also provided for activities relating to Market research and market promotion, as under:

a) **Market research:** 100 per cent of the cost limited to Rs.25 lakhs for Govt. agencies and cooperative societies. 50 per cent of the cost limited to Rs.12.50 lakhs for individuals, NGOs and other organizations.

b) **Market Promotion:** 100 per cent of the cost limited to Rs.25 lakhs for Govt. agencies and cooperative societies. 50 per cent of the cost limited to Rs.10 lakhs for NGOs and private institutes.

(c) Financial Assistance for copra drier integrated units: Modernisation of coconut processing by introduction of improved copra dryer / other processing machineries / equipment @ 25 per cent of the cost of dryer / equipment or maximum Rs. 10,000, whichever is less.

Policy Interventions in the Marketing front

The Coconut Development Board initiated various market oriented short term and long term measures to de-link the copra-coconut oil driven domestic coconut market and to convert into a multiple products oriented market. Similarly efforts are made to project Indian products in the domestic and international markets through Exhibitions and Fairs. Industrialists and entrepreneurs are given opportunity for showcasing their products in such occasions with a view to exploiting market potential.

In order to ensure market stability, the Government of India takes the necessary steps from time to time as detailed below:

Fixation of Minimum Support Price for de-husked coconut

Policy intervention and institutional support are the instruments adopted in India to contain the risk of price instability and price fluctuations. A system to fix Minimum Support Price (MSP) has been introduced by the Government of India since 1986 with a guarantee to purchase copra at a pre-announced price. Generally the MSP declared for both milling and edible copra rules below the

market price and procurement operations have to be resorted to rarely.

In the system being followed, it was observed that the benefits were not percolating to the farmers as intended, since farm level processing was not taken up in a significant manner on the grass root level. Therefore, a new initiative to protect the interest of farmers and to do away with middle-man ie. issuance of Minimum Support Price for de-husked coconut has been launched from 2008. This would encourage cooperative societies for developing infrastructure facilities for undertaking procurement of raw coconuts from the farmers and processing into copra.

Future Trading : Future trading in coconut oil and copra has given a fillip to the Indian coconut Industry. It has regulated the trade by minimizing the erratic trade fluctuations in the industry.

The volume of coconut oil traded under future trading was 1.24 lakh metric tones during the year 2005-06. The volume of coconut oil transaction under forward market trading system registered an increase of 48 percent when compared to the previous year.

During the year 2006, future trading in copra was introduced with a view to ensure better price discovery, greater transparency and price stabilization. This measure is expected to benefit the small farmers in coconut sector by enabling them to pool the small quantities of market surplus into a tradable quantity and enter into future trading.

Taxation Relief: The Excise Duty of 16.5 per cent imposed on



packed Tender Coconut Water (TNW) which is a nascent industry in the country with 6 functioning packaging units set up with the technology availed from the Board has been totally withdrawn in order to protect the industry. This has provided a motivation to the existing entrepreneurs and inspired those who are aspiring to venture into the field.

New Initiatives planned

With a view to address the problems of lowered productivity due to very high density of palms in certain areas, high incidence of senility in palms, affliction by disease and to provide some protection to the small farmers against losses in production due to natural calamities like tsunami, cyclone, droughts, etc. the Government of India proposes to introduce two schemes, viz. on replanting and rejuvenation and on Coconut Palm Insurance, as per details given below:

Replanting and Rejuvenation Scheme: Taking a cue from observations in earlier APCC Sessions, the Government is contemplating a proposal for introducing a massive replanting and rejuvenating plan, aimed at reducing senility and achieving increased productivity, augmenting income of about 3 to 5 lakh farmers through adoption of coconut based integrated farming system and providing increased employment opportunities. The implementation of this project is also envisaged to generate quality raw material for the coir and coir based industry.

The area envisaged to be covered under the project is 4.56 lakh

hectares. After cutting and removal of senile, unproductive and disease advanced palms, replanting and rejuvenation through integrated management practices is planned. This programme would also encourage creation of community irrigation sources.

The project period envisaged is 10 years. It is expected that an additional production potential of 1854 million nuts will be available annually by implementing the project which will help to augment the income of farmers by Rs.742 crores annually. The per ha productivity would be enhanced from the current level of 7600 to 10700 nuts per ha by the end of the project period.

Coconut Palm Insurance: Coconut crop, with a long gestation period of 6-7 years, is always subjected to the perils of storm/ cyclone, heavy rains/ flood, pest and disease of widespread incidence, fire, earthquake / landslide, riot, severe drought etc. However, the crop is presently not covered under the purview of any insurance scheme in the country. The Government is therefore considering a scheme to introduce a coconut palm insurance in collaboration with a leading National Agricultural Company by meeting a portion of the premium through the Coconut Development Board. The share of the Board will be remitted to the Company. The scheme will encourage long term investment in raising coconut plantations which have a long gestation period.

A welfare scheme for coconut climbers is also worked out for the climbing community.

Cluster Programme for increasing productivity and income from coconut - A farmer participatory demonstration programme : One of the factors that limits production and productivity in the country is fragmented small holdings. The fragmented holdings do not render themselves viable for the optimum utilization of resources and the adoption of improved technologies. The impact of development programmes at the field level also does not become entirely visible in such fragmented holdings. To augment the production and productivity of such smaller holdings an approach of group management of resources has been adopted to help overcome the inherent weaknesses including high labour cost of the fragmented holdings.

The implementation is done by the Coconut Development Board in contiguous areas of 25ha to 50ha to make the cluster vehicle for dissemination of technology and adoption of management practices for achieving higher productivity and increased income. This strategy helps in improving the efficiency of land and water use, adoption of a community approach in plant protection, procurement and application of inputs, raising of intercrops. The clusters also form the basic unit for primary processing of coconut which results in enhanced income accruing to the coconut farmers. Each cluster involves the participation of nearly 200 farmers and all the farmers become beneficiaries of the programme. This arrangement is an important tool for overcoming the problems associated with scarce resources, fragmentation



and dispersion of coconut cultivation and inadequate levels of marketable surpluses. Utmost transparency can be assured in the entire implementation which encourages the participating farmers as well as other implementing agencies. Financial assistance @ Rs.35000 per ha in two consecutive years is extended for adopting the package of practices.

Adoption of the cluster approach has shown encouraging results. Reduction in cost of cultivation, regular employment, decline in pests and disease problems and technology adoption are the major advantages, besides ensuring regular supply of produces to the government and private outlets which sustains the local markets and marketing activity.

Accreditation of Coconut Nursery: With a view to achieve quality assurance of planting material, a programme for accreditation of coconut nurseries is proposed to be introduced by the Board to facilitate availability of reliable and certified seedlings to the farming community.

Value Added Coconut Products - The Present Scenario

The technological support and the financial assistance rendered through the Coconut Development Board have opened up a congenial environment for setting up integrated processing units in different parts of the country for the commercial production of varied coconut products. So far 72 coconut processing units have been established under the Technology Mission having infrastructure facilities worth Rs.58 crores. These

units have the processing capacity of 214 million nuts per year. The Board extended financial support of Rs.9.31 crores. Seven tender coconut preserving and packaging units with the capacity to process 22.5 million nuts have been started under the programme. Commencement of 6 activated carbon units having the capacity to produce 46 tons per day which earn foreign exchange of US\$36 million is the other achievements under the programme.

As a result of the above mentioned initiatives, several value added products have been added to the profile of the Indian coconut industry.

Packed tender coconut water: Technology for the preservation and packaging of tender coconut water has been developed by the Board in collaboration with the Defence Food Research Laboratory, Mysore. This product is gaining acceptance as a natural soft drink and nutritious health drink. This technology has been transferred to prospective entrepreneurs and there are 6 units operational in the states of Kerala, Karnataka, Tamil Nadu, Gujarat and West Bengal. The packing medium in pouches and cans has a shelf life of more than three months under ambient conditions and six months under refrigerated conditions. The production capacity of the present units is processing of 2500 million nuts per year. This approximately yields 4 million litres of tender coconut water of which 40 per cent is exported to various countries in packed form. Although the processed and packaged tender nut water is still in a nascent stage, almost all the units have succeeded

in making a small entry into markets in the Gulf region and Europe. The US market is undoubtedly large and attractive. But the stringency in the food safety rules and regulations acts as a barrier to the expansion of this market. Being a natural health drink a growth rate of 20 per cent is anticipated for this product by the end of the year 2011-12 in the export market.

Spray dried coconut milk powder: The technology for the spray drying of coconut milk was perfected in collaboration with the CFTRI, Mysore. This is the best method for preservation of flavour and texture of coconut milk. The technology has been transferred to one unit for commercialization. This product can be converted into coconut milk by diluting with water and has got additional advantage like long shelf life, less packaging cost and occupies less storage space. It could be used as a substitute for freshly squeezed coconut milk in households/hotels for food preparation, kheer and beverages. On an average, one thousand coconuts would yield about 99.6kg of spray dried coconut milk powder. Spray dried coconut milk powder has a tremendous market potential in India and abroad.

At present there is only one fully operational unit functioning in the country with a production of 375 MT per year. Forty per cent of the production is exported to various Western and Middle East countries. Being a ready-to-use convenient product, this product is poised for a growth rate of 20 per cent.

Desiccated coconut: Desiccated Coconut (DC) is a traditional



product which possesses very good domestic as well as export demand. It is the disintegrated and dehydrated coconut meat. It is mainly used in biscuits, confectionery, bakery and other food industries. The confectionery industry is the main consumer of DC in the organized sector. A study conducted by the Coconut Development Board has revealed that consumer demand for DC could be developed in the country by resorting to organized market promotion activities for the popularization of the product packed in consumer packs for household uses. DC is exported in small quantities to Brazil and Middle East by a few units. In the case of DC also there is a spurt in the international price and the gap between the domestic and international price has reduced. This could possibly motivate Indian exports to vigorously try to enter the export trade.

The present total annual production of DC is estimated at 45,000 tonnes. Because of the large scale demand for the product in the confectionery industry, a growth rate of about 25 per cent is estimated for DC in the coming 5 year period. Price competitiveness and quality upgradation has to be ensured to achieve this growth.

Coconut chips: Coconut chips, as any other chips, is a ready-to-eat snack food. It is prepared in salted and sweetened forms. The coconut kernel is cut into the form of chips using a chipper. The cut chips are soaked in sugar or salt solution for about 40 minutes. The chips are then baked in a hot air oven till the product attains a golden brown colour. The Coconut Development

Board is imparting training in the manufacturing of coconut chips to the interested individuals and entrepreneurs. There has been a manifold increase in the demand for this product.

At present nearly 40 units are functioning in the country which yield nearly 600 MT of coconut chips. This delicious snack is expected to gain a growth rate of 10 per cent within 5 year period.

Coconut Vinegar : The technology for coconut vinegar was developed by the Board through the CFTRI under a sponsored project. Vinegar is the product obtained by fermentation of sugar containing coconut water. It is used as a food preservative and a flavouring agent and aids in digestion and improves the quality of cooked meat and fish. The technology has been transferred to sixteen entrepreneurs in different states and most of the units have started commercial production of vinegar.

At present nearly 40 units are functioning in the country which yield nearly 0.6 million litres of coconut vinegar. This being a natural product is expected to gain a growth rate of 10 per cent by the end of 2011-12.

Virgin Coconut Oil : The wet processing of coconuts is a new process of oil extraction from fresh matured coconuts producing virgin coconut oil rich in vitamin E and possessing long shelf life period of one year. This technology is capable of achieving complete utilization of the coconut. Apart from virgin coconut oil, a number of other value added coconut products like coconut milk, low fat coconut powder, skim

milk and packed coconut water, could be developed from the process. The Board has developed a technology through C.F.T.R.I., Mysore and the same will be transferred to prospective entrepreneurs in the country. A plant processing 1 lakh nuts per day can produce 7.5 tons of virgin coconut oil, 9 tons of medium fat DC, 11,500 liters of matured coconut water, 16.5 tons of skim milk and 11.5 tons of coconut shell.

Now the technology is under commercialization and more than 150 units of 500 nuts are expected to come into production stage as such, which will yield 6.75 million litres of virgin coconut oil. This product will grow at a rate of 10 per cent in another 5 year period. More than 80 per cent of this production is likely to go into the export market in view of its therapeutic and nutraceutical properties.

Coconut/ Shell Charcoal: The waste heat recovery technology is currently available indigenously for coconut shell carbonization. The technology is advantageous in reducing the smoke problem and produces clean and well carbonized charcoal using the coconut shell. The flue gases, during carbonization, is passed through a heat exchanger process, produces heat which could be effectively utilized for drying operation in copra making and D.C. production. The application of the WHU technology would generate coconut shell charcoal which could be utilized for the manufacturing of activated carbon.

It is estimated that 1.3 million metric tonne coconut shells are available in the country which are



not commercially exploited fully. It is estimated that 0.43 million tonnes of shell charcoal would be available in the country, if the total production of shell is put to use. Shell charcoal is the raw material for the production of activated carbon. On the above basis, 0.14 million metric tonne of activated carbon can be produced which can be exported fully. The shell charcoal is likely to have a growth rate of more than 25 per cent.

Activated Carbon: Activated Carbon is a non graphite form of carbon which could be produced from any carbonaceous material. Coconut shell based activated carbon is considered superior to those obtained from other sources due to its small macro pore structure which renders it more effective for the adsorption of gas/vapour and for the removal of colour and odour of compounds. It is widely used in the refining and bleaching of vegetable oils and chemical solutions, water purification, recovery of solvents and other vapours, recovery of gold,

and in gas masks for protection against toxic gases. On an average 3 tons of coconut shell charcoal would yield 1 ton of activated carbon. The total capital outlay for a unit of 1 ton/day capacity of finished product would be around Rs.8.5 million.

At present there are nearly 6 activated carbon units in India. The present production is estimated at 5000 metric tonne per year. Being a product of unique utility this is likely to gain a growth rate of 20 per cent in the export market.

Conclusion

While the Indian Coconut Industry is on the path to steady progress in terms of productivity and production, there is considerable further scope in the areas of product diversification and value addition by increasing popular adoption of latest technological developments.

The growing health consciousness and the preference for natural products needs to be fully

exploited in promoting tender nut water as a health drink with international acceptance.

An integrated approach for processing and marketing of coconut and its product is essentially needed to make inroads in the export market. Adherence to globally accepted quality standards is also of paramount importance not only for India but for all coconut producing countries. This would enable coconut to realize its potential as a renewable resource which can be put to a wide array of profitable and nourishing end uses, through synergy in processing and marketing efforts of all countries under the APCC umbrella.

Cooperation in ways and means to achieve further value addition in traditional knowledge relating to coconut by utilizing advantages of Geographical Indications in APCC member countries can also be explored profitably.

Country paper presented in the 43rd Cocotech

China firm offers 'COCONUT MOSAIC'

China-based Zaijian Mosaic, among the largest mosaic suppliers in the world and now a popular brand in the Gulf, has launched an innovative product known as Tropical Life, which is a 'coconut mosaic'.

Natural coconut shell has been used in combination with marble mosaic for manufacturing this tile series, in an attempt to combine the spirit of simple tropical life with contemporary design trends in mosaic tiles for urban homes and offices.

Also available as medallions, the tiles have an enhanced appeal thanks to the raw texture of the coconut precisely cut into medallions and bordered with traditional stone.

"The coconut mosaic used to produce these tiles helps to accentuate a feeling of simple and pure tropical life within modern building interiors. With a textured surface that alternates brown and white colours and the sophisticated surface finish of every single chip, these mosaic tiles create an ambiance of pure nature within a closed room. Close your eyes and you can smell the nature, walk bare feet and you can sense the nature," said Morpheus Chen, a spokesperson for the company.

Established in 1993 in Chengdu (Sichuan) China, Zaijian specialises in a wide range of European and American-style marble mosaic, high-quality art glass mosaic, luxury metal mosaic and different kinds of natural stone material.

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