

## PROCESSING, CHEMICAL COMPOSITION AND UTILIZATION OF ARECANUT

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Arecanut is used in India and other South East Asian countries as a masticatory. The uses of arecanut have been mentioned in ancient Sanskrit texts. It has both religious and medical significance. Chewing increases production of saliva, gastric juices and strengthens gums. Traditionally, betel nut and betel leaves are offered in religious functions. In addition to this other parts of the palm are used for various purposes. The leaf sheath is used to make throw away cups and plates and also used in manufacturing ply wood. The tannin extracted from immature and mature nuts is used in leather industries for colouring. The arecanut trunk is used in construction works.

### 1. Processing

Arecanut is processed by two methods in different states: 'chali' fully ripe dehusked graded nuts account for about 80 % of production, and saraku, semi-ripened, dehusked, boiled, coloured and dried nuts account for about 15 % . The most popular type of arecanut is dried whole nuts.

**1.1. Ripe nut processing for making chali/ dry kernel:** After harvesting, fully ripe fresh nuts are sun dried for 40-45 days. It is essential to spread the nuts in single layer for drying. Proper drying is essential to avoid fungal infections. Turning of nuts once in a week helps in uniform drying. The dry nuts are dehusked manually or

mechanically and marketed. Good quality chali/ dry kernel is free from immature nuts, surface cracking, husk sticking, fungal and insect infection.

**1.2. Tendernut / immature nut processing (Red Supari):** The nuts are harvested at 6 to 7 months maturity when they are green and soft and used for tender nut processing. Karnataka and Kerala are main processing areas for this type. The processing consists of dehusking, cutting nut into halves and boiling in water or dilute extract from previous boiling. After boiling, arecanut pieces are coated with 'kali', which is a concentrated extract after boiling 3-4 batches of arecanut, to get good quality processed nuts. These nuts are generally sun dried though occasionally oven drying is followed. The well-dried product should be crisp, dark brown in colour, glossy in appearance and well-toned astringency.

**1.3. Products of tender arecanut:** It is also used for making scented 'supari'. Dried arecanuts are broken into bits, blended with flavour and packed for marketing. The flavouring of supari varies with region and market preferences. The products of tender nut processing are widely used in making scented supari. Spices and synthetic flavours are added. Rose essence and menthol are common additives. The scented supari is packed in aluminum or butter paper

pouches for marketing. Recently a product blended with cashew nut bits called 'kaju-supari' has been developed and marketed.

## 2. Medicinal and other uses

Traditionally betelnut and betel leaves are offered in religious and social functions. The practice of chewing the arecanut, either alone or in combination with betel leaves or pan (*Piper betle* L.), lime, tobacco, camphor or spices, the combination then being called tambula has been in existence from time immemorial. Chewing is said to increase the production of saliva and gastric juices and thus aid digestion. It is believed to strengthen the gums and the teeth and cleanses and deodorises the mouth. It is also an appetizer and a stimulant.

The ripe nut has astringent quality and is used in veterinary practice as vermifuge. Arecanut powder is an effective antihelmenthic for dogs and in the treatment of leucoderma, leprosy, cough, epilepsy, obesity and anaemia. It is used in various ayurvedic medicines in modern times. It is especially useful in bleeding gums, as skin ointment and for controlling dysentery. The tannins of arecanut can be used in tanning industry and also for dyeing clothes.

## 3. Chemical composition

The arecanut is used both in raw and processed forms or value added products. The nuts contain mainly polyphenols, fat, polysaccharides, fiber and protein. Polyphenols, which constitute 11-18% in dried nuts, are mainly flavonols. Among these catechin (10%), epicatechin (2.5%), leucocyanidin (12%) are the major. The fat content ranges from 9 to 15% in dry arecanut. The fat sample is shown to have a melting point of 38°C, specific gravity of 0.973

at 15°C, saponification value of 236.4 and iodine value of 59. It is rich in saturated fatty acids like myristic acid, which forms about 50%. Other fatty acids present in smaller amounts are lauric acid, palmitic acid and capric acid. The polysaccharides constitute 17 to 25 % and proteins 6.2 to 7.5 % in ripe nuts. The mineral constituents are calcium (0.05 %), phosphorus (0.13 %), and iron (1.5 mg/100 g). Arecanut contains high level of copper (205-535 nmol/g) also. Arecanut kernels contain 11.35-11.45% crude fat, 13.92-14.16% crude fiber, 2.45-3.59% total sugar and 4.48-5.59% polysaccharides.

Arecanut contains about five alkaloids, the main and most active being arecoline (0.07-0.24%). The other alkaloids are arecaidine, guvacine, guvacoline and arecolidine.

**3.1. Polyphenol:** Polyphenols, which are major components, have been identified to be flavonols. The monomeric components include about 10% (+) catechin, 2.5% (+) epicatechin, 12% (+) leucocyanidin and 1.3% of another isomer of complex flavonoid varying degrees of polymerization. The polyphenols ranged from 14.5-19.8% among the high yielding varieties.

**3.2. Carbohydrates:** Arecanut powder was extracted with perchloric acid. Total Hydrolysable polysaccharides were estimated by Phenol-Sulphuric acid method. The starch content showed variation between 14.6 – 24.0%.

**3.3. Alkaloids:** The arecoline contents were 0.180 – 0.375% in the areca cultivars. The chemical has pharmacological properties.

**3.4. Arecanut fat:** It is seen that fractions containing over 90% of lauric and myristic acids could be obtained. These fractions could be used in the manufacture of soaps, fatty

alcohols, esters and various surfactants needed in cosmetic, pharmaceutical, detergent and pesticide industries. Capric and myristic acids and their derivatives have excellent export potential.

#### 4. Utilization

**4.1. Utilization in tanning:** It is reported that arecanut tannins as such and with different blended extract ratios of other tanning materials could be successfully utilized for retanning of chrome leathers. The tannins can also be used for dyeing clothes, rope etc. It may also be used as an adhesive in plywood manufacture.

**4.2. By-product utilization:** Defatted and detanned arecanut meal can be used in compound feed formulations and fertilizers. During splitting, 11.2-14% glycerol is formed which can be recovered. Good quality defatted arecanut meal can be utilized for scented supari manufacture.

**4.3. Developing edible uses for arecanut constituents:** Areca fat can be used for certain confectionary purpose after modification using different blend ratios of areca fat and cocoa butter or areca fat and butter fat. This can be used as a substitute for cocoa butter or for the manufacture of imitation dairy products. The polymerized polyphenolics in arecanut are promising in use as natural colouring matter in food and nonfood products. Arecanut extract can be used successfully in the preparation of chewing gums.

#### 5. Use of other plant parts

**5.1. Arecanut husk:** The husk is the outer cover of the areca fruit and constitutes 60-80 % of the total volume and weight of the fruits (fresh

weight basis). It is now largely being wasted in its use as an inferior fuel and mulch. It is now being used in Indo-China and the Philippines for tooth brushes. The husk fibres are predominantly composed of cellulose with varying proportions of hemicellulose, lignin, pectin and propectin. The fibres adjoining the inner layers are irregularly lignified groups of cells called 'hard fibres' and the middle layer below the outermost layer is soft fibre. The total hemicellulose content varies with development and maturity; the mature husk contains less hemicellulose than the immature ones. The lignin content increases proportionately with development till maturity is reached. The areca husk fibre could be used for making items such as thick boards, fluffy cushions and non-wooven fabrics.

Areca husk fibre could be used as a cushioning material, a substitute to cotton wool and as a complimentary material to coir. It was used for making rubberized mattresses and fibreboards. Soft cushion pads made from spongy fibrous mass obtained by boiling the green husk with alkali and defibrated compared well with cushion pads made with imported material and that these could be used as packaging for books, making cushioned envelopes, soft boards *etc.*

**5.2. Packaging paper boards:** The pulp obtained from the leaf sheath in admixture with other pulp could be used for making packing paperboards. The paper boards made with greater amounts of arecanut sheath materials had more resistance to water absorption. The addition of paper increased the substance weight of the paperboards.

**5.3. Oyster mushroom production:**

Bioconversion of organic residues of arecanut plantation through mushroom cultivation offers the potential for efficient recycling of organic wastes, especially in a country like India, where the problem of protein deficiency exists. High production of oyster mushroom, *Pleurotussajorcaju* can be obtained using substrates composed of arecanut leaf and inflorescence wastes.

**5.4. Disposable cups and plates:** The flexibility of the sheath when wet makes it a good material for heat moulding. Cups and plates are already being produced in cottage level small-scale units in India. The leaf sheath cups and plates have found market in the urban areas in functions and parties as replacement for plastic cups and plates.

**5.5. Ply boards:** Ply boards are prepared using cold or hot setting urea formaldehyde (UF) resin as glue, extended with tamarind seed powder (TSP) or deoiledsal meal upto 15 per cent. Tea chests and packing cases made of areca leaf

sheath ply boards can be put to most of the uses for which ply boards are presently used.

**5.6. Other possible applications:** Briefcases, bags, spectacle cases, tea and coffee trays, file boards and many other fancy and utility products have been prepared from areca leaf sheaths. Possibilities for using the sheaths in the manufacture of match boxes; matchsticks and paperboards for packing also appear to be promising. The corky feel and lightness of the sheath make it possible to convert the sheaths into packing wool for making lining materials in place of cork sheaths. Test conducted for thermal and electrical conductivity of sheath have shown that it could enter manufacturing fields where thermal and electrical insulations are needed. But with the fluctuation in market prices, the producer who depends on this crop suffers and also to a certain extent the general economy suffers a setback. To avoid such fluctuation in price and hardship, it is necessary to divert the small quantity, which causes glut in the market, to other uses.

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