

Cocosnucifera(L.) :A review

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ABSTRACT

Cocosnucifera(L.) (Arecaceae) is commonly called as the coconut tree and it is most naturally widespread fruit plant on earth. The parts of C. nucifera have properties such as anthelmintic, antidiabetic, antiinflammatory, antifungal, antimicrobial activities. C. nucifera has important pharmacological effects with low toxicity. It used traditionally by peoples in different countries to treat various illness. In addition, other properties such as antihypertensive, anti-inflammatory, antimicrobial, antioxidant, cardioprotective, antiseizure, cytotoxicity, hepatoprotective, vasodilation, nephroprotective, and anti-osteoporosis effects were also reported. Because each part of C. nucifera has different constituents, the pharmacological effects of the plant vary according to the part of the plant evaluated

Keyword : *Cocosnucifera L, traditional use, Phytoconstituents, coconut parts*

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Review of genus Cocos–Germplasm resources information network (GRIN) online database.

Plant Collection: Fresh, ripen coconuts of *Cocos nucifera* were collected from botanical garden of HSBPVT'S, GOI, College of Pharmacy, Kashti, Shrigonda, Ahmednagar, Maharashtra, India.

Cocos nucifera (L.) is an important member of the family Arecaceae (palm family) popularly known as coconut, coco, coco-da-bahia, or coconut-of-the-beach. The plant is originally from Southeast Asia (Malaysia, Indonesia, and the Philippines) and the islands between the Indian and Pacific Oceans. From that region, the fruit of the coconut palm is believed to have been brought to India and then to East Africa. After the discovery of the Cape of Good Hope, this plant was introduced into West Africa and, from there, dispersed to the American continent and to other tropical regions of the globe. The plant is an arborescent monocotyledonous tree of around 25 m in height (giant coconut) with a dense canopy (Figure 1). The root of the coconut system is fasciculated. The stem is an unbranched type, and at its apex, a tuft of leaves protects a single apical bud. The pinnate leaves are feather-shaped, having a petiole, rachis and leaflets. Under favorable environmental conditions, the giant adult coconut emits 12-14 inflorescence

spikes per year, while the adult dwarf coconut can emit 18 spikes in the same period. The axillary inflorescence has globular clusters of female flowers. The plant is monoecious (male and female reproductive organs on the same plant)

For analyzing chemical properties of the fruit, fruit were separated, dried in the air drier and ground. Moisture, titrable acidity, sugars, crude fibre, crude fat, crude protein and ash content were estimated by employing the standard methods of analysis . pH was measured by control dynamic digital pH meter

Minerals were analyzed by acid digestion .

Iron in the digested sample was determined by atomic absorption spectrophotometer according to method of Lindsey and Norwell. Other minerals including calcium, magnesium, phosphorus, zinc and potassium etc. were determined by the flame photometer according to the method of Lindsey and Norwell.

Etymology:

The name coconut is derived from the 16th century portuguese word



Fig.1

coco, meaning head or skull. After the three indentations on the coconut shell that resembles facial features. The binomial name *Cocosnucifera* is combination of words nux(nut) and fera(bearing) .

Fig1: De husk coconut fruit shows the characteristic three pores resembling a face

Plant : *Cocosnucifera(L)* is a large palm. It's height about 30m (100 ft) , with pinnae 60-90 cm (2- 3 ft) long. Healthy plant of coconut tree can yield up to 75 fruits per year. Given proper care and growing conditions, coconut palm produce their 1st fruit in 6 to 10 years, taking 15 to 20 years to reach peak production. Coconut palm require warm condition for successful growth. It requires the mean temperature



Fig.2

above 12-13°C every day of the year.

Coconut tree heavy with fruit.

Fruit: Botanically speaking, the coconut fruit is a drupe, not a true nut like other fruits. It has three layer epicarp, mesocarp and endocarp.

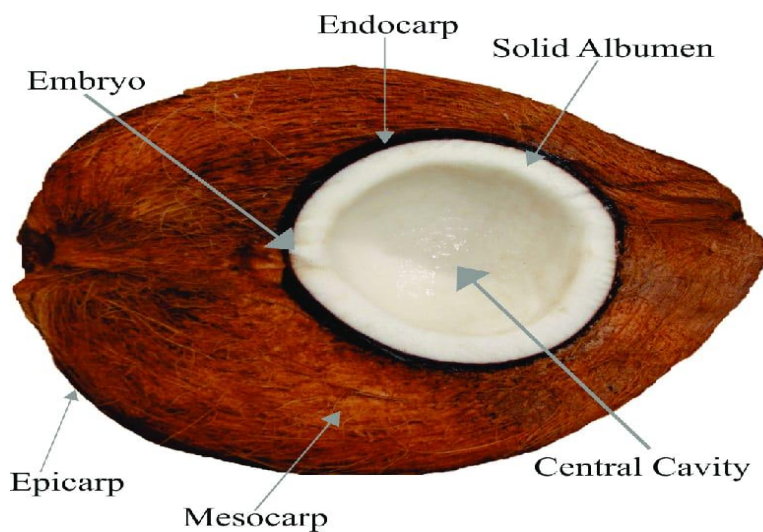


Figure 3 : parts of coconut fruit

A 100 gram reference serving of raw coconut flesh supplies 1,480 Kilojoules (354 kilocalories) of food energy and high amount of fat (33gm). It also contains the moderate quantity of carbohydrate(15gm) and protein (3gm).Micronutrient includes dietary minerals, manganese, Copper, iron, phosphorus, selenium and zinc. Coconut fruit is considered as functional food.

•coconut meat –

Coconut meat is good source of protein and an effective natural laxative. From the coconut meat we can also obtained products like coco flour, dedicated coconut, coco milk, coco chips, candies copra and animal feed.

• coconut water –

It is used for rehydration and kidney cleansing. Per 100 gram, coconut water contain 19 calories.

• coconut oil –

It is commonly used for its benefits for the hairs, face and skin. It’s extracted from copra and it has antimicrobial property.

Photochemistry of cocosnucifera (L) :

Photochemistry study of coconut fiber (mesocarp) ethanolic extract revealed that the presence of phenols, tannins, flavonoids, alkaloids. The butanol extract recovered triterpines, saponins, condensed tannins possess antihelminthic activity.

The lyophilized extract and ethyl acetate extract, from the C.nucifera (L) fiber are riched in polyphenol, compounds such as catechins, tannins, epicatechins.

The contituents of the liquid albumen were identified as vitamin B, nicotinic acid(B₃, 0.64ug/ml), riboflavin (B₂, <0.01ug/ml), folic acid (0.003ug/ml) with trace quantities of vitamins B₁, B₆ and C, thiamine, amino acid, L-arginine. Furthermore oil extracted from the solid albumenis primarily lauric acid and alpha tocopherol. Roots phenolic compound were identified as flavonoids and saponins. The other compounds found in leaf epicuticular wax were lupeol methyl ether, skimmiwallin[3b–methoxy–25–ethyl–9,19– cyclolanost– 24 (241) – ene]andisoskimmiwallin[3b–methoxy– 24 – ethyl – 9,19– cyclolanost–25(251)– ene].

Table 1: main phytoconstituents in different parts of Cocosnucifera(L).

| Phytochemical compounds | Coconut part / extract |
|--|---------------------------------------|
| Vitamin C | Liquid albumen |
| Lauric acid | Coconut oil |
| L - arginine | Liquid albumen and Solid albumen |
| a-tocopherol | Coconut oil |
| Saponin | Root |
| Catechin | Coconut fiber |
| Flavonoid | Coconut fiber, Root and Inflorescence |
| Tannin | Coconut fiber, Inflorescence |
| Lupeol- methylether, Skimmiwallin, Isoskimmiwallin | Leaves (epicuticular wax) |

Traditional use :

All the parts of fruit of the coconut tree have broad range of usefulness. Some of them have been used traditionally by people’s to cure various pathological conditions in various countries.

Table 2: Traditional use of Cocosnucifera(L) to treat different diseases.

| Coconut parts | Prepararion | Popular use | Country |
|---------------------|-------------|---|--------------------------------------|
| Coconut shell fiber | Tea | •diarrhea treatment • Amenorrhea •veneral diseases treatment | Brazil Haiti Trinidad |
| | Extract | •Antipyretic, kidney inflammation •Diabetes treatment •Asthma treatment | Guatemala Jamaica Haithi, peru |
| | Cream | • Abscesses, dermatitis dermatitis and injuries burns | Guatemala |
| Root | Tea | •Diarrhea and stomach pains | Papua, New Guinea |

| | | | |
|---------------------------------|-----------------------|---|---------------------|
| Solid albumen (pulp) of coconut | Extract | <ul style="list-style-type: none"> •Antipyretic,diarrhea treatment •Preventing hair loss, wound healing | Indonesia |
| | Oil | <ul style="list-style-type: none"> •Diarrhea treatment •oral contraceptives | Fiji, Indonesia |
| | Milk | <ul style="list-style-type: none"> •Aphrodisiac •Relief to rashes caused by HIV AIDS infections | Ghana Indonesia |
| | Pulp | <ul style="list-style-type: none"> •Treatment of fever and malaria •Treatment of renal diseases | Mozambique Kenya |
| | Decoction of the pulp | <ul style="list-style-type: none"> •Treatment of changes in menstrual cycle | Malaysia |
| Coconut water | Water | | Fiji |
| Inflorescence | Tea | | India |

II. Conclusion

Cocos nucifera is a widely dispersed plant that has important pharmacological effects with low toxicity. Furthermore, medicinal use of C. nucifera has an environmental appeal, since this plant is widely used in the food industry and use of discarded plant parts will reduce waste and pollution. The pharmacological effects of the plant differ according to the part of the plant or fruit used. Antioxidant activity predominated in the constituents of the endocarp and coconut water. In addition, the fiber showed antibacterial, antiparasitic, and anti-inflammatory activities. Only the ethanolic extract of the root had depressant and anticonvulsant action on the central nervous system. Coconut water seems to have protective effects, e.g., on the kidney and heart, and antioxidant activity, as well as a hypoglycemic effect. Some limitations of the studies on C. nucifera must be acknowledged. First, the studies have focused on the effects of different parts of the plant but without demonstrating the mechanisms underlying these actions. Second, formulations based on parts of the plant must be developed to conduct clinical trials

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