Popular Article

Volume 3 Issue 7
Page: 0460 – 0461

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Coconut (Cocos nucifera L.): Countless Benefits and its Scientific Evidences

Coconut is consumed in the daily diet in several part of the world. All parts of the coconut tree have medicinal properties. Many phytochemicals are present in different parts. Coconut water contains phenols and flavonoids. Pharmacological properties of coconut kernel, flower, husk, tender coconut water and virgin coconut oil were proved through *in vitro* and *in vivo* techniques. Ozone treatment and UV coupled polyamide membrane system could be used to improve shelf life of coconut water. Many value added products and nutraceuticals can be produced using coconut.

INTRODUCTION

In India, the coconut tree - *Cocos nucifera* L. has been considered from time immemorial as "Kalpavriksha," literally meaning "a tree of heaven". Over the generations the coconut palm and its products have been an integral part of the way of life of the people in the humid tropics. No other tree has been looked upon with such esteem either in the past or in the present anywhere in the world. The entire palm is beneficial-its roots, leaves, inflorescence, heart of palm and haustorium are having health benefits.

INDIGENOUS MEDICINAL PROPERTIES

Coconut inflorescence added with curd is aphrodisiac. Topical application of coconut shell ash mixed with slaked lime cure ringworm infection. Tender coconut water along with sandalwood paste is a remedy for fish poisoning and coconut husk ash could stop excess bleeding. Tender coconut roots pasted with Ashoka tree bark is a remedy for infertility. Its spindle leaf is eaten raw to relieve throat congestion.

PHYTOCHEMICALS

Phenols, flavonoids, glycosides, tannins, *etc.* are present in green coconut shell, roots as well as coconut oil and a natural colorant was also present in coconut mesocarp and exocarp. Total phenols and flavonoids in coconut water was quantified as 1.48 mg GAE g^{-1} and 0.53 mg QE g^{-1} (Oluwarotimi *et al*., 2021).

PHARMACOLOGICAL PROPERTIES

Authentication of traditional knowledge of coconut done through *in vitro* and *in vivo* studies showed that coconut kernel as well as powder isolated from petiole showed *in vitro* antimicrobial properties. Administration of coconut husk tea could lower blood glucose level in diabetic rats. Anti-anaemic activity of tender coconut water was also proven *in vivo*. Curcumin enriched virgin coconut oil proved to inhibit skin papilloma in rats. *In vitro* antioxidant activity of coconut flower was proven by Nagappan *et al*. (2021).

POSTHARVEST HANDLING AND VALUE ADDITION

Ultrafiltration (UF) of coconut skimmed milk yielded protein powder, kinetin and zeatin. Polysulfone membrane (PS10) was used to fractionate skimmed coconut milk into concentrated coconut protein solution. Coconut protein solution was then fed into a spray dryer and coconut protein powder was produced. UF permeate was again filtered through nanofiltration process using NF membrane to obtain the plant hormones, kinetin and zeatin. Ozone treatment and UV coupled polyamide membrane system (Vani *et al*., 2020) could improve shelf life of coconut water. Role of green nanoparticles in shelf life enhancement of coconut endosperm was also investigated. Silver nitrate was added with *Garuga pinnata* leaf extract to develop a silver nanoparticle. The developed silver nanoparticles were further treated with coconut DNA and a successful conjugation was obtained when detected using Agarose Gel Electrophoresis (Biswas *et al*., 2020). Coconut meal ladoo, non-diary cheese analogue, spice blended tender coconut water are the different value added products from coconut.

NUTRACEUTICALS

Nutrient rich coconut water could be obtained from coconut harvested at 13 months of maturity. Electrolytes *viz*., sodium, calcium, magnesium and zinc in coconut water found to increase with maturity and the maximum being recorded in 13 months old coconut (35.42 mg ml^{-1}, 27.12 mg ml^{-1}, 37.72 mg ml^{-1} and 0.27 mg ml^{-1} respectively). Herbal powder enriched chocolate coated coconut balls, coconut inflorescence sap powder and non-alcoholic palm nectar products paved the scope for the development of coconut nutraceuticals.

CONCLUSION

Coconut is a potential crop to be glorified for its countless nutritional and medicinal benefits. Its indigenous uses have been verified by phytochemical, pharmacological and post- harvest research. At present research on development of green nanoparticles and nutraceuticals is progressing worldwide aiming on building a safe and sustainable coconut community.

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