CHAPTER 7

HEALTH BENEFITS OF COCONUT SPIKELET INFLORESCENCE

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Introduction

The coconut palm is one of the most important of all cultivated palms in the world and is grown in more than 80 countries of the tropics. It is botanically known as cocos nucifera.L, and belongs to the natural order arecaceae (palmae) as important member of monocotyledon. Coconut flower is an indispensable item in the auspicious moments in Kerala. Whether it is a wedding or a temple festival, the ceremony cannot take place without the use of coconut flowers. These flowers are effective remedies for lifestyle diseases such as diabetes, cholesterol, and high blood pressure. Honey in coconut blossom can reduce diabetes. Coconut spikelet inflorescence or coconut flower is also used for healing many diseases. A tonic made of coconut flower is a well-known medicine. It is a medicine that can be made in Ayurvedic shops and at home alike. According to elderly, drinking a cooled concoction made from boiling a bunch of coconut flower is good for some kidney related diseases.

Cocos nucifera inflorescence improves glucose homeostasis and antioxidant status. Treatment with inflorescence significantly lowered blood glucose levels thereby preventing steep onset of hyperglycaemia. It maintained glucose tolerance and glycosylated haemoglobin close to the values observed in normal control. In addition, the levels of serum total cholesterol and triglycerides were also lowered. Antioxidant enzymes registered a decline in their activity. But their activities were reverted towards near-normal range in inflorescence-supplemented animals. Oxidative damage in various tissues as evidenced by marked elevation in the levels of thio-barbituric acid reactive substances was nullified by inflorescence treatment, indicating its antioxidant efficacy in resisting oxidative damage. Many flowers also contain pollen which helps indigestion. Studies indicate that immature coconut inflorescence can lower blood glucose in diabetic. In Kerala, for women to eat lehyam after delivery, which is usually made from coconut inflorescence. Iron and zinc is found in abundantly and fatty acid is also very low in this inflorescence.

Coconut Palm and its Phytoconstituents

In the coconut matures, the pulp becomes firmer, with less water and its nutrients are more of carbohydrates (6.23%), proteins (3.33%), and mineral salts, particularly magnesium, calcium and phosphorus. However, the most abundant nutrient in the coconut is fat, which makes up more than a third of its mature weight. Most (up to 94.3%) of the fatty acids that make up coconut fat are saturated (Pattigadapa et al., 2011). Coconut water contains sugar, fibre, proteins, antioxidants, vitamins & minerals, & provides an isotonic electrolyte balance, making it a nutritious food source. Mature fruits have significantly less liquid (coconut water) than young immature coconuts .The coconut oil obtained from the kernel consists of monolauric and lauric acid, which helps the immune system in a beneficial manner. Two types of protein namely glutelin and prolamin, which were found in coconut milk, were also reported to be present in the juice of Cocos nucifera (Zakaria et al., 2006). Its

only monounsaturated fatty acid is oleic acid, while its only polyunsaturated fatty acid is linoleic acid (Shrivastava & Durgaprasad, 2008).

Pharmacological Activity

Coconut palms in India and world belonged to the sub family species Cocos nucifera have highest medicinal uses. This traditional medicinal knowledge had been supplanted by a conventional medical system, which, despite relying on many of the therapeutic compounds derived from traditional or alternative medical paradigm (Bayton, 2006).According to a study, the coconut tree inflorescence crude extract contains carbohydrates, protein, amino acid, alkaloid, flavonoids, terpenoids, tannins, saponin, phenolic compounds, xanthoprotein, reducing sugar , triterpenoids and Phlobatinins. The crude extract of coconut tree inflorescence displayed effective antimicrobial activities against pathogenic microbes. The crude extract had been found to have good potential activity against all tested bacterial strains.

COCONUT SPIKELET INFLORESCENCE

Palms (Areceae) include about 2800 species in 190 genera. Coconut is a member of the Arecaceae family, originating from the South Asian region. There are male flowers and female flowers, male flowers are smaller with a more significant number of flowers and are above the female flowers (Valensia et al., 2021). The inflorescence arise at leaf axils and are enveloped by a carinate spathe and unbranched spadices. It is a hard oblong longitudinally splitting spathe enclosing many yellow or orange male flowers and few female flowers (Figure 1). Flower bears lanceolate petals, 6 stamens and an ovary consisting of 3 connate carpals. The flower of the coconut palm is polygamo monoecious, with both male and female flowers in the same inflorescence. Flowering occurs continuously, with female flowers producing seeds (Swathi et al., 2021). Female coconut flowers have many positive impacts on health, especially for wound healing, because of their active substances (Khuluk et al., 2019). The female flowers on the coconut are known to be antimicrobial, antitumoral, and

antioxidants. As an antimicrobial, it inhibits the growth of Staphylococcus aureus bacteria, and as an antitumor, it can inhibit the growth of leukaemia cancer cells (Berthon, et al., 2017).

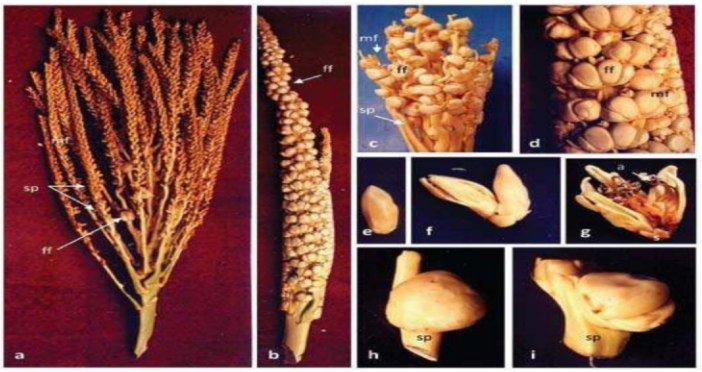

Fig 1. Coconut Spikelet Inflorescence (Source: Prasanthi et.al. 2008)

In Indian folk medicine, the fresh juice of Cocos nucifera inflorescence (CnI) is used in treating dyspepsia, diarrhoea, dysentery, diabetes, haemoptysis and strangury. In most of these cases, scientific proof in terms of modern medicine is lacking . The flowers of Cocos nucifera (L.) have a traditional use as a potent healer of many inflammatory disorders like postnatal changes. Food technology based studies are underway to use its powder as an alternate to wheat flour by considering its gluten free nature, nutritional value and natural sweetness. The flower (inflorescence) of Cocos nucifera (L.) may also be a natural and delicious alternative to wheat and grain, which is not explored yet. In India, the coconut flower infusions as tea are used for treating the disorders associated with menstrual cycle. Coconut flower nectar is full of vitamins and minerals which contains 17 amino acids, 14 minerals and vitamin C; has a broad spectrum of B vitamins (vitamin B1, B2, B3 and B6); and is high in potassium, magnesium, zinc and iron. The coconut flower is available as Ayurveda formulations and value added products for human consumption. An Ayurvedic preparation named “Thengin Pookula Lehyam”, made from coconut flowers, is widely used by the women of Kerala as a post-natal medicine and an in vivo study has proven a significant treatment effect of aqueous extract of

coconut flower on induced Poly Cystic Ovarian Disease (PCOD) in rats, which supports the traditional uses (Soumya et al., 2014). In traditional medicine, it helps in relieving back pain, promoting lactation, reducing post-natal tension and anxiety. It also helps in recovery from health changes and in the overall development of the baby and the mother. Yet, not much research studies have been carried out on the medicinal properties of the flower extracts of Cocos nucifera (L.). The phytochemicals were analyzed by preliminary tests in different solvent as well as aqueous extracts of the flowers of Cocos nucifera, in which the ethanol extract was found to have phytosterols and tannins. The alcoholic extract and oil of Cocos nucifera flower have shown a curative effect on alloxan-induced pancreatic cytotoxicity with an anti-diabetic action. The polyphenol tannins and the phytosterols are the phytochemicals proven to have an effective anti-inflammatory and anti-cancer properties. The waste fallen flowers can be used in ayurvedic preparations in the place of inflorescences. It was shown that the fallen C. nucifera female flowers can be used as antimicrobial agents, as antitumoral and antioxidants. (Raja & Poonkuil, 2015). In addition, female coconut flowers have many positive impacts on health because of their secondary metabolites such as flavonoids, saponins, tannins, and capric acid as antibacterial, antifungal, and antiviral. In tall type coconut, the inflorescence and flower development has been comprehensively studied. The development process takes over two years with floral 15 morphogenesis being the longest event taking about one year and sex determination, a rapid process occurring within a month.

Conclusion

This chapter profiles the potential usage of coconut spikelet inflorescence in human health and nutrition. Eventhough the application of coconut to health promotion and disease prevention have received wide publicity, coconut spikelet inflorescence and its importance is not clearly known to the population. Due to the presence of its secondary metabolites it has so many

positive effects on the health. So it is important to impart knowledge and incorporation in other ways for the betterment of life.

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