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Research Article

PRELIMINARY PHYTOCHEMICAL SCREENING OF *COCOS NUCIFERA* L. FLOWERS

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ABSTRACT

Medicinal plants are the local heritage with global importance. Plants and plant-based medicaments are the basis of many of the modern pharmaceuticals we use today for our various ailments. The present paper shows the therapeutic importance of *Cocos nucifera* flowers and features its medicinal character. The flowers of *Cocos nucifera* were collected, shadow dried and extracted with chloroform, methanol, ethanol, hydroalcohol and water. Phytochemical screening was carried out according to standard procedures. The preliminary phytochemical screening showed the presence of alkaloids, flavanoids, phenols, steroids and tannins in *Cocos nucifera* flowers.

Keywords: Phytochemical, *Cocos nucifera*, Alkaloids, Flavonoids.

INTRODUCTION

Natural phytochemicals derived from medicinal plants have gained significant recognition in the potential management of several human clinical conditions, including cancer [1]. "Phyto" is the Greek word for plant. There are many "families" of phytochemicals and they help the human body in a variety of ways. Phytochemicals may protect human from a host of diseases. They are non-nutritive plant chemicals that have protective or disease preventive properties. Plant produces these chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against diseases. There are many phytochemicals in fruits and herbs and each works differently [2].

The coconut, *Cocos nucifera* L., has been described as the "tree of life" or "tree of heaven" and nature's greatest gift to man. Each part of the coconut tree can be used to produce items of value for the community. *Cocos nucifera* L. is a dominant type tree belonging to the family Arecaceae (palm). The common name of *Cocos nucifera* is coconut or coconut palm. Coconut is believed to have its origins in the Indo-Malayan region, from where it spread throughout the tropics. The coconut palm is monoecious, i.e., with male and female flowers on the same inflorescence, called a spadix, that develops within a woody sheathe or spathe. At flowering, the spathe splits lengthwise to expose the spadix. Each spadix consists of a main axis 1–1.5 m (3.3–5 ft) in length with 40– 60 branches or spikelets bearing the flowers. Under favorable growing conditions, first flowering occurs about 4–5 years after planting 3.

Once a palm reaches maturity, a spadix (flower spike) is produced in every leaf axil. Between 12 and 15 spadices are produced throughout the year at fairly regular intervals, although drought conditions can delay the emergence of the spadix or cause it to abort. The number of female flowers per spadix varies. Since the floral primordia are initiated 12 months before the spadix emerges, the number is correlated to the growing conditions (weather, nutrition) 12 months prior to emergence. From the literature survey, it is quite evident that the flowers of *Cocos nucifera* has potent therapeutic value on the areas of anti bacterial, larvicidal, antioxidant, dietary, anti-inflamatory, hepatoprotective and anti cancer. The present investigation aims to focus the light on the phytochemical constituents of flowers of *Cocos nucifera.*

MATERIAL AND METHODS

Collection of plant materials

Cocos nucifera flowers were collected from Rasipuram, Namakkal district, Tamilnadu. Flowers were taken for the phytochemical analysis. The plant material was dried in shade, coarsely powdered and passed through sieve No.40 and was used for the extraction.

Preparation of extracts

The shade-dried flowers of *Cocos nucifera* were extracted with various solvents. Chloroform, methanol, ethanol, hydroalcohol (80% aqueous ethanol) and aqueous extracts of flowers of *Cocos nucifera* were prepared in 20g/200 ml. The excess solvent in the extracts were removed by distillation and concentrated on water bath. The extracts were then collected in petridish and stored in desiccators at room temperature. These extracts were used for the detection of phytochemical analysis.

Preliminary Phytochemical Screening

The various extracts of *Cocos nucifera* flowers were subjected to preliminary phytochemical screening [4].

Alkaloids

Mayer's Test: A small quantity of the extract was treated with few drops of dilute hydrochloric acid and filtered. The filtrate was tested with alkaloid Mayer's reagent. Formation of cream precipitate indicated the presence of alkaloids.

Wagner's Test: To 2-3 ml extract with few drops Wagner's reagent. Formation of reddish brown precipitate indicates the presence of alkaloids.

Flavonoids

NaOH Tests: To 2-3 ml of extract, few drops of sodium hydroxide solution were added in a test tube. Formation of intense yellow colour that became colourless on addition of few drops of dilute HCl indicated the presence of flavonoids.

Phenols

Phenol Test: When 0.5 ml of $FeCl_3$ (w/v) solution was added to 2 ml of test solution, formation of an intense colour indicated the presence of phenols.

Phytosterols

Salkowski Test: To 2 ml of extract, add 2ml chloroform and 2 ml concentrated $H_2SO_4$and was shaken well. Chloroform layer appeared red and acid layer showed greenish yellow fluorescence indicated the presence of sterols.

Liberman-Burchard's Test: Mix 2ml extract with chloroform. Add 1-2 ml acetic anhydride and 2 drops concentrated H_2SO_4 from the side of the test tube. First red, then blue and finally green colour indicated the presence of sterols.

Saponins

Foam Test: The extract was diluted with 20 ml of distilled water and it was shaken in a graduated cylinder for 15 minutes. A 1 cm. layer of foam indicated the presence of saponins.

Tannins

Ferric Chloride Test: Small quantity of extract was boiled in 20 ml of water in a test tube and then filtered. A few drop of 0.1% ferric chloride was added and observed for brownish green or blue-black coloration which indicate the presence of tannins.

Carbohydrates

Molish's Test: To 1 ml of extract, 2 drops of Molisch's regent was added in a test tube and 2 ml of concentrate H_2SO_4 was added carefully keeping the test tube slightly curved. Formation of violet ring at the junction indicated the presence of glycosides.

Aminoacids

Ninhydrin Test: To 5 ml of extract, 2 drops of freshly prepared 0.2 % ninhydrin reagent was added and heated. The appearance of blue colour indicates the presence of aminoacids.

Anthraquinones

0.5 g of the extract was boiled with 10 ml of sulphuric acid (H2SO4) and filtered while hot. The filtrate was shaken with 5 ml of chloroform. The chloroform layer was pipette into another test tube and 1 ml of dilute ammonia was added. The resulting solution was observed for colour changes.

RESULTS AND DISCUSSION

In the present investigation, preliminary phytochemical screening has been done in the various extracts of *Cocos nucifera* flowers and the results are presented in Table-1. The chloroform extract showed the presence of alkaloids, flavanoids, tannins and carbohydrates. The methanol extract showed the presence of alkaloids, flavanoids, phenols, carbohydrates and aminoacids. The ethanol extract contain phytosterols and tannins. The hydroalcoholic extract showed the presence of flavanoids, phenols, tannins and carbohydrates. The aqueous extract contains alkaloids, flavanoids, phenols, tannins and carbohydrates. The various extracts of *Cocos nucifera* flowers showed the absence of saponins and anthraquinones. The systemic research for useful bioactives from the plants is now considered to be a rational approach in nutraceuticals and drug research. The results of phytochemical analysis comprehensively validate the presence of therapeutically important and valuable secondary metabolites (Alkaloids, Flavonoids, Phenols, Tannins and Steroids) in *Cocos nucifera* flowers.

Table 1: The analysis of phytochemicals in the various extracts of *Cocos nucifera* flowers

Phytochemicals	Chloroform Extract	Methanol Extract	Ethanol Extract	Hydroalcohol Extract	Aqueous Extract
Alkaloids	+	+	-	-	+
Flavonoids	+	+	-	+	+
Phenol	-	+	-	+	+
Phytosterols	-	-	+	-	-
Saponins	-	-	-	-	-
Tannins	+	-	+	+	+
Carbohydrates	+	+	-	+	+
Aminoacids	-	+	-	-	-
Anthraquinones	-	-	-	-	-

+ = presence; - = absence

Medicinal plants are a source of great economic value all over the world. Nature has bestowed on us a very rich botanical wealth and a large number of diverse types of plants grow in different parts of the country. Herbal extracts contain different phytochemicals with biological activity that can be of valuable therapeutic index. Different phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases [5]. Alkaloids exhibit marked physiological effects when administered to animals and hence their wide use in medicine for development of drugs [6,7]. They produce analgesic, antispasmodic and bactericidal effects [8]. Flavonoids and tannins are phenolic compounds and plant phenolics are a major group of compounds that act as primary antioxidants or free radical scavengers [9]. Steroids, triterpenoids and saponins showed the analgesic properties and central nervous system activities [10, 11].

CONCLUSION

The phytochemical screening of *Cocos nucifera* flowers demonstrated the presence of alkaloids, flavonoids, phenols, phytosterols, tannins, aminoacids and carbohydrates. The phytochemicals present in *Cocos nucifera* flowers have well known curative activity against several human pathogens and therefore could suggest the use traditionally for the treatment of various diseases.

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