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Phytochemicals Investigation on a Tropical Plant, *Syzygium cumini* from Kattuppalayam, Erode District, Tamil Nadu, South India

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Abstract: The developing countries mostly rely on traditional medicines. This traditional medicine involves the use of different plant extracts or the bioactive constituents. This type of study provides the health application at affordable cost. This study such as ethnomedicine keenly represents one of the best avenues in searching new economic plants for medicine. In keeping this view in mind the present investigation is carried out in *Syzygium cumini* seed of Kattuppalayam, Erode District, Tamil Nadu, South India. The results suggest that the phytochemical properties of the seed for curing various ailments.

Key words: *Syzygium cumini,* ehtyl acetate, methanol, phytochemical, traditional medicine

Introduction

"Phyto" is the Greekword 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. Phytochemicals 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.

Syzygium cumini Skeels (or *Eugenia jambolana*) belonging to the family of Myrtaceae is a large evergreen tree. It has been valued in Ayurveda and Unani system of medication for possessing variety of therapeutic properties. Most of the plant parts are used in traditional system of medicine in India. According to Ayurveda, its bark is acrid, sweet, digestive and astringent to the bowels, anthelmintic and in good for sore throat, bronchitis, asthma, thirst, biliousness, dysentery, blood impurities and to cure ulcers (Kirtikar and Basu, 1975). In Unani medicine system the ash of leaves is used for strengthen the teeth and the gums, the seeds are astringent, diuretic, stops urinary discharge and remedy for diabetes and the barks showed good wound healing properties (Nadkarni, 1954). *Syzygium cumini* is a medicinal plant, whose parts were pharmacologically proved to possess hypoglycemic, antibacterial, anti-HIV activity and anti-diarrhea effects. (Bhuiyan *et al.,* 1996; Kusumoto *et al.,* 1995; Indira and Mohan, 1993; Ravi *et al.,* 2004). Slowing *et al.* (1994) and Muruganandan *et al.* (2001) reported the anti-inflammatory activity of leaf and barks. Hence, the present study has been made to investigate the phytochemical screening of the *Syzygium cumini* seed.

Materials and Methods

Plant materials: The fully mature *Syzygium cumini* seeds were collected in June-July 2006 from Kattuppalayam village in Erode District of Tamil Nadu, India from a single tree. The seed was identified and authenticated by Dr. S. Amerjothy, Head of the Department of Plant Biology and Plant Biotechnology, Presidency College, Chennai and voucher specimen (No. 1586) was deposited in the Herbarium of the same department.

Preparation of extracts: The *Syzygium cumini* fruits were first washed well and pulp was removed from the seeds. Seeds were washed several times with distilled water to remove the traces of pulp from the seeds. The seeds were dried at room temperature and coarsely powdered. The powder was extracted with hexane to remove lipids. It was then filtered and the filtrate was discarded. The residue was successively extracted with ethyl acetate and methanol using cold percolation method. The percentage yields were 1.81% in ethyl acetate and 10.36 % in methanol.

Preliminary phytochemicals screening: One gram of the ethyl acetate and methanol extracts of *Syzygium cumini* seed were dissolved in 100 ml of its own mother solvents to obtain a stock of concentration 1% (v/v). The extracts thus obtained were subjected to preliminary phytochemical screening following the methodology of Harborne (1998) and Kokate (2001).

Screening procedure

Test for alkaloids: Five ml of the extract was added to 2 ml of HCl. To this acidic medium, 1 ml of Dragendroff's reagent was added. An orange or red precipitate produced immediately indicates the presence of alkaloids.

Test for amino acids: One ml of the extract was treated with few drops of Ninhydrin reagent. Appearance of purple colour shows the presence of amino acids.

Test for anthraquinones: Five ml of the extract solution was hydrolysed with diluted Conc. H_2SO_4 extracted with benzene. 1 ml of dilute ammonia was added to it. Rose pink coloration suggested the positive response for anthraquinones.

Test for flavonoids: One ml of the extract, a few drops of dilute sodium hydroxide was added. An intense yellow colour was produced in the plant extract, which become colourless on addition of a few drops of dilute acid indicates the presence of flavonoids.

Test for glycosides: The extract was hydrolysed with HCl for few hours on a water bath. To the hydrolysate, 1ml of pyridine was added and a few drops of sodium nitroprusside solutions were added and then it was made alkaline with sodium hydroxide solution. Appearance of pink to red colour shows the presence of glycosides.

Test for phytosterol: The extract was refluxed with solution of alcoholic potassium hydroxide till complete saponification takes place. The mixture was diluted and extracted with ether. The ether layer was evaporated and the residue was tested for the presence of phytosterol. The residue was dissolved in few drops of diluted acetic acid; 3 ml of acetic anhydride was added followed by few drops of Conc. H_2SO_4. Appearance of bluish green colour showed the presence of phytosterol.

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

Test for steroids: One ml of the extracts was dissolved in 10 ml of chloroform and equal volume of concentrated sulphuric acid was added by sides of the test tube. The upper layer turns red and sulphuric acid layer showed yellow with green fluorescence. This indicated the presence of steroids.

Test for tannins: Five ml of the extract and a few drops of 1% lead acetate were added. A yellow precipitate was formed, indicates the presence of tannins.

Test for triterpenoids: Ten mg of the extract was dissolved in 1 ml of chloroform; 1 ml of acetic anhydride was added following the addition of 2 ml of Conc. H_2SO_4. Formation of reddish violet colour indicates the presence of triterpenoids.

Table 1: The analysis of phytochemicals in the ethyl acetate and methanol extract of syzygium cumini

	Inference	
Phytochemicals	Ethyl acetate	Methanol
Alkaloids	+	+
Amino acids	+	+
Anthraquinones	-	-
Flavonoids	+	+
Glycosides	+	+
Phytosterol	+	+
Saponins	+	+
Steroids	+	+
Tannins	+	+
Triterpenoids	+	+

+ = presence; - = absence

Results

The result obtained in the present investigation (Table 1), the ethyl acetate and methanol extracts of the seeds of *Syzygium cumini* showed the presence of alkaloids, amino acids, flavonoids, glycosides, phytosterols, saponins, steroids, tannins and triterpenoids. Further, the ethyl acetate and methanol extracts of the seeds showed the absence of anthraquinones,

Discussion

A variety of herbs and herbal extracts contain different phytochemicals with biological activity that can be of valuable therapeutic index. Much of the protective effect of fruits and vegetables has been attributed by phytochemicals, which are the non-nutrient plant compounds. Different phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases. For example, Phytochemicals such as saponins, terpenoids, flavonoids, tannins, steroids and alkaloids have anti-inflammatory effects (Liu, 2003; Manach *et al.,* 1996; Latha *et al.,* 1998; Akindele and Adeyemi, 2007; Ilkay Orhan *et al.,* 2007). Glycosides, flavonoids, tannins and alkaloids have hypoglycemic activities (Oliver, 1980; Cherian and Augusti, 1995). Rupasinghe *et al.* (2003) have reported that saponins possess hypocholesterolemic and antidiabetic properties. The terpenoids have also been shown to decrease blood sugar level in animal studies (Luo *et al.,* 1999). Steroids and triterpenoids showed the analgesic properties (Sayyah *et al.,* 2004 and Malairajan *et al.,* 2006). The steroids and saponins are responsible for central nervous system activities (Argal and Pathak, 2006).

Phytochemicals screening of the ethyl acetate and methanol extracts of *Syzygium cumini* seed used in this study revealed that the crude extracts contained alkaloids, amino acids, flavonoids, glycosides, phytosterols, saponins, steroids, tannins and triterpenoids (Table 1). Syzygium cumini seeds can also have various medicinal values such as anti-inflammatory, anti-diabetic and analgesic activities and also for central nervous system activity.

Even though, this is only a preliminary study of the occurrence of certain properties of *Syzygium cumini* seed an in-depth study will provide a good concrete base of all the phytochemicals functions mention above.

Conclusion: In the present study, we have found that most of the biologically active phytochemicals were present in the ethyl acetate and methanol extracts of *Syzygium cumini* seed. The medicinal properties of *Syzygium cumini* seed extract extracts may be due to the presence of above mentioned phytochemicals. Further studies are in progress in our laboratory to isolate the active components.

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