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PHYTOCHEMICAL SCREENING OF SYZYGIUM CUMINI SEEDS

***Azra Kamal**

Forensic Science Laboratory, C.I.D (Police), Patna-800023, Bihar, India

*Author for Correspondence

ABSTRACT

The phytochemical analysis of the medicinal plants are important and have commercial interest in both research institutes and pharmaceutical companies for the manufacturing of the new drugs for treatment of various diseases. The present study was aimed to investigate the preliminary phytochemical screening of the seeds of *Syzygium cumini* belonging to family Myrtaceae. The results revealed the presence of medicinally important phytochemical constituents in the ethyl acetate and methanol extracts of *Syzygium cumini* seeds and it justifies their use in the traditional medicines for the treatment of different diseases. Additional work is encouraged to elucidate the possible mechanism of action of these extracts.

Keywords: *Phytochemicals, Syzygium Cumini Seeds, Ethyl Acetate Extract, Methanol Extract and Medicinal Plants*

INTRODUCTION

Medicinal plants are the local heritage with global importance and world is endowed with a rich wealth of medicinal plants (Suriyavathana *et al.*, 2010). Medicinal plants are the richest bio-resource of drugs of traditional systems of medicine, modern medicines nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs (Ncube *et al.*, 2008). Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defense mechanism and protect from various diseases (Krishnaiah *et al.*, 2007). *Syzygium cumini* (L.) is belonging to the family Myrtaceae. Large trees cultivated throughout India for the edible fruits (Black Plum) and are reported to contain vitamin C, gallic acid, tannins, anthocyanins, includes cyanidin, petunidin, malvidinglucoside and other components (Martinez and Del, 1981), (Wealth of India Raw materials 1976). *Syzygium cumini* is a medicinal plant, whose parts were pharmacologically proved to posses hypoglycaemic, antibacterial, anti –HIV activity and anti- diarrhea effects (Bhuiyan *et al.*, 1996), (Kusumoto *et al.*, 1995), (Indira and Mohan 1993), (Ravi *et al.*, 2004). Leaves and barks of *Syzygium cumini* have anti-inflammatory activity (Slowing *et al.*, 1994), (Muruganandan *et al.*, 2001). Leaves have been also used in traditional medicine as a remedy for diabetes mellitus in many countries (Rahman and Zaman 1989), (Texixer *et al.*, 2000). Extract of seed which is traditionally used in diabetes, has a hypoglycemic action and antioxidant property in alloxan diabetic rats (Prince *et al.*, 1998) possibly due to tannins (Bhatia *et al.*, 1971). So, the study aimed to analyze the phytochemical screening of the *Syzygium cumini* seeds.

MATERIALS AND METHODS

Collection of Plant Materials

The fruits of *Syzygium cumini* were collected from Sanjay Gandhi Botanical and Zoological Garden Patna, Bihar, India. The fresh fruits were washed under running tap water to remove dust, pulp was separated, seeds were washed thoroughly, air dried and crushed into powder.

Preparation of Plant Extracts

The powder was extracted with hexane and filtered, residue was extracted with ethyl acetate and methanol using cold percolation method. Extract were taken and used for further phytochemical analysis.

Phytochemical Screenings

The seed extracts of *Syzygium cumini* were analysed for the presence of alkaloids, glycosides, tri terpenoids, steroids, saponins, flavonoids, tannins and carbohydrates according to standard methods (Harborne 1998), (Kokate 2001).

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Test for Alkaloids: 2 ml of dilute hydrochloric acid was added to the 5 ml of extract then treated with Dragondroff’s reagent, appearance of an orange brown precipitate showed the presence of alkaloids.

Test for Glycosides: The extract was hydrolysed with dilute hydrochloric acid for few hours on a water bath. 1 ml of pyridine and a few drops of sodium nitroprusside solution were added. Then 2-3 drops of dilute NaOH was mixed. Pink colour produced which turn into red indicated presence of glycosides.

Test for Triterpenoids: About 5 ml of extract was mixed in 2 ml of chloroform; 2 ml of acetic anhydride and a few drops of conc. H₂SO₄ was added. Reddish violet colour indicated the presence of triterpenoids.

Test for Steroids: 10ml of chloroform was mixed with 2ml of extracts and conc. H₂SO₄ was added to form lower layer. A reddish yellow colour at the interface was an indicative of the presence of steroidal ring.

Test for Saponins: 15 ml of distilled water was added to the extract and shaken vigorously until formation of a stable persistent froth which indicates presence of saponins.

Test for Flavonoids: Few drops of dilute NaOH was mixed with 2 ml of extract. A yellow solution that turns colourless showed the presence of flavonoids.

Test for Tannins: In a test tube containing little quantity of extract few drops of 1 % lead acetate were added. Yellow precipitate appeared it showed the presence of tannins.

Test for Carbohydrates: The small portion of extract was mixed with 2ml of Molisch’s reagent and the mixture was shaken properly. After that 2ml of concentrated H₂SO₄ was poured carefully along the side of the test tube. Violet ring at the interphase was not formed which indicates absence of carbohydrate.

Table 1: Phytochemical test of seed extract of *Syzygium cumini*

S.No.	Phytoconstituents	Type of extracts	
		Ethyl acetate extract	Methanol extract
1.	Alkaloids	+	+
2.	Glycosides	+	+
3.	Triterpinoids	+	+
4.	Steroids	+	+
5.	Saponins	++	++
6.	Flavonoids	++	++
7.	Tannins	+	+
8.	Carbohydrates	-	-

+ indicates presence of the Phytoconstituents

++ indicates present in more quantity of the Phytoconstituents

– indicates absence of the Phytoconstituents.

RESULTS AND DISCUSSION

Results

The results of phytochemical analysis are given in the Table 1. It revealed the presence of alkaloids, glycosides, triterpenoids, steroids, saponins, flavonoids, tannins except carbohydrates in the extracts of *Syzygium cumini* seed.

Discussion

Phytochemical analysis conducted on the plant extracts has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Analysis of the plant extracts revealed the presence of phytochemicals such as alkaloids, glycosides, triterpenoids, steroids, saponins, flavonoids and tannins except carbohydrates, results were summarized in Table 1. The various phytochemical compounds detected are known to have beneficial importance in medicinal sciences. For instance, Alkaloids have been associated with medicinal uses for centuries and one of their common biological properties is their cytotoxicity (Nobori *et al.*, 1994). Several workers have reported the analgesic (Antherden, 1969), (Harborne, 1973) antispasmodic and antibacterial properties of alkaloids (Stray, 1998) (Okwuand, 2004). Glycosides are known to lower the blood pressure according to many reports (Nyarko and Addy 1990). The terpinoids have been shown to decrease blood sugar level in animal studies (Luo *et al.*, 1999). The

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triterpenoids have analgesic properties (Kumar *et al.*, 2009). Plant steroids are known to be important for their cardiostimulant activities and also possess insecticidal and antimicrobial properties. They are also used in nutrition, herbal medicine and cosmetics (Callow, 1936). Saponins have the property of precipitating and coagulating red blood cells. Some of the characteristics of saponins include formation of foams in aqueous solutions, hemolytic activity, cholesterol binding properties and bitterness (Sodipo *et al.*, 2000), (Okwu, 2004). Saponin is used as mild detergents and in intracellular histochemical staining. It is also used to allow antibody access in intracellular proteins. In medicine, it is used in hypercholesterolaemia, hyperglycaemia, antioxidant, anticancer, anti-inflammatory, weight loss, etc. It is also known to have antifungal properties (Haslem, 1989). Flavonoids were found in the extracts and are potent water soluble antioxidants (Borhade, 2012). Flavonoids have been referred to as nature's biological response modifiers, because of their inherent ability to modify the body's reaction to allergies and virus and they showed their anti-allergic, anti-inflammatory, anti-microbial and anti-cancer activities (Aiyelaagbe and Osamudiamen, 2009). Tannins bind to proline rich protein and interfere with protein synthesis (Yadav and Agarwala, 2011). Tannins were reported to exhibit antiviral, antibacterial and anti-tumour activities. It was also reported that certain tannins were able to inhibit HIV replication selectively and was also used as diuretic (Callow, 1936). The results obtained in this study indicate that phytochemical compounds are the bioactive constituents and this tropical plant *Syzygium cumini* seed is proving to be a valuable reservoir of bioactive compounds of potential health benefits. More research is needed to fully explain the actions of these phytochemical compounds in the human body.

Conclusion

The results revealed the presence of medicinally important phytochemical constituents in the ethyl acetate and methanol extracts of *Syzygium cumini* seeds. Additional work is encouraged to elucidate the possible mechanism of action of these extracts.

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