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QUALITATIVE PHYTOCHEMICAL ANALYSIS OF *MADHUCA LONGIFOLIA*

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ABSTRACT

Medicinal plants are having a great importance to pharmaceutical industry because these are rich source of drugs and a vast reservoir of chemical diversity for screening programs aimed at new drug discovery. *Madhuca longifolia* is one of the universal plant having medicinal activities. In this present study an attempt has been made to screen phytochemical profile of *Madhuca longifolia* leaves. The presence of some bioactive substances established phytochemical activity of the *Madhuca longifolia* leaves which supports the traditional medicinal utilization of the plant. Further biological study is required to explore their potential therapeutic activities.

Keywords: Phytochemicals, *Madhuca Longifolia* Leaves, Methanol Extract, Aqueous Extract and Medicinal Plants

INTRODUCTION

Plants are being an effective source of both traditional and modern medicines are genuinely useful for primary healthcare. The medicinal plants produce wide range array of bioactive molecules and rich source of medicines (Agharkar, 1991). Traditional healing systems around the world that utilize herbal remedies are an important source for the discovery of new antibiotics (Okpekon *et al.*, 2004). The secondary metabolites are the important substance responsible for the main medicinal properties in the crude drugs (Sengar and Agarwal, 2009). *Madhuca longifolia* belongs to the family Sapotaceae. It is a medium sized deciduous tree distributed in Nepal, India and Srilanka (Saluja *et al.*, 2011). Previous phytochemical studies on *Madhuca indica* included characterization of sapogenins, triterpenoids, steroids, saponins, flavonoids and glycosides (Kumar *et al.*, 2011). The medicinal properties attributed to this plant are stimulant, demulcent, emollient, heating and astringent (Awashthi and Mitra, 1967). The flowers have been traditionally used as cooling agent, tonic, aphrodisiac, and astringent, demulcent and for the treatment of helminthes, acute and chronic tonsillitis, pharyngitis as well as bronchitis (Chandra 2001). *Madhuca longifolia* leaves are expectorant and also used for chronic bronchitis, Cushing's disease, verminosis, gastropathy, dipsia, bronchitis, consumption, dermatopathy, rheumatism, cephalgia and hemorrhoids. The seeds fat has emulsuscent property, used in skin disease, rheumatism, headache, laxative, piles and sometimes as galactogogue. The bark is used for rheumatism, chronic bronchitis, diabetes mellitus, decoction for rheumatism, bleeding and spongy gums. It is a good remedy for itch, swelling, fractures and snake- bite poisoning, internally employed in diabetes mellitus, fruits are astringent and largely employed as a lotion in chronic ulcer, in acute and chronic tonsillitis and pharyngitis (Sunita and Sarojini, 2013). Preliminary phytochemical screening of the plants is primarily an important aspect in finding the chemical constituents in plant materials. Hence, the present investigation is carried out to find out the phytochemicals present in the leaves of *Madhuca longifolia*.

MATERIALS AND METHODS

Collection of Plant Material and Extraction

The fresh leaves of *Madhuca longifolia* were collected from Sitamarhi district of Bihar, India. The shade dried, coarsely powdered leaf material was extracted successively with methanol and aqueous using soxhlet apparatus. Extract were obtained and used for further phytochemical analysis.

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Phytochemical Qualitative Analysis

Freshly prepared extracts were subjected to phytochemical evaluation for the detection of various phytochemical constituents using conventional protocol (Harborne, 1992), (Kokate, 1994).

Alkaloids (Hager's test): 3ml of dilute hydrochloric acid was added to the small amount of extract and filtered. Filtrate was mixed with 2ml of Hager's reagent; formation of a yellow precipitate was regarded as positive for the presence of alkaloids.

Carbohydrates (Molish's test): 2ml of extract was mixed with 1ml of Molisch's reagent; 2ml of concentrated H₂SO₄ was poured carefully along the side of the test tube. Appearance of a violet ring at the interphase indicated the presence of carbohydrate.

Proteins (Biuret test): Small amount of copper sulphate solution was added with 5ml of extract, NaOH solution was mixed, violet color appeared suggesting the presence of proteins.

Saponins (Froth test): 2ml extract was mixed with 15ml of distilled water, shaken vigorously. Formation of foam was taken as an indication for the presence of saponins.

Tannins (Lead acetate test): A small amount of extract was treated with lead acetate and observed for the formation of white precipitate which shows presence of tannins.

Triterpenoids (Noller's test): A small amount of extract was heated with tin and thionyl chloride, formation of pink color was an indication of the presence of triterpenoids.

Gums/Mucilage: The extract was mixed with water, no thickening of the substances occur indicates absence of gums.

Fixed oils & Fats: A small quantity of extract pressed between the filter papers. No formation of oil spot indicates the absence of fixed oils and fats.

Table 1: Phytochemical screening of leaf extracts of *Madhuca longifolia*

Phytochemical Tests	Methanol extract	Aqueous extract
Alkaloids	+	+
Carbohydrates	+	+
Proteins	+	+
Saponins	+	+
Tannins	+	+
Triterpenoids	+	+
Gums/Mucilage	-	-
Fixed oils & Fats	-	-

+ Present, - Absent

RESULTS AND DISCUSSION

Results

The present study was carried out on the leaf extracts of *Madhuca longifolia* revealed the presence of alkaloids, carbohydrates, proteins, saponins, tannins, triterpenoids and absence of gums and fixed oils (Table – 1).

Discussion

The performed qualitative studies indicate the presence of various phytoconstituents such as alkaloids, carbohydrates, proteins, saponins, tannins, triterpenoids except gums and fixed oils in the methanolic and aqueous extract of *Madhuca longifolia* leaf. The phytochemical compounds detected are known to have beneficial importance in medicinal sciences. For instance, the alkaloids contained in plants are used in medicine as anaesthetic agents (Pandey *et al.*, 2011) Saponins possess hypocholesterolemic and antidiabetic properties (Rupasinghe *et al.*, 2003). Saponins also revealed the inhibitory effect on inflamed cells (Just *et al.*, 1998). Many human physiological activities, such as stimulation of phagocytic cells, host-mediated tumour activity and a wide range of anti-infective actions have assigned to tannins (Haslam, 1996). Tannins have also been found to form irreversible complexes with proline rich protein (Shimada, 2006) resulting in the inhibition of cell protein synthesis. Tannins are known to react with

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proteins to provide the typical tanning effect which is important for the treatment of inflamed or ulcerated tissues (Parekh and Chanda, 2007). Herbs that have tannins as their main components are astringent in nature and are used for treating intestinal disorders such as diarrhea and dysentery (Dharmananda, 2003). The terpenoids have also been shown to decrease blood sugar level in animal studies (Liu, 2003). Terpenoids regulate various transcription and growth factors, inflammatory cytokines, and intracellular signaling pathways involved in cancer cell proliferation, apoptosis and tumor angiogenesis (Patlolla and Rao, 2010). The present studies provide phytochemical potential of *Madhuca longifolia* leaves and support the traditional uses of the plant for the treatment of various diseases.

Conclusion

The phytochemical screening process showed the presence of medicinally important constituents in the leaf extracts of *Madhuca longifolia*. Further biological study is required to explore their potential therapeutic activities.

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REFERENCES

- Agharkar SP (1991)**. *Medicinal Plants of Bombay* (Pre-sididency scientific publications) India 48-49.
- Awashthi YC and Mitra CR (1967)**. *Madhuca Indica* constituents of fruit pulp and nut shell. *Phytochemistry* **6** 121-125.
- Chandra D (2001)**. Analgesic effect of aqueous and alcoholic extracts of *Madhuca longifolia* (Koeing). *Indian Journal of Pharmacology* **33** 108-111.
- Dharmananda S (2003)**. Gallnuts and the uses of Tannins in Chinese Medicine. *In Proceedings of Institute for Traditional Medicine*, Portland, Oregon.
- Harborne JB (1992)**. *Phytochemical Methods a Guide to Modern Technique of Plant Analysis* (Chapman and Hill) London.
- Haslam E (1996)**. Natural polyphenols (vegetable tannins) as drugs possible modes of action. *Journal of Natural Products* **59** 205-215.
- Just MJ, Recio MC, Giner RM, Cueller MJ, Manez S, Bilia AR and Rios JL (1998)**. Anti-inflammatory activity of unusual lupine saponins from *Bupleurum fruticosum*. *Planta Medica* **64** 404-407.
- Kumar KP, Vidyasagar G, Ramakrishna D, Reddy IM, Gupta VA and Raidu C (2011)**. Screening of *Madhuca indica* for Antidiabetic Activity in Streptozotocin and Streptozotocin Nicotinamide induced Diabetic Rats, *International Journal of Pharmaceutical Technology Research* **3**(2) 1073-1077.
- Kokate CK (1994)**. Practical Pharmacognosy 4th Edition Vallabh Prakashan New Delhi 112-120.
- Liu RH (2003)**. Health benefits of fruits and vegetables are from additive and synergistic combination of phytochemicals *American Journal of Clinical Nutrition* **78**(5) 17S – 520S.
- Mishra S and Padhan S (2013)**. *Madhuca Lonifolia* (Sapotaceae) A Review of Its Traditional Uses and Nutritional Properties. *International Journal of Humanities and Social Science* **2** 30-36.
- Okpekon T, Yolou S, Gleye C, Roblot F, Loiseau P, Bories C, Grellier F, Frappier F, Laurens A and Hocquemiller R (2004)**. Antiparasitic activities of medicinal plants used in Ivory Coast. *Journal of Ethnopharmacology* **90** 91-97.
- Pandey M, Debnath M, Gupta S and Chikara SK (2011)**. Phytomedicine An ancient approach turning into future potential source of therapeutics. *Journal of Pharmacognosy and Phytotherapy* **3**(1) 113-117.
- Parekh J and Chanda S (2007)**. In vitro antibacterial activity of crude methanol extract of *Woodfordia fruticosa* Kurz flower (Lythaceae). *Brazilian Journal of Microbiology* **38** 2.
- Patlolla MR and Rao CV (2010)**. Triterpenoids for Cancer Prevention and Treatment Current Status and Future Prospects. *Current Pharmaceutical Biotechnology* **13**(9) 147-155

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Rupasinghe HP, Jackson CJ, Poysa V, Di Berado C, Bewley JD and Jenkinson J (2003). Soyasapogenol A and B distribution in Soybean (*Glycine Max L.Merr*) in relation to seed physiology genetic variability and growing location. *Journal of Agricultural and Food Chemistry* **51** 5888-5894.

Sengar NPS, Agarwal R and Singh A (2009). *A Text Book of Pharmacognosy* (Pharmamed press) Hyderabad **1** 44-45.

Saluja MS, Sangameswaran B, Hura IS, Sharma A, Gupta SK and Chaturvedi M (2011). *International Journal of Drug Discovery and Herbal Research* **1(2)** 55-57.

Shimada T (2006). Salivary proteins as a defense against dietary tannins. *Journal of Chemical Ecology* **32(6)** 1149-1163.