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PHYTOCHEMICAL SCREENING OF DIFFERENT SOLVENT EXTRACTS OF LEAVES OF *MORUS ALBA* Linn.

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ABSTRACT

Morus alba Linn. (Mulberry) belongs to family *Moraceae* is a perennial tree. It is used as a traditional medicine and modern drug preparation, mainly constitutes diet for the silk worm. The preliminary phytochemcial screening of three extracts (Alcoholic, aqueous and chloroform) of mulberry leaves revealed that it contains like alkaloids, steroids, glycosides, saponins, flavones, oils and fats, phenolic compounds and tannins etc. which give the medicines several healing properties. The aqueous extract of leaf samples were used for the phytochemical analysis to find out the phytochemical constituents in the plants. The main objective of the research work was to check the presence or absence of the phytochemical constituents in leaf extract of *Morus alba*. The results of the phytochemical analysis of *Morus alba* leaf extract showed that the like alkaloids, steroids, glycosides, saponins, flavones, oils and fats, phenolic compounds and tannins etc. were found to be present in the above mentioned medicinal plant.

Keywords: Mulberry, *Morus alba* Linn, Leaves, Moraceae, Phytochemicals.

INTRODUCTION

The taxonomy of *Morus* is disputed and complex. Over 150 species of Morus have been published, and although differing sources may cite various selections of accepted names, only 10 to 16 are generally cited as being accepted by the extensive majority of botanical authorities. ***Morus*** is a genus of flowering plants in the family Moraceae which comprises 10–16 species of deciduous trees commonly known as **mulberries and shehtoot**.[1]

Taxonomic Position[2]

Kingdom	:	Plantae
Subkingdom	:	Tracheobionta
Super division	:	Spermatophyta
Division	:	Magnoliophyta

Fig: leaf of *Morus alba*

Class	:	Magnoliopsida
Subclass	:	Hamamelididae
Family	:	Moraceae
Genus	:	Morus L.
Species	:	Morus alba L.

Mulberry trees especially *Morus alba* is a widely found plant in Egypt. It is a wild plant available all over the year and found in a large amount in Beni-Suef governorate mainly in Beni-Suef villages.[3] They are distributed into the subtropic regions of Asia such as Japan, India, China and Korea. They are also present in other region of world like North America, an Africa. Out of a total of 14 species that have been reported so far, former nine are present in Asia and the last five are newly discovered.[4]

Morus alba is native of India, China and Japan. It is occasionally cultivated elsewhere in Europe, North America, and Africa. *Morus alba* is commonly known as white mulberry. White mulberry is cultivated throughout the world, wherever silkworms are raised. The leaves of white mulberry are the main food source for the silk worms.[6]

Cultivation of white mulberry for silkworms began over four thousand years ago in China. In 2002, 6,260 km^2 of land were devoted to the species in China. The species is now extensively planted and widely naturalized throughout the warm temperate world.[1] Most of these countries grow mulberry plants (Morus species) for different purposes like production of silk worm (Bombys mori L.) or enhancing the foliage production in India and China. In other countries like Europe, mulberry plants are grown for the production of mulberry fruits. It is also used as silkworms and as sericulture-related materials.[4]

Propagation and Growth[1]

Morus alba L. can be propagated in several ways:

- By Harwood Cuttings:
- By Softwood & Semi-hardwood Cuttings:
- By Seed sowing:
- By Grafting:
- By Air Layering:

For optimum growth, the soil where you are planning to plant your mulberry should be well drained and between pH 5.5 and pH 7.0. If the soil is below pH 5.5, it can be limed. Soil

with a pH between 7.0 and pH 8.3 can be treated with sulfur to lower the soil pH. Although not ideal, *Morus rubra* and *Morus nigra* can grow in soils up to pH 8.5. Your county agricultural extension office can accurately test your soil for pH and nutrients (some even do testing for free), or you can get a soil test kit from a home improvement center for under twenty dollars. Ideally, soil treatment should be done at least a year before planting, but few have that kind of foresight.[1]

Reported Phytoconstituents:

The plant is a very good source of ascorbic acid, of which over 90% is present in a reduced form, and also contains Carotene, Vitamin B1, Folic Acid, Folinic Acid, Isoquercetin, Quercetin, Tannins, Flavonoids and Saponins. These reports are very encouraging and indicate that herb should be studied more extensively for its therapeutic benefits. The plant is reported to contain the main active principles Phytoconstituents like; Tannins, Phytosterols, Sitosterols, Saponins, Triterpenes, Flavanoids, Benzofuran derivatives, Morusimic Acid, Anthocyanins, Anthroquinones, Glycosides and Oleanolic acid.[4]

This study concluded that mulberry leaves are richest source of phytochemicals, which are beneficial for the health and can be used as vegetable.

Reported Pharmacological Activities

Different plants have been reported for their biological activities such as anthelmintic, anti-parasitic[8,9] and anti-diarrheal properties.[10] because of its good therapeutic activity and low toxicity *Morus alba* has been extensively used in conventional Chinese medicine.[11]

The review reveals the wide range of important Pharmacological activities including Antidiabetic, Antimicrobial, Antimutagenic, Antioxidant, Anticancer, Anxiolytic, Anthelmintic, Antistress, Immunomodulatory, Hypocholesterolemic, Nephroprotective, Hepatoprotective. Various other effects like Adaptogenic effect, effect on Hyperlipidemia, inhibition of melanin biosynthesis used in psychiatric disorder, also in gut and airways disorders.[12] *Morus alba* is reported to have Neuroprotective, skin tonic, antioxidant, anti-hyperglycemic, antibacterial, antihypertensive, and Anti-Hyperlipidemic activities.[13,14]

MATERIALS AND METHODS

Plant Selection

Morus alba Linn commonly known as white mulberry belongs to family Moraceae is also known as White Mulberry, Shahtoot in India. *Morus alba* is a moderately sized tree

which have three to six meters high. Young & fresh leaves of *Morus alba* Linn of family moraceae were collected in the month of January 2019 (winter season) from local area of Meerut City. The plant was identified by Expert & Faculty of Department of Pharmacognosy, Translam Institute of Pharmaceutical Education and Research.

Plant Authentication

The drug *Morus alba* leaves were authenticated by **Dr. Sunita Garg**, Emeritus Scientist and **Mr. RS Jayasomu**, Chief Scientist Head, Raw Materials Herbarium and Museum Delhi (RHMD), CSIR-National Institute of Science Communication and Information Resources (CSIR-NISCAIR), Pusa Campus , New Delhi. Voucher specimens of drugs were attached with reference number **NISCAIR/RHMD/Consult/-2019/3421-22.**

Preparation of samples

Leaf samples collected were washed thoroughly with tap water followed by distilled water, then wiped and dried under shade followed by oven drying at 60° C-65° C till constant weight was attained. Completely dried leaf samples were ground using an electric blender to obtain a fine powder. The powder was further passed through successive cycles using Soxhlet's apparatus using all the three solvents 200 ml each with 20 gms of dried plant material. The resulting extract is filtered and concentrated in vacuum evaporator. The concentrated extract is then used to determine the presence of phytoconstituents.

Phytochemical screening

The phytochemical test of leaves of *Morus alba* were analysed after extraction by three solvents (alcoholic, aqueous and chloroform).

Test	Observation	Inference
ALKALOIDS		
a) Mayer's test Extract+ 4-5ml dil. HCl. Shake well+ Mayer's reagent	White or pale yellow ppt.	Alkaloids Present
b) Dragendroff's test Extract + 4-5ml dil. HCl+ Dragendroff's reagent	Orange ppt.	Alkaloids Present

c) Wagner's test Extract + 4-5ml dil. HCl. Shake well + few drops of iodine in KI	Brown ppt.	Alkaloids Present
STEROIDS:		
a) Solkowski's test Extract (dissolved in $CHCl_3$)+ conc. H_2SO_4	Red colour	Steroids present
b) Libermann-Burchard's test Extract (dissolved in $CHCl_3$) + conc. H_2so_4 + acetic acid	Greenish colour	Steroids present
GLYCOSIDES:		
a) Sulphuric acid test Extract + conc. H_2SO_4 Shake and allow the contents to stand for a few minutes.	Reddish colour	Glycosides present
b) Molisch's test Extract + Molisch's reagent and shake,then add carefully 2ml of conc. H_2So_4 along the side of the test tube and allow it to stand for 2 min.	Formation of reddish violet colour at the junction of two liquids	Glycosides present
SAPONINS:		
a) Aqueous test Extract + water, shake well	foam Formation	Saponins present
FLAVONES:		
a) Aqueous test Extract + aqueous NaOH	Yellow to orange colour	Flavones present
b) H_2SO_4 test Extract + conc. H_2SO_4	Yellow to orange colour	Flavones present

c) Mg. HCl test Extract + Mg- HCl	Yellow to red colour	Flavones present
OILS AND FATS		
a) Spot test Small quantity of extract is pressed with filter paper	Oils stains on the Paper	Oils present
Saponification test Extract + few drops of 0.5N alcoholic potassium hydroxide + a drop of phenolphthalein, heated on a water bath for 1-2 hrs	Formation of soaps	Oils and fats present
PHENOLIC COMPOUNDS AND TANNIN:		
$FeCl_3$ test Extract + $FeCl_3$ solution	Precipitate or violet colour	Phenolic compounds and tannin present
Lead acetate test Extract + Lead acetate	Precipitate	Phenolic compounds and tannin present

RESULTS AND DISCUSSION

Results of Phytochemical Screening

Table 1 Evaluation of different phyto-constituents in *Morus alba*

No.	Test	60% alcohol extract	Aqueous extract	Chloroform extract
I	**Alkaloids** a) Mayer's test	+	-	-
	b) Dragendroff's test	+	-	-
	c) Wagner's test	+	-	-
II.	**Steroids** a) Solkowski's test	+	-	+
	b) Libramaann-Burchards test	+	-	+

III.	**Glycosides** a) Sulphuric acid test	+	+	-
	b) Molischs test	+	+	-
IV	**Saponins** a) Aqueous test	+	-	-
V	**Flavones** a) Aqueous NaOH test	+	-	-
	b) H_2SO_4 test	+	-	-
	c) Mg-HCl test	+	-	-
VI	**Oils and Fats** a) Spot test	+	-	+
	b) Saponification test	+	-	+
VII	**Phenolic compounds and tannins** a) FeCl3 test	+	-	-
	b) Lead acetate test	+	-	-

(+) Sign for present and (-) Sign for absent.

The different solvent extracts of the *Morus alba* L. leaves were subjected to preliminary qualitative assessment for the presence of alkaloids, steroids, glycosides, saponins, flavones, oils and fats, phenolic compounds and tannins The results of phytochemical analysis are discussed in the above table. From the results, it is clear that the alcoholic leaves extract of *Morus alba* (L.) shows the presence of photochemicals when extracted with different solvents using soxhlet extraction procedure.

CONCLUSION

Phytochemicals found in leaf extracts of *Morus alba* indicates its potential as an important source of medicine and also to improve the health of its users as a result of the presence of various compounds that are vital for good health. Phytochemical screening test has revealed the presence of the substances like alkaloids, steroids, glycosides, saponins, flavones, oils and fats, phenolic compounds and tannins etc. Isolation, purification and characterization of the phytochemicals found in moraceae family tree should be studied.

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