

Phytochemical Screening of Ficus Religiosa Root Bark.

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ABSTRACT: *Ficus religiosa* (L) dry deciduous (Moraceae) is used as traditional herbal remedy for several ailments. The bark of *Ficus religiosa* was used for the treatment of inflammatory disorders in traditional medicine. The objective of this study is to find out the correct extraction procedure for *Ficus religiosa* root bark. The dried powdered root bark was extracted using different solvents by continuous soxhlet percolation. The results showed that only methanol and water extract shows presence of all phytoconstituents like alkaloids, Flavonoids, tannins, saponins etc.

KEY WORDS: *Ficus religiosa*, Extraction, Phytochemical screening

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I. INTRODUCTION:

Medicinal plants are the main source of various bioactive compounds which is the backbone of our traditional medicine system. Phytoconstituents from the medicinal plants play a crucial role in healthcare sector. Many plant species have been used in folklore medicine to treat various ailments. The favorable effects of plants are mainly due to the presence of secondary metabolites which provide health promoting properties. A variety of active phytoconstituents including flavonoid, polyphenolics, tannins, terpenoids, saponins, plant steroids, glycosides etc. have been identified from medical plants and are found to be safe and effective for the therapeutic remedy¹. *Ficus religiosa* is one of the important traditional medicines that have been used as a remedy for various diseases. *Ficus religiosa* is native to Indian subcontinent and Southeast Asia. Its synonyms include: Sanskrit - Ashwattha, English - Sacred fig, Marathi - Pimpala, Hindi - Peepal and Tamil - Achuvattam. *Ficus religiosa* is mostly planted near religious or spiritual places in Indian cities and villages as it holds great relevance in Indian culture, mythology and religion. It is considered sacred by followers of Hinduism, Buddhism and Jainism². Literature survey reveals that *Ficus religiosa* has many properties includes antimicrobial, antiulcer, antidiabetic, antiasthmatic, antioxidant, anti-inflammatory, wound healing, hepatoprotective, anti-convulsant, anti-parkinson, anti-amnesic, anti-cancer, acetylcholinesterase inhibitor, memory enhancing and anti-arthritis. Almost every part of the tree is rich in phytochemicals and is used in various food and herbal medicinal preparations. Fruits of *Ficus religiosa* are rich in phytochemicals like flavonoids, terpenoids etc. and used to cure respiratory and digestive disorders. Leaves contain flavonoids, tannin etc. which effectively cure diseases like vomiting, antivenom, inflammation etc. Traditionally, barks are used as antibacterial, astringent, antidiarrhoeal, in the treatment of gonorrhoea etc.^{3,4,5}.

In this present study, various extracts of *Ficus religiosa* root bark was prepared in order to find out which all the constituents are present and responsible for the various activities like anti-inflammatory, anti bacterial, astringent, antidiabetic e.t.c.

II. MATERIALS AND METHODS:

The root bark of the plant *Ficus religiosa* was collected from Kozhikode, Kerala, India. The plant was authenticated by Dr. A.K. Pradeep, Associate Professor, Dept. of Botany, Calicut University with specimen No. 88488. The root bark was washed thoroughly with tap water, shade dried and then pulverized to fine powder. It is stored in air tight container for further study.

Chemicals: hexane, petroleum ether, chloroform, methanol, distilled water.

Instruments: weighing balance, hot air oven, soxhlet apparatus, heating mantle.

Experimental investigation:

Macroscopical and physiochemical evaluation

Macroscopical parameters: The Macroscopic evaluation was carried out to know the shape, size, colour, odour, taste and fracture of the material. Different physiochemical values such as Ash values, Loss on drying, foreign organic matter were determined.

Physiochemical parameters:

1. Foreign organic matter (FOM): Weigh accurately 50gm of the original sample and spread it out in a thin layer. Inspect the sample with un-aided eye or with the use of a 6 X lens and separate the foreign organic matter manually as completely as possible.
2. Loss on drying: Weigh about 1gm of the powdered crude drug in to a weighed porcelain dish. Dry in the oven at 100 °C– 105 °C for half an hour. Cool and weigh the contents. Keep the contents in a hot air oven and repeat the drying at 100 °C – 105 °C for half an hour (care should be taken that the contents should not get charred off). Cool the contents and its weight. Repeat the drying and weighing procedure until two concordant weights are noted.
3. Determination Total Ash: Heat silica or platinum crucible to red heat for 30min then allows cooling in a desiccator and weigh. Weigh accurately about 2gm of the substance being examined and evenly distribute in the crucible. Dry at 100 °C to 105 °C for one hour and ignite to constant weight in a muffle furnace at 600 ± 25°C. Allow the crucible to cool in a desiccator after each ignition. The material should not catch fire at any time during the procedure. If after prolonged ignition a carbon free ash cannot obtained, exhaust the charred mass with hot water, collect the residue on an ash less filter paper, Incinerate the residue and filter paper until the ash becomes white or nearly so. Calculate the percentage of ash with reference to air dried drug.
4. Determination of Acid-insoluble Ash: The total ash obtained is boiled for five minutes with 25ml of 2M hydrochloric acid and filtered through an ashless filter paper. The filter paper is ignited in the silica crucible. Cooled and then acid insoluble ash is weighed.
5. Determination of Water-soluble Ash: Water soluble ash is the difference in weight between the total ash and the residue obtained after boiling the total ash in water. The total ash obtained, should be boiled for five minutes with 25 ml of water. The insoluble matter may be collected on a Gooch crucible or on ash-less filter paper. It should be washed with hot water and ignited for 15 minutes at a temperature not exceeding 450°C. The total weight of insoluble matter should be subtracted from the weight of the ash. This difference in weights represents the water soluble ash. The percentage of water soluble ash should be calculated with reference to the air dried drug.
6. Determination of Sulphated Ash: The total ash obtained is boiled for five minutes with 1ml of sulphuric acid, until the fumes are no longer evolved and ignite at 600 ± 25°C until black particles have disappeared. Allow the crucible to cool, Add a few drops of sulphuric acid and heat. Ignite and allow to cool and weigh. Repeat the procedure until two successive weighing don't differ by more than 0.05mg. Calculate the percentage difference between total ash and sulphated ash.

Preparation of Extracts:

The root bark was collected, washed, adhering foreign matters were removed. Then root bark was shade dried for 2 weeks. Powdered the crude drug and stored in closed vessel for further use. Weighed accurately 50gms of crude drug packed in a thimble of soxhlet apparatus and successively extracted by 250ml of solvents in increasing polarity order for 72 hrs by Hexane, Pet.ether, Chloroform, Methanol and Water. Each extract was concentrated by distilling off the solvent and then evaporating the solvent to dryness to become residue. Then calculate the percentage yield of the extract.

Phytochemical screening tests:

a) Test for Carbohydrates :

Benedict's test: To 1ml of extract solution, add 2ml of Benedict's reagent and heat on a water bath for 10-15minutes. Observe the colour change in the test tube.

b) Test for Alkaloids:-

Dragendorff's test: To 2 ml of the extract added 1 ml of Dragendorff's reagent along the side of the test tube. Formation of orange or orange reddish brown precipitate indicated the presence of alkaloids.

c) Test for Tannins:

Ferric chloride test: This detection was based on blue colour formed by the addition of few drops of 5% ferric chloride solution to 2 ml of the extract solution.

d) Test for Flavonoids:

Shinoda test: A few magnesium turnings and 5 drops of concentrated hydrochloric acid was added drop wise to 1 ml of the extract solution. A pink, scarlet, crimson red or occasionally green to blue colour appeared after few minutes confirm the presence of flavonoids.

e) Test for Saponins:

Foam test: 5 ml of the extract was taken in a test tube was shaken well for five minutes. Formation of stable foam indicates the presence of saponins.

f) Test for Glycoside:

Kellar killani's test : Dissolve the crude extract in water with glacial acetic acid, ferric chloride and add concentrated sulphuric acid, presence of brown ring at the junction indicates the presence of glycosides.

g) Test for phenols:-

Folin ciocalteu test: To the extract solution add Folin ciocalteu reagent. The formation of blue color indicates the presence of phenols.

III. RESULTS AND DISCUSSION:

Ficus religiosa belongs to family Moraceae and is found throughout tropical and subtropical region in India. The various parts of plant have claimed to have several traditional medicinal properties. There is no research work on the standardization and isolation of the active constituent of ficus religiosa root bark. So in this present investigation, an attempt was made to study its pharmacognostical features like Macroscopic and phytochemical evaluation. The different ash values and different physiochemical parameters were screened. Extraction was performed by using soxhlet apparatus. The qualitative analysis of the extracts shows the presence of Alkaloids, flavanoid, tannins, phenols, etc.

Physiochemical parameters:

Parameter	Value:	Limits:
Foreign organic matter	1.2%	NMT 2%
Loss on drying	0.1%	
Total ash	4.5%	NMT 7%
Acid insoluble ash	0.17mg	NMT 0.3mg
Water insoluble ash	0.14mg	NMT 50mg
Sulphated ash	0.25mg	NMT 0.5 mg
Alcohol soluble extractives	6.2%	NMT 8%
Water soluble extractive	6.8%	NMT 9%

Percentage yield for different extracts:

Sl.No.	Extract	Percentage yield
1.	Hexane	04%
2.	Petroleum ether	03%
3.	Chloroform	07%
4.	Methanol	13%
5.	Water	15%

Phytochemical screening of extracts:

Phytoconstituents	H.E	P.E	C.E	M.E	A.E.
Alkaloids	-	-	-	+	+
Flavanoids	-	-	-	+	-
Phenols	-	-	-	+	+
Saponins	-	-	-	-	+
Tannins	-	-	-	+	+
Glycosides	-	-	-	+	-
Carbohydrates	-	-	+	+	+

H.E.- Hexane extract

+ :- Present

P.E. – Petroleum ether extract

- :- Absent

C.E. – Chloroform extract

M.E.- Methanol extract

A.E. – Aqueous extract

IV. CONCLUSION:

The present study mainly deals with extraction and further Phytochemical screening studies of root bark powder of Ficus religiosa. It was found that Ficus religiosa contains various active phytoconstituents, which was confirmed by preliminary phytochemical screening. Hence detailed screening and quantification are needed to isolate the active moiety.

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