

Research Article

Ayurvedic Pharmacopoeial Standardization of *Ficus exasperata* Stem Bark

Ashvini R. Patil^{*1} and Ravindra Patil²

¹Associate Prof., Dept. of Sharir-rachana Matoshri Asarabai Darade Ayurved College, Babhulgaon, Dist. Nashik, India.

² Associate Prof., Dept. of Shalakyatantra Ashwin Rural Ayurved College, Manchi Hill, India.

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ABSTRACT

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Many *Ficus* species have been used in folk medicine around the globe as astringents, carminatives, hypotensives, and for treatment of tumors and dysentery. *Ficus exasperata* Vahl, commonly known as forest sandpaper fig, is also popularly used as a medicine in different ailments. Despite the existence of some works on the pharmacological activities of this species, its standardization as per Ayurvedic Pharmacopoeia not reported. The aim of this study was to extend the knowledge on the qualitative and quantitative analysis of this species as per Ayurvedic Pharmacopoeia of India. The quantitative evaluation of the stem bark part of the plant was done using parameters such as various ash values, extractive values, foreign matter, moisture content and water insoluble matter. The qualitative analysis revealed occurrence of phytosterols, triterpenes, phenolic compounds, flavonoids, tannins, saponins, protein, carbohydrates etc when studied using different extracts. This finding may be useful as identifiers of herb parts and serve as a guiding path for the development of official monograph and detailed standardization of *Ficus exasperata*.

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*Corresponding author: e- mail: drravi1616@gmail.com

INTRODUCTION

The genus *Ficus* (Moraceae) is comprised of about 750 species, most of them living in the tropics, and many of which can have overlapping ranges. Some *Ficus* plants are cultivated for their edible fruits while others are for providing shade and/or as ornamentals. *Ficus* species are generally rich in latex and are thus economically important as sources of rubber. Many *Ficus* species have been used in folk medicine as astringents, carminatives, hypotensives, and for treatment of tumors and dysentery (Mousaa O., et al. 1999; Enogieru A.B., et al. 2015). *Ficus exasperata* Vahl, (Family-Moraceae) commonly known as forest sandpaper fig, is a terrestrial Afro-tropical tree used in popular medicine. Sandpaper tree is widely used as a source of sandpaper and as a valuable medicinal plant. The extracts from the tree used to treat

as anti-ulcer, hypotensive, lipid-lowering, analgesic, anti-inflammatory and antipyretic activity. Different parts of the plant are used for treating eyesores, ring worm, stomach pains and leprosy. The young leaves of *F. exasperata* are prescribed as a common anti-ulcer remedy. The leaf extract has been reported to have diverse uses in the treatment of haemostatic ophthalmia, coughs, haemorrhoid, epilepsy, high blood pressure, rheumatism, arthritis, intestinal pains, colics, bleeding, ulcer and wounds (Muibat O.B., et al. 2014). Despite the existence of some works on the pharmacological activities of this species, its standardization as per the Ayurvedic Pharmacopoeia of India not reported.

MATERIALS AND METHODS

Collection and Processing of Plant Material

Fresh Stem bark of *F. exasperata* was collected from Yeola area forest, Maharashtra, India, in the month of December 2021. Botanical identification was carried out from local botanist and voucher specimen of the plant material has been deposited at the Institute level. The Stem bark of *F. exasperata* are air dried and pulverized with electric blender and kept in air tight polythene bags for further study.

Chemicals and Instruments

Solvents and reagents were procured from Pallav Chemicals, Mumbai, India.

Quantitative Analysis

The pulverized powder of *F. exasperata* stem bark standardized according to the official methods prescribed in Ayurvedic Pharmacopoeia. The various ash values like total ash, acid insoluble ash, water soluble ash and sulphated ash valued were determined. The all ash values were determined to find out about the physiological state and level of extraneous matter. The moisture content of the powdered determined based on the loss of drying method. The alcohol soluble, water soluble and ether soluble extractive values also determined. Addition to above analysis, foreign matter

determination and water insoluble matter carried out in view of standardization (API 2018).

Qualitative Analysis

The qualitative chemical analysis of the *F. exasperata* stem bark powder was preceded for the identification of different phytoconstituents. The phytochemical analysis for detection of alkaloids, phenols, flavonoids, saponins, tannins, cardiac glycosides, steroids, anthraquinone glycosides, phloba-tanins, triterpenes, antho-cyanins, etc were carried out. The standard experimental procedures were used to conduct this investigation (Khandelwal KR, 2005).

TLC Finger Print Profile

Thin layer chromatography of the ethanolic extract of *F. exasperata* stem bark was studied and Rf values were determined (Harborne JB, 1984).

RESULTS AND DISCUSSION

Quantitative Analysis

Physicochemical parameters are a vital for the standardization and quality control of any medicinal plant material used as a drug. The results of analysis of physical factors such as ash values, extractive values, water insoluble matter, etc. are presented in Table 1.

Table 1: Quantitative Analysis of *Ficus exasperata* Stem bark powder

Parameter	Values % (w/w)* ± SD
Ash Values	
Total Ash	13.45 ± 0.756
Acid-Insoluble Ash	00.94 ± 0.112
Water-Soluble Ash	04.39 ± 0.364
Sulphated Ash	11.42 ± 0.542
Extractive values	
Alcohol Soluble	8.32 ± 0.124
Water Soluble	14.01 ± 0.352
Ether Soluble (Fixed Oil Content)	01.63 ± 0.234
Foreign Matter	06.03 ± 0.524
Moisture Content (Loss on Drying)	05.25 ± 0.069
Water Insoluble Matter	68.39 ± 1.035

*Values are expressed as mean of three readings; SD-Standard Deviation

Ash values

Determination of ash values is used to control the quality and purity of crude drugs. The total ash value (13.45±0.756% w/w), acid-insoluble ash value (00.94±0.112% w/w) and water-soluble ash value (04.39 ± 0.364% w/w) carried out for *Ficus exasperata* Stem bark powder. The sulphated ash value also determined which to be found as 11.42 ±0.542%w/w. A total ash value indicates presence of various inorganic impurities like phosphates, carbonate, oxalate and silicates of potassium, sodium, magnesium, calcium. The amount of inorganic components contained in given drug is estimated using water soluble ash. The acid insoluble ash is mostly composed of silica and shows that it has

been contaminated with earthy material (Ushir YV, et al. 2022).

Extractive values

The maximum soluble extractive value of *Ficus exasperata* Stem bark powder was found in water (14.01 ± 0.352% w/w) and minimum soluble extractive value was found in petroleum ether (01.63 ± 0.234% w/w). The alcohol soluble extractive value was 8.32 ± 0.124% w/w. The tentative idea about the plant material's possible active chemical components when extracted with a specific solvent is determined by extractive values. The chemical constituents' compositions are influenced by the drug's nature and the solvent utilized.

It also indicates whether or not the crude drug has been exhausted (Tatiya, AU, et al. 2012).

Foreign matter

When analyzed, medicinal plant materials must be free of obvious mold growth, rodent excrement, insects, sliminess, stones or any other toxic foreign matter (API, 2008). The foreign matter for *Ficus exasperata* Stem bark powder was observed as 06.03±0.524% w/w.

Moisture content

Moisture content (loss on drying) is commonly used test procedure for determination of moisture content in a powdered sample. Moisture content of drugs should be at minimal levels to discourage the growth of bacteria, yeast, or fungi during storage. The moisture content of *Ficus exasperata* Stem bark powder was found to be 05.25±0.069% w/w.

Water insoluble matter

The water insoluble matter is a residue remains after boiling with water mainly sugar free residue; it was confirmed by negative Molisch test. The water insoluble matter for *Ficus exasperata* Stem bark powder was found to be 68.39±1.035% w/w.

Phytochemical Analysis

The qualitative phytochemical investigation of the *Ficus exasperata* Stem bark powder in different solvent extracts is presented in Table 2. The phytochemicals were soluble in the solvent depending on its polarity. The solvent choices were made in this protocol as per polarity index (PI) from none polar to semi-polar to polar (Ramluckan K., et al. 2014). Solvent used for extraction as petroleum ether (PI-0.1), benzene (PI-2.7), chloroform (PI-4.1), Propanone (PI-5.1), ethanol (PI-5.2), and, water (PI-10.1). In petroleum ether and benzene extract, phytosteroids and triterpenes were present. In propanone extract, tests for phenolic compounds, tannins and triterpenoids were found positive. In chloroform extract, chemical tests for the detection of flavonoid, phytosteroids, and triterpenoids were found positive. In ethanol extract, flavonoids, mucilage, phenolic, saponins, and triterpenes were present. Finally, water extract undertaken for screening and in it carbohydrates, protein, mucilage, phenolics, saponins were present.

Table 2: Phytochemical analysis of *Ficus exasperata* Stem bark extracts

Phytoconstituents	Pet. Ether (40-60°)	Benzene	Chloroform	Propanone	Ethanol (95%)	Water
Alkaloids	-	-	-	-	-	-
Amino acid	-	-	-	-	-	-
Carbohydrates	-	-	-	-	-	+
Flavonoid	-	-	+	-	+	-
Mucilage	-	-	-	-	+	+
Phenolic	-	-	-	+	+	+
Phytosterols	+	+	+	-	-	-
Proteins	-	-	-	-	-	+
Saponins	-	-	-	-	+	+
Tannins	-	-	-	+	+	-
Triterpenoids	+	+	+	+	+	-

‘+’ presence; ‘-’ absence

TLC Fingerprint Profile

Thin layer chromatography of the ethanolic extracts of the *Ficus exasperata* Stem bark was carried out using

Ethanol: Ethyl acetate (6:4) as mobile phase, silica gel GF254 as stationary phase and the R_f were recorded in Table 3.

Table 3: TLC Fingerprint Profile Ethanolic Extract of *Ficus exasperata*

Mobile phase	Extract	Number of spot and their R _f value
Ethanol: Ethyl acetate (6:4) Detection- 264nm UV cabinet	Ethanol	0.01, 0.11, 0.19, 0.53 and 0.95

CONCLUSION

These data and parameters have been investigated for *Ficus exasperata* Stem bark to set standards which could be useful to find the authenticity of this traditional medicinal system plant. These investigations may be useful to supplement existing information with regard to distinguish from substitutes and adulterants. In other words, the pharmacognostic features examined in the

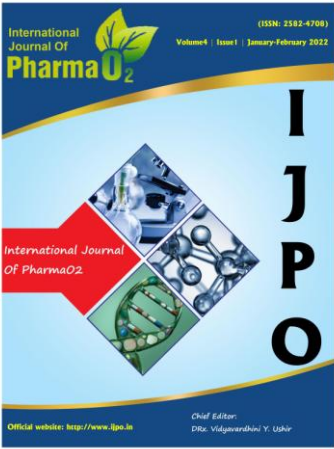
present study may serve as tool for validation of the raw material and for standardization of its formulations at herbal industrial level in the forth-coming days.

CONFLICT OF INTEREST

The author declares no conflict of interest.

REFERENCES

1. A. Tatiya, S.Surana, S.Bhavsar, D. Patil, Y.Patil. (2012). Pharmacognostic and preliminary phytochemical investigation of *Eulophia herbacea* Lindl. Tubers (Orchidaceae), *Asian Pac. J. Trop. Dis.* 2(Suppl 1), S50–S55. [https://doi.org/10.1016/S2222-1808\(12\)60123-6](https://doi.org/10.1016/S2222-1808(12)60123-6).
2. Didier G. Mouho, et al. (2018). Chemical findings and in vitro biological studies to uphold the use of *Ficus exasperata* Vahl leaf and stem bark. *Food and Chemical Toxicology.* 112 (2), 134-144.
3. Enogieru, A.B., Charles, Y.O., Omoruyi, S.I., Momodu, O.I., Ezeuko, V.C. (2015). Stem Bark Extracts of *Ficus exasperata* protects the Liver against Paracetamol induced toxicity in Wistar Rats. *J. Appl. Sci. Environ. Manage.* Vol. 19 (1) 155 – 159.
4. Harborne JB. *Phytochemical methods.* Chapman and Hall, London, Edition 3, 1984: 88, 203.
5. K. R. Khandelwal. (2005). “Practical Pharmacognosy techniques and experiments”, 13th Ed., NiraliPrakashan, Pune, 130-149.
6. K. Ramluckan, K. G. Moodley, F.Bux. (2014.). An evaluation of the efficacy of using selected solvents for the extraction of lipids from algal biomass by the soxhlet extraction method. *Fuel*, 116, 103-108. <https://doi.org/10.1016/j.fuel.2013.07.118>.
7. Khandelwal KR. (2005). *Practical Pharmacognosy techniques and experiments.* Nirali Prakashan, Pune, Edition 13, 130-149.
8. Kokate C.K. (1994). *Handbook of Practical Pharmacognosy.* Vallabh Prakashan, New Delhi, Edition 4, 58-136.
9. Mousaa O, Vuorela P, Kiviranta J, Wahab SA, Hiltunen R. (1999). Bioactivity of certain Egyptian *Ficus* species. *Journal of Ethnopharmacology*, 41, 71–76.
10. Muibat O.B., Misbaudeen Abdul-Hammed, Precious Ogunbaku. (2014). Nutrient and Anti-nutrient Phytochemicals in *Ficus exasperata* Vahl Leaves. *International Journal of Scientific & Engineering Research.* Volume 5, Issue 1, 2177-2181.
11. *The Ayurvedic Pharmacopoeia of India, Part-I.* (2008). 1st Ed., Volume-VI, Government of India, Ministry of Ayush, New Delhi, 242-245.
12. WHO, Geneva. (2002). *Quality Control methods for medicinal plant material.* A.I.T.B.S. Publishers and Distributors, New Delhi, 31.
13. Y. V. Ushir, A. U.Tatiya, S. J.Surana, U. K.Patil. (2010). Gas chromatography–Mass spectrometry analysis and antibacterial activity of essential oil from aerial parts and roots of *Anisomelesindica* Linn., *Int. J. Green Pharm.*, 4, 98-101. <https://doi.org/10.4103/0973-8258.63884>.
14. Yogesh V. Ushir, Rakesh E. Mutha, Kundan J. Tiwari, Dashan M. Kokate. (2022). Pharmacognostic Studies on *Anisomeles Heyneana* Benth. (Labiatae). *Journal of the Maharaja Sayajirao University of Baroda.* Volume-55, No.1(X) 2021, 232-244.



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