

Research Article



Pharmacognostical and Preliminary Phytochemical Studies on Stem Bark of *Eugenia jambolana*

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Accepted on: 21-08-2014; Finalized on: 31-10-2014.

ABSTRACT

Eugenia jambolana (Synonym: *Syzygium cumini* (Linn.) Skeels, *Eugenia cumini* (L.) Druce belonging to the family Myrtaceae is a tall evergreen tree grown in tropical and sub-tropical regions. It is known as Jamun, Jambu, Jambava in Hindi, Naval in Tamil and Black plum in English. The extract of the bark in water can treat giddiness, infantile diarrhoea, dysentery, hemorrhage, leucorrhoea, non-insulin-dependent type II diabetes, excessive thirst, dyspepsia, cough, asthma and menorrhagia. Literature survey showed that no detailed pharmacognostical research work has been done on the stem bark of *Eugenia jambolana*. Hence in the present study pharmacognostical characters, fluorescence characters and physicochemical constants were studied to provide authentication of the plant material in future.

Keywords: Cork, *Eugenia jambolana*, Fluorescence characters, Physicochemical constants.

INTRODUCTION

Eugenia jambolana (Synonym: *Syzygium cumini* (Linn.) Skeels, *Eugenia cumini* (L.) Druce belonging to the family Myrtaceae is a tall evergreen tree grown in tropical and sub-tropical regions. The plant is found up to an altitude of 1800m and also grown in throughout the plains from sub-Himalayas to South India. It is known as Jamun, Jambu, Jambava in Hindi, Naval in Tamil and Black plum in English. The extract of the bark in water can treat giddiness, infantile diarrhoea, dysentery, hemorrhage, leucorrhoea, non-insulin-dependent type II diabetes (because it lowers the blood glucose level), excessive thirst, dyspepsia, cough, asthma and menorrhagia. Decoction of the bark is an efficacious mouthwash and gargle for treating spongy gums, tumors, stomatitis, relaxed throat etc. The juice of leaves is used to treat dysentery. Juice of ripe fruit is used as a stomachic, carminative and diuretic. The seed extracts have marked hypoglycemic properties. Seeds are very efficacious in treating diabetes mellitus and glycosuria.¹⁻⁵ *Eugenia jambolana* seeds reported to contain tannins, flavonoids, phenols, 7-Hydroxycalamenene, Methyl- β orsellinate, β -Sitosterol and Oleanolic acid. *Eugenia jambolana* leaves reported to contain Lupeol, 12-Oleanen-3-ol- β -acetate, Stigmasterol, β -Sitosterol. It is reported to have Antibacterial activity, Antioxidant activity, Anti hyperglycemic activity, Central nervous system activity, Chemopreventive Action, α amylase inhibitor activity.⁶⁻¹⁴ Eventhough it has different ethnomedicinal uses but the literature survey showed that no detailed pharmacognostical research work has been done on the stem bark of *Eugenia jambolana*. Hence our aim is to evaluate the pharmacognostical characters of *Eugenia jambolana* bark in this present study.

MATERIALS AND METHODS¹⁵⁻¹⁹

Collection and Authentication

The barks of *Eugenia jambolana* were collected from the herbal garden of Sri Ramachandra University, Porur, Chennai. The plant was authenticated by Prof. P. Jayaraman, Plant Anatomy Research Centre, Tambaram, Chennai (PARC/2012/1275). Only healthy fresh bark of *Eugenia jambolana* was collected and used for further studies. The barks were dried, coarsely powdered and used for the studies.

Pharmacognostic Evaluation

Macroscopic studies

The bark was examined for macroscopical characters.

Microscopic studies

The hand sections of the bark of *Eugenia jambolana* were prepared and observed under 10x and 40x of the microscope, the details were observed, noted and the photomicrographs were taken. Microscopic descriptions of tissues are supplemented with photomicrographs wherever necessary. Photographs were taken with Nikon Lab photo 2 microscopic units. For normal observation bright light was used.

Physico-Chemical Analysis

Total ash, water soluble ash, acid insoluble ash, sulphated ash, extractive values, crude fibre content, solubility value were determined as detailed in official methods of analysis described in Indian pharmacopoeia (I.P.1998).

Fluorescence Analysis

The fluorescence behavior of the powdered drug with different chemical reagent was studied under day light and UV Light (254 & 366 nm).



Preliminary Phytochemical Analysis

Preliminary Phytochemical analysis of Petroleum ether, Chloroform, Ethyl acetate and Ethanol extracts were carried out.

RESULTS AND DISCUSSION

Pharmacognostical Evaluation

Macroscopy

Bark is Smooth, light grey bark up to 2.5cm thick with shallow depressions, exfoliating in woody scales. The bark is flaky and rough, especially on the lower trunk (Figure 1).

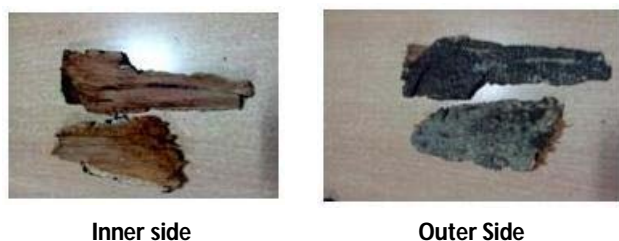
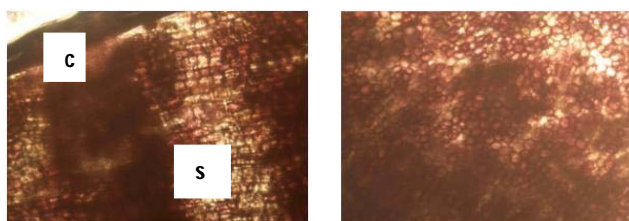


Figure 1: Bark

Microscopic Studies

The cork is composed of several layers of rectangular cells. Phelloderm contains characteristic sclereids, either isolated (or) in small groups. It also shows the presence of prisms of calcium oxalate crystals. Medullary rays and phloem fibers are also observed. Calcium oxalate crystals and starch grains are also observed (Figure 2).



C- Cork, S- Sclerides

Figure 2: Transverse Section of Bark of *Eugenia Jambolana* (10x)

Powder Microscopy

Light yellow with pink colour, odorless powder with astringent taste. The powder material of *Eugenia jambolana* showed the presence of sclereids and bunch of phloem fibres. Group of cork cells are also observed (Figure 3).

Physico- Chemical Analysis

The results of Physico chemical analysis is given in Table 1

Fluorescence Analysis

The fluorescence behavior of the powdered drug with different chemical reagent was studied under day light and UV Light (254 & 366 nm) and results are given in Table 2.

Preliminary Phytochemical Analysis

Preliminary Phytochemical analysis of Petroleum ether, Chloroform, Ethyl acetate and Ethanol extracts were carried out and the results are given in Table 3.

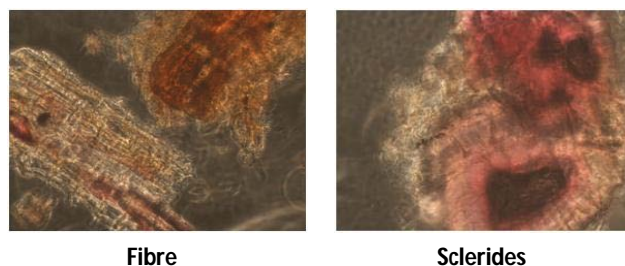


Figure 3: Powder Microscopy of *Eugenia Jambolana* (40x)

Table 1: Physico-Chemical Constants of *Eugenia Jambolana*

Parameters	Percentage w/w
Ash Values	
Total ash	4.8
Acid insoluble Ash	1.2
Water soluble ash	3.2
Sulphated ash	3.1
Extractive Values	
Ethanol soluble extractive	14
Water soluble extractive	22
Chloroform soluble extractive	36
Loss on drying	8.91
Crude fiber content	35.4

Table 2: Fluorescence Analysis of Bark Power of *Eugenia Jambolana*

Treatment	Daylight	UV Light	
		Short (254nm)	Long (365nm)
Powder	Brown	Yellow	Green
Powder + water	Brown	Green	Green
Powder+ 1N Hydrochloric acid	Brown	Green	Yellow
Powder +1N Nitric acid	Colorless	Colorless	Green
Powder + 1N Sulphuric acid	Colorless	Black	Green
Powder + 1N Sodium hydroxide	Purple	Green	Yellowish green
Powder + Ethanol	Brown	Colorless	Green
Powder + Chloroform	Brown	Brown	Yellow
Powder + Ethyl acetate	Brown	Colorless	Yellow
Powder + Petroleum ether	Brown	Yellow	Yellow

Table 3: Behavior of Powdered Drug of *Eugenia Jambolana* with Different Chemical Reagents

Test	Reagent	Reaction	Result
Terpenes	Tin + thionyl chloride	pink colour	+
Flavonoids	Mg turnings + Conc Hydrochloric acid	Magenta colour	+
Steroids	Acetic anhydride + Sulphuric acid	Green colour	-
Carbohydrates	Fehling's 1 & 2 solution	Red precipitate	+
Glycosides	Anthrone + Sulphuric acid	Green colour	-
Quinones	Sodium hydroxide	Red colour	-
Alkaloids	Dragendroff's reagent	Reddish brown ppt	-
Phenols	Ferric chloride	Blue colour	+
Tannins	Lead acetate	White precipitate	+
Saponins	powder + water	Lather formation	-
Gum	Powder+ drop of water	No reaction	+
Proteins	Picric acid	Yellow colour	-

'+' = Positive; '-' = Negative

CONCLUSION

The stem bark of *Eugenia jambolana* belonging to family Myrtaceae has been studied to give detailed reports on pharmacognostical studies like macroscopical and microscopical characters, powder microscopy and physico-chemical constants. The anatomy of *Eugenia jambolana* shows the presence of compactly arranged cork cells, tannin cells, sclereids, fibers and calcium oxalate crystals. Physico chemical constants, Fluorescence analysis were given in Table 1 and 2. The phytochemical analysis of *Eugenia jambolana* revealed the presence of Terpenoids, saponins, phenols, flavonoids,, tannins and coumarins. The study helps in the identification of original drug in future and also helps to establish the standard monograph of the herbal drug.

Acknowledgement: The authors are thankful to the management of Sri Ramachandra University for their support and help.

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Source of Support: Nil, Conflict of Interest: None.

