Pharmacognostical and Preliminary Phytochemical Studies on Stem Bark of Eugenia jambolana

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ABSTRACT

Eugenia jambolana (Synonym: Syzygium cumini (Linn.) Skeels, Eugenia cuminii (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-Hydroxycalamene, 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 amyase inhibitor activity.6-14 Even though 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 macroscopic 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).

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).

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.
Table 3: Behavior of Powdered Drug of Eugenia jambolana with Different Chemical Reagents

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

\^+ = 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.

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