

PHARMACOGNOSTIC AND PRELIMINARY PHYTOCHEMICAL INVESTIGATION ON  
*FICUS BENGALENSIS* L. BARK

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**Summary**

Pharmacognostic and preliminary phytochemical investigation on bark of *Ficus bengalensis* was carried out to determine macroscopic, microscopic, physical parameters and chemical constituents. A macroscopic study showed that bark is about 5 to 12 mm in thick outer surface is rough due to lenticel with channel shaped. Microscopic studies indicated presence of thin cork, thick cortex containing starch grain and thick stone cells 2-6 seriate medullary rays containing starch grains and thick phloem parenchyma and lignified sclereids. Preliminary phytochemical investigation showed that presence of sterol, triterpenoids, saponin proteins, amino acids, alkaloids, glycosides, tannins and carbohydrates. These findings will be useful towards establishing pharmacognostic standards on identification, purity, quality and classification of the plant, which is gaining relevance in plant drug research.

**Key words:** *Ficus bengalensis*, moisture content, ash value, extractive value.

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### Introduction

*Ficus bengalensis* Linn (Moraceae) is a very large tree reaching about 30 m. high and sending down many aerial roots from the branches.<sup>1</sup> Bark is tonic, cooling, astringent, and diuretic, antidysentric, antidiabetic and used in inflammation.<sup>2,3</sup> Bark of plant showed different pharmacological activities, immunomodulatory<sup>4</sup>, antioxidant<sup>5</sup>; prevent liver damage<sup>6</sup>, antidiabetic<sup>7,8</sup> and anti-atherogenic<sup>9</sup>. Taur et al (2007) found that antistress and antiallergic effects of bark in asthma<sup>10</sup>. Ethanol extract of roots showed anti-diarrheal activity<sup>11</sup>. Aqueous extract of bark significantly inhibited clonidine-induced catalepsy<sup>12</sup>.

Herbal medicine is most popular in curing many chronic disorders. An examination to determine macroscopic and microscopic characteristics is the first step towards establishing the identity and the degree of purity of herbal materials, and should be carried out before any further tests are undertaken<sup>13</sup>. The objective of present was to perform pharmacognostic and preliminary phytochemical investigation on bark of *F. bengalensis*.

### Material and Methods

#### Plant material

Samples of *F. bengalensis* bark were collected from Ahmednagar district of Maharashtra and authenticated at Botanical Survey of India, Pune, where a sample (voucher number TDJ1) has been deposited.

#### Pharmacognostic Investigation

The macroscopic and Microscopic feature of the bark of *F. bengalensis* was determined using prescribed method<sup>13-15</sup>. The moisture content, ash and extractive values of the powdered bark samples were performed as per described method<sup>15-17</sup>.

#### Phytochemical Investigation

Dried and coarsely powdered bark of *F. bengalensis* was subjected to successive solvent extraction in Soxhlet extractor using petroleum ether, chloroform, ethyl acetate and ethanol as solvent and the marc left was refluxed with water and these extracts were screened for preliminary phytochemical tests using standard procedure<sup>14, 16-18</sup>.

### Results

#### Pharmacognostic study

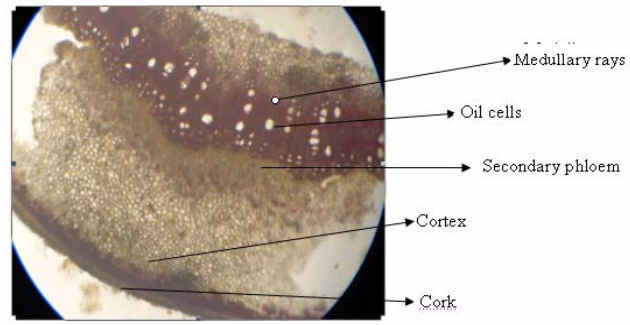
The macroscopic study of bark of the *F. bengalensis* was observed to be 5 to 12 mm thick. Bark is grayish-brown in color and channeled shape. Outer surface is rough due to the presence of lenticels and transverse wrinkles. Inner surface is smooth and whitish-brown to buff colored with characteristic odor and sweet taste as shown in fig.1.

Microscopically, periderm is the outermost layer contains cork, phellogen and cortex. Cork is made up of few layers and nonlignified cells. Phellogen consists of 2 to 3 layers of thin walled nonlignified cells as shown in (fig.2). Cortex contains several layers of thin walled cells. Starch grains and highly lignified, thick stone cells are observed in cortex region. Secondary phloem region contains medullary rays and phloem parenchyma. Medullary rays are 2 to 6 seriate and contain starch grains. Phloem parenchyma is made up of thick and dark cells. Sclereids are observed in the regions of secondary phloem while phloem fibers were absent.

Powder characteristic showed presence of yellowish brown cork cells, rectangular to oval shaped, thick and highly lignified stone cells as shown in (fig.3) and abundant starch grains. Physicochemical values of bark of *F.bengalesis* as shown in (fig.4.).



Fig.no.1 Dried bark of *F.bengalensis* L



.Fig.no.2. Transeverse section of bark

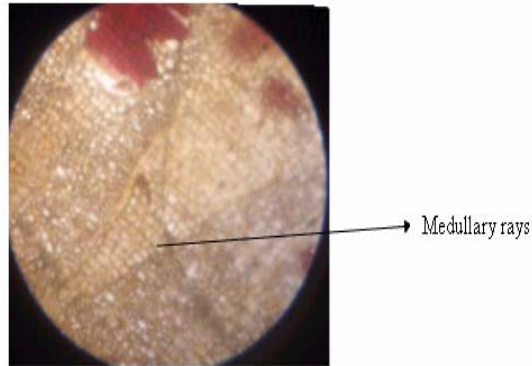


Fig.no.3. T.S. of bark showing medullary ray

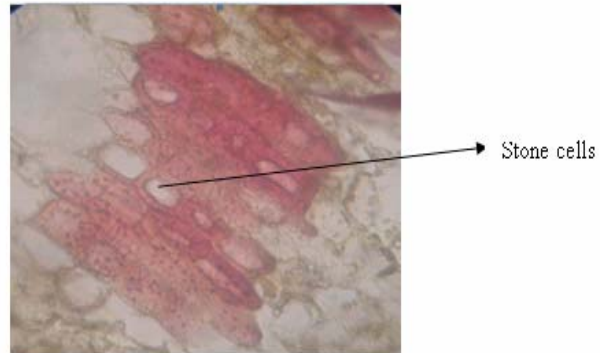


Fig.no.4. Powder of bark showing lignified stone cells

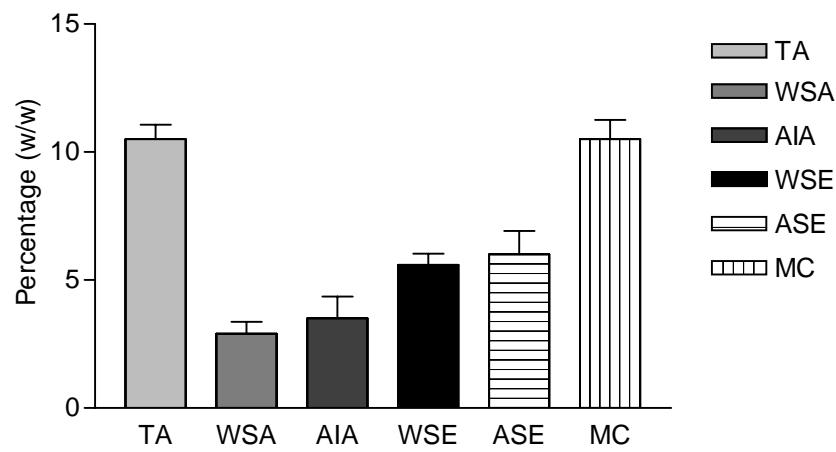


Fig. no.5. Pharmacognostic parameter of *F. bengalensis* L. bark

TA- Total ash

WSA- Water soluble ash

AIA- Acid insoluble ash

WSE- Water soluble extractive value

ASE- Alcohol soluble extractive value

MC- Moisture content

**Phytochemical study**

Different chemical compounds such as steroids, triterpenes, saponine, alkaloids, tannins, flavonoids, glycosides, amino acids, proteins and carbohydrates were detected in *F. bengalensis* L bark as shown in (table no. 1.).

Table 1. Preliminary phytochemical investigation of various extracts of *F. bengalensis* bark

Test for active constituents	Petroleum ether extract	Chloroform extract	Ethyl acetate extract	Methanol extract	Aqueous extract
Steroids	+	+	-	+	-
Triterpenes	+	+		+	-
Saponine	+	+	-	-	-
Alkaloids	-	+	-	+	-
Tannins	-	-	+	+	+
Flavonoids	-	-	+	+	+
Glycosides	-	-	-	+	+
Amino acids	-	-	-	+	+
Proteins	-	-	-	+	+
Carbohydrates	-	-	+	+	+

+ Indicates positive testes and – Indicates negative taste

**Discussion**

The quantitative determination of some pharmacognostic parameters is useful for setting standards for crude drugs. The physical constant evaluation is an important parameter in detecting adulteration or improper handling of the drug. Various ash values are important to determine purity of the drug i.e. the presence or absence of foreign inorganic matter. Since the plant *F. bengalensis* is useful in the traditional medicine for the treatment of some ailment, it is important to standardize it for use as a drug. The pharmacognostic constants for the bark of this plant, the diagnostic microscopic features<sup>19</sup> and the numerical standards reported in this work could be useful for the compilation of a suitable monograph for its proper identification. Different phytochemical detected in the plant useful for treating different ailments and having potential of providing useful drugs of human use.

**Conclusion**

These findings will be useful towards establishing Pharmacognostic standards for identification, purity, quality and classification of the plant. Preliminary phytochemical studies will be helpful for isolation of selective phytoconstituents.

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