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## PHARMACOGNOSTICAL EVALUATIONS OF THE LEAVES OF *ZIZIPHUS MAURITIANA*

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### ABSTRACT

#### Keywords:

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*Ziziphus mauritiana* belongs to family Rhamnaceae and commonly known as Indian jujube or ber. The leaves are alternate and elliptic. Flowers are small and bisexual. The leaves are about 2.5 – 3.2 cm long. Commercially it is cultivated in China & India. *Ziziphus mauritiana* is small to medium sized spiny tree. The chemical compositions of the leaves are proteins & amino acids, flavonoids, alkaloids, glycosides, terpenoids, saponins, fibers, tannins and phenolic compounds. Leaves are used in the treatment of diarrhoea, gastric disorder, fever, liver damage and pulmonary disorders. The present work deals to summarize the Pharmacognostical studies like ash value, extractive value, moisture content, volatile matters, crude fibers, phytochemical test, fluorescence analysis and micro chemical test. The alcoholic and aqueous extract of *Ziziphus mauritiana* leave shows hepatoprotective, antioxidant and other important pharmacological activities. The results of above parameters show the clue for more medicinal properties of *Ziziphus mauritiana*.

**INTRODUCTION:** Herbal medicines are the staple of medical treatment in many developing countries. Herbal preparations are used for virtually all minor ailments. Individual herbal medicines in developing regions vary considerably, healers in each region have learned over centuries which local herbs have medicinal worth<sup>1</sup>.

*Ziziphus mauritiana* belongs to the family Rhamnaceae and is generally propagated by seeds. Several cultivars have been selected among the seedling populations for their superior fruit quality. This fruit is commonly consumed in households as fresh and is dehydrated for later use. The powder from the fruit is used for baking and to prepare jam and a traditional loaf. Mature green fruits (unripe) are used in India to prepare chutney, pickle and jelly<sup>2</sup>.

Flowers are minute, greenish-white or yellow, hermaphrodite, in sessile or shortly peduncled auxiliary cymes, and are insect pollinated with an acrid smell<sup>3,4,5</sup>. The leaves are simple, shining green above and whitish tomentose beneath, commonly sub-orbicular to ovate-oblong, rounded at both ends, highly variable in shape and size<sup>6</sup>.

*Ziziphus mauritiana* leaves contain 13-17% crude protein and 15% fibre, and make an excellent fodder for livestock. In winter, the shoots and fruit of the trees are an important feed source<sup>7</sup>. *Ziziphus mauritiana* mostly contains Alkaloids, Sapogenin & Flavonoids<sup>2,8,9</sup>.

It also contains Triterpenoids and Phenolic compounds<sup>10,11</sup>. *Ziziphus mauritiana* has antimicrobial, anti-inflammatory & antiulcer properties<sup>12,13,14</sup>.

They are also used in the treatment of cancer and cardiovascular disorder<sup>15, 16</sup>. Here we report the ash value, moisture content, volatile matters, crude fibers, phytochemical test, fluorescence analysis and micro chemical test of *Ziziphus mauritiana* leaves.

**MATERIALS AND METHODS:** The fresh leaves of *Ziziphus mauritiana* was collected in Sept., 2010, from Allahabad district (Uttar Pradesh, India) and identified by Dr. D. D. Patra, Scientist, Central Institute of Medicinal and Aromatic Plants, Lucknow, India. The fresh leaves were dried under shade, powdered and pass through 40 mesh sieve and stored in closed containers for further use. The powder was extracted with different solvents ranging from non-polar to polar solvents.

#### Ash Values:

**Total Ash:** About 3 g of powdered leaves was accurately weighed and taken in a silica crucible, which was previously ignited and weighed. The powder was spread as a fine, even layer on the bottom of the crucible. The crucible was incinerated gradually by increasing temperature to make it dull red hot until free from carbon. The crucible was cooled and weighed. The procedure was repeated to get constant weight<sup>17</sup>.

**Acid Insoluble Ash:** The ash obtained as described above was boiled with 25 ml of 2N HCl for five minutes. The insoluble ash was collected on an ash less filter paper and washed with hot water. The insoluble ash was transferred into a silica crucible, ignited and weighed. The procedure was repeated to get a constant weight<sup>18</sup>.

**Water Soluble Ash:** The ash obtained as described in the determination of total ash was boiled for 5 minutes with 25 ml of water. The insoluble matter was

collected on ash less filter paper and washed with hot water. The insoluble ash was transferred into silica crucible, ignited for 15 minutes, and weighed. The procedure was repeated to get a constant weight. The weight of insoluble matter was subtracted from the weight of the total ash. The difference of weight was considered as water-soluble ash<sup>17, 18</sup>.

The result of total ash, acid insoluble ash, water soluble ash and other physical parameters of *Ziziphus mauritiana* leaves are summarized in **table 1**.

**TABLE 1: THE RESULT OF TOTAL ASH, ACID INSOLUBLE ASH, WATER SOLUBLE ASH AND OTHER PHYSICAL PARAMETERS OF ZIZIPHUS MAURITIANA LEAVES**

Type of Ash	Percentage* (w/w)
Total Ash	8.02
Acid Insoluble Ash	2.72
Water Soluble Ash	4.11
Moisture Content	7.62
Crude fibers	13.08
Volatile matters	0.19

\*Average of three determinations

**Phytochemical test of *Ziziphus mauritiana* leaves:** The successive extracts of petroleum ether, chloroform, methanol and water extracts were subjected to various chemical tests for the identification of the phytoconstituents.

#### Fluorescence Analysis:

A. Fluorescence characters of the *Ziziphus mauritiana* leaves extract were observed under UV (254 & 366 nm.) and visible light<sup>19, 20</sup> with different solvents. The results are shown in **Table 3**.

B. Fluorescence characters of the *Ziziphus mauritiana* leaves Powder were observed under U V (254 & 366 nm.) and visible light<sup>19, 20</sup> with different solvents. The results are shown in **Table 4**.

**TABLE 2: PHYTOCHEMICAL TESTS OF THE SUCCESSIVE EXTRACTS OF ZIZIPHUS MAURITIANA LEAVES**

Chemical Constituents	Aqueous Extract	Pet. Ether Extract	Alcoholic Extract	Chloroform Extract
Alkaloids	-	-	+	-
Carbohydrates	+	-	+	-
Glycosides	-	+	-	-
Saponins	+	+	+	-
Flavonoids	-	-	+	+
Phenolic Compounds	+	-	+	+
Triterpenoids	-	+	+	+
Proteins and Amino acids	+	+	+	-
Glycosides	-	-	+	-

+ = Present, - = Absent

TABLE 3: FLUORESCENCE CHARACTERS OF THE *ZIZIPHUS MAURITIANA* LEAVES EXTRACT

Name of the Extract	UV Light		Visible Light
	Short (254 nm)	Long (366 nm)	
Petroleum ether (40 - 60°C)	Greenish brown	Brown	Light Green
Chloroform	Greenish black	Greenish brown	Light brown
Methanol	Light brown	Blackish brown	Greenish brown
Aqueous	Greenish brown	Dark brown	Light Green

TABLE 4: FLUORESCENCE CHARACTERS OF THE *ZIZIPHUS MAURITIANA* LEAVES POWDER

Drug & Reagents	UV Light		Visible Light
	Short (254 nm)	Long (366 nm)	
Powder as such	Green	Light Green	Light Green
Powder + n-Butanol	Orange	Light Orange	Light Green
Powder + Conc. HCl	Dark Green	Greenish brown	Light Brown
Powder + Conc. HNO <sub>3</sub>	Dark Green	Dark brown	Blackish brown
Powder + Conc. H <sub>2</sub> SO <sub>4</sub>	Greenish black	Black	Black
Powder + Methanol	Light Orange	Greenish Orange	Light Green
Powder + Trichloro acetic acid solution	Green	Light brown	Greenish Brown
Powder + ethanol	Orange	Light Orange	Yellowish Green
Powder + Chloroform	Bluish Green	Light Purple	Dark Green
Powder + Ammonia	Light Green	Greenish brown	Green
Powder + toluene	Light Orange	Orange	Light Green
Powder + Glacial acetic acid	Light Green	Green	Greenish Brown

**Microchemical test:** The behavior of the leaves of *Ziziphus mauritiana* with different chemicals was carried out to observe the color changes under ordinary light<sup>21</sup>. The results are shown in **Table 5**.

TABLE 5: THE BEHAVIOR OF THE LEAVES OF *ZIZIPHUS MAURITIANA* WITH DIFFERENT CHEMICALS

Acid/ Chemicals	Observations
Powder as such	Green
Pyridine	Dark Brown
Glacial Acetic acid	Light Brown
Conc. HCl	Greenish Brown
Dil. HCl	Light Green
Conc. H <sub>2</sub> SO <sub>4</sub>	Dark brown
Dil. H <sub>2</sub> SO <sub>4</sub>	Greenish Gray
Conc. HNO <sub>3</sub>	Dark Brown
Ammonia solution	Light Green
Ethyl acetate	Yellowish Green
Benzene	Greenish Brown
Methanol	Green
Toluene	Light Green

**RESULTS AND DISCUSSION:** The leaves of *Ziziphus mauritiana* show the presence of Saponins, Flavonoids, Alkaloids, Triterpenoids, Glycosides and phenolic compounds (table 2). Extract of *Ziziphus mauritiana* leaves also shows characteristic fluorescence analysis in visible and under U.V. Light at 254 & 366 nm (table 3).

The same fluorescence analysis was also determined for the powder of *Ziziphus mauritiana* leaves with different reagents (table 4). Microchemical test with different chemicals and acids was also determined in ordinary light (table 5). Physical parameter of *Ziziphus mauritiana* leaves powder like ash value, moisture content, and crude fibers also shown (table 1).

*Ziziphus mauritiana* showed significant anti-inflammatory, cytoprotective, anti-allergic and antiulcer activity. The leaves also possess immunostimulant and cardiovascular properties. Many other biological and pharmacological properties of *Ziziphus mauritiana* are yet to come.

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