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Research Article

Pharmacognostic and Anthelmintic Activity of *Ziziphus mauritiana* extract

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ABSTRACT

Herbal products or herbal based products gains popularity since last two decades. Numerous plants or there products are marketed for the treatment of varieties of diseases. *Ziziphus mauritiana* belongs to faculty rhamnaceae, reported for the treatment of variety of diseases. In the present manuscript we have reported physiochemical evaluations of leaves of *Ziziphus mauritiana* for total ash values, acid-insoluble ash, water-soluble ash and sulphated ash values. Extractive values of *Ziziphus mauritiana* leaves were also reported in pet. ether, ethanol and in water. Similarly, phytoconstitutents in plant extracts were also reported in pet. ether, ethanol and in water. The anthelmintic activity of *Ziziphus mauritiana* extracts against intestinal roundworm parasite, *Pheretima posthuma* were determined and compared to albendazole suspension. The results of anthelmintic activity of *Ziziphus mauritiana* ethanolic extract (200 mg/ml concentration) possess comparable anthelmintic activity with standard drug.

INTRODUCTION

Plants are one of the most common kinds of life on Earth. It can create its own food but is unable to move. Traditional medicinal systems utilizing plants as a form of therapy can be dated back to the Middle Paleolithic period, approximately 60,000 years ago, according to fossil findings [1]. In recent years, developed countries have turned to traditional medicinal systems that involve the use of herbal drugs and remedies, and the World Health Organization (WHO) reports that nearly 65% of the world's population has incorporated the value of plants as a methodology of medicinal agents into their primary mode of health care. It is frequently stated that plants provide 25% of all medications prescribed today. According to this estimate, plant-derived medications account for a sizable portion of natural product-based pharmaceuticals [2].

Many pharmacological activities were derived from medicinal plants. Plants with anthelmintic action have piqued the interest of researchers due to their ability to treat a disease that causes significant economic loss and lower livestock production to livestock owners. Pathogenic infection has a substantial impact on mortality and other problems that were previously uncontrolled due to anthelmintic resistance that develops in the host organism [3]. Despite the fact that numerous synthetic medications have been produced, they produce more adverse effects than therapy efficacy. As a result, the requirement for plant discovery for treatment has

sparked a lot of interest in the treatment of helmintic infection [4].

Ziziphus belongs to the family Rhamnaceae named after the genus Rhamnus. The Rhamnaceae have drupes or dry fruits and are closely linked to another family, Vitaceae, which comprises key economic species with berry fruits. The term ziziphus is derived from an Arabic word, and the ancient Greeks called the jujube ziziphon. *Z. mauritiana* Lam., the Indian jujube or ber, and *Z. jujuba* Mill., the common jujube, are the two principal domesticated jujubes. These two species have been cultivated all over the world [5].

There are numerous traditional medical uses that are not always based on understanding of the ingredients. The plant of *Z. mauritiana* Lam is bitter and cooling, and it heals coughs, biliousness, and headaches, according to Ayurveda. The bark is useful for treating boils and dysentery and diarrhoea [6]. The leaves have antipyretic properties and help to prevent obesity. The fruit is cooling, digestible, tonic, aphrodisiac, laxative, and relieves biliousness, burning feelings, thirst, and vomiting. It is also beneficial in the treatment of tuberculosis and blood illnesses. The seeds are used to treat eye disorders including leucorrhoea [7].

In this paper, we report the phytochemical and anthelmintic activity of *Ziziphus mauritiana* leaves extract.

MATERIALS AND METHODS

Drugs and Chemicals

Albendazole oral suspension (I.P. 200mg/5ml) was purchased of Cadila Laboratories, India and all other chemical and solvents used were procured of HI media Laboratories, of analytical grade.

Plant Material Collection and Authentication

Fresh leaves of *Ziziphus mauritiana* (Retz.) Willd. (Rhamnaceae) were collected from the Bhopal (M.P.) India. Identification and confirmation were done by Department of Botany, RKDF, University, Bhopal (M.P.) India, and stored in for further use.

Preparation of Plant Material

The *Ziziphus mauritiana* plant was picked and rinsed with tap water. To avoid direct loss of phytoconstituents from sunlight, the plant leaves were crushed into small pieces and air-dried thoroughly under shade (at room temperature) for 1 month. The shade dried materials were pulverized and sieved up to 80 meshes using a pulverizer. It was then homogenized to a fine powder and stored in an airtight container for later examination [6].

Physicochemical Evaluation of *Ziziphus mauritiana*

Determination of total ash

Two grams of *Ziziphus mauritiana* entire plant powder were properly weighed in a previously fired (350°C for 1 hour) and tarred crucible. The dried material was distributed in an even layer in the crucible and ignited by progressively increasing the heat to 550°C in a muffle furnace for 5 hours until it was white, demonstrating the absence of carbon. Weighed after cooling in a desiccator. The total ash content was determined in milligrams per gram of air-dried material [7].

Determination of acid-insoluble ash

25 ml of hydrochloric acid was added to the crucible containing the complete ash, covered with a watch-glass, and slowly heated for 5 minutes. The watch-glass was rinsed with 5 ml of hot water before being placed in the crucible. The ash-free filter paper (Whatmann 41) was used to capture the insoluble materials, which was then washed with hot water until the filtrate was neutral. The insoluble matter was transferred to the original crucible, which was ignited by progressively increasing the heat to 550°C in a muffle furnace for 3 hours to constant weight. Allowing the residue to cool in a suitable desiccator for 30 minutes before weighing. The acid-insoluble ash concentration was measured in milligrams per gram of air dried material [7].

Determination of water-soluble ash

25 mL of water was added to the crucible containing the whole ash, which was covered with a watch glass and slowly cooked for 5 minutes. Insoluble materials was filtered via an ash-free filter paper. In a muffle furnace, washed with hot water and ignited in a crucible for 15 minutes at a temperature not exceeding 450°C. Allowing the residue to cool in a suitable desiccator for 30 minutes before weighing. The weight of the residue was deducted in mg from the total ash

weight. The ash concentration in water was determined as mg per gram of air-dried material [7].

Determination of sulfated ash

Ignited an appropriate crucible (silica) at 550°C to 650°C for 30 minutes, cooled it in a desiccator (silica gel), and precisely weighed it. One gram of Ziziphus Mauritiana plant powder was placed in a previously fired crucible and gently ignited until the mixture was fully white. After cooling and moistening the sample with a tiny amount (typically 1 ml) of sulfuric acid TS, the sample was gently heated at the lowest possible temperature until totally charred. After cooling, wet the residue with a little amount (typically 1 ml) of sulfuric acid TS, gradually heat until no white vapors are produced, and burn at 800°C + 25°C until the residue is totally incinerated. Ensure that no flames were produced during the procedure. The crucible was cooled in desiccators and precisely weighed. This was repeated until the sample reached a fixed weight, at which point the percentage of residue was computed [7].

Preparation of Plant Extracts

A moderately coarse plant powder of Ziziphus Mauritiana was collected and utilized to make several extracts. Continuous hot extraction was used to extract the plant leaves powder of Ziziphus Mauritiana utilizing petroleum ether, ethanol, and water as solvents. The residue was evaporated using Whatmann No. 1 filter paper, and the aqueous extract was concentrated using a Rotary evaporator to obtain a solid yield extract [5].

Preliminary Phytochemical Screening

Preliminary screening of phytochemicals is an important step in detecting bioactive principles present in medicinal plants, which may lead to medication discovery and development. It is the process of extracting, screening, and identifying medicinally active compounds present in plants. The presence of various secondary metabolites such as alkaloids, flavonoids, saponins, tannins, steroid glycosides, phenols, coumarins, reducing sugars, protein, fixed oils, and fats was detected in the ethyl acetate, methanol, and water extracts of Ziziphus Mauritiana plant powder using standard laboratory procedures [6].

Evaluation of Anthelimintic activity of *Ziziphus mauritiana*

The anthelimintic activity of *Ziziphus mauritiana* plant extracts was tested in *Pheretima posthuma* (earth worm) of almost identical size (61 cm). Because of its morphological and physiological similarities with the human intestinal roundworm parasite, *Pheretima posthuma* is utilized. Because earthworms are readily available, they have been routinely utilized for preliminary anthelmintic compound evaluation. Before the experiment, the worms were acclimatized to the laboratory environment. The earthworms were separated into five groups of six each and placed in eight Petri dishes with the extract solutions or reference medications listed below [8,9]:

Group -1: Received distilled water which served as the control

Group-2: Received Albendazole suspension at a dose of 10mg/ml which served as the standard

Group-3: Received Petroleum ether extract at a dose of 200mg/ml

Group -4: Received Ethanolic extract at a dose of 200mg/ml

Group-5: Received Aqueous extract at a dose of 200mg/ml

The Petri dishes were all kept at ambient temperature. The living or viable worms were closely monitored. Individual worms were observed for the time it took to complete paralysis (PT) and death (DT). External stimuli that stimulate and produce movement in earthworms, if alive, were applied to each worm on a regular basis. When the worms do not resuscitate even in normal saline, they are said to be paralyzed. Death was declared when the worms lost their motility and their body color faded [10-12].

RESULTS AND DISCUSSION

Physicochemical evaluation of *Ziziphus mauritiana*

Physicochemical parameters such as pH, foreign organic matter, methanol soluble extractives, water soluble extractives, total ash content, acid insoluble ash, water soluble ash, loss on drying, and% moisture content were determined in an air dried coarse powdered sample of *Ziziphus*

mauritiana. Table 1 lists the average physicochemical properties of *Ziziphus mauritiana* course powder.

Table 1: Physicochemical parameters of *Ziziphus mauritiana*

S. No.	Parameters	Values
1	Total ash value	2.20±1.25
2	Water soluble ash	1.10±0.10
3	Acid insoluble ash	1.25±0.40
4	Sulphated ash	1.50±0.10

Extraction of *Ziziphus mauritiana*

The plant leaves powder of *Ziziphus mauritiana* was extracted using ethyl acetate, methanol, and water as solvents, in that order. After removing the solvent, the practical yield was determined and recorded. Table 2 summarizes the findings.

Table 2: Extractive values of *Ziziphus mauritiana*

Solvent	Yield (g)	Yield (%)
Petroleum ether	11.0	13.75
Ethanol	13.5	16.87
Water	8.2	10.25

Phytochemical Screening of *Ziziphus mauritiana*

To determine the presence of various secondary metabolites, ethyl acetate, methanol, and water extracts of *Ziziphus mauritiana* plant powder were subjected to preliminary phytochemical screening using standard laboratory protocols. Tables 3, 4, and 5 provide all of the findings.

Table 3: Phytochemical screening of petroleum ether extract of *Ziziphus mauritiana.*

S. No.	Phytoconstituents	Pet ether extract
1	Alkaloids	Negative
2	Glycosides	Positive
3	Flavonoids	Negative
4	Saponins	Negative
5	Steroids	Positive
6	Tannins	Negative
7	Terpenoids	Negative

Table 4: Phytochemical screening of methanol extract of *Ziziphus mauritiana.*

S. No.	Phytoconstituents	Pet ether extract
1	Alkaloids	Negative
2	Glycosides	Negative
3	Flavonoids	Positive
4	Saponins	Negative
5	Steroids	Negative
6	Tannins	Positive
7	Terpenoids	Positive

Table 5: Phytochemical screening of aqueous extract of *Ziziphus mauritiana.*

S. No.	Phytoconstituents	Pet ether extract
1	Alkaloids	Negative
2	Glycosides	Negative
3	Flavonoids	Positive
4	Saponins	Positive
5	Steroids	Negative
6	Tannins	Positive
7	Terpenoids	Positive

Anthelimintic Activity of *Ziziphus mauritiana*

Anthelimintic activity of *Ziziphus mauritiana* is mentioned in table 6.

A statistically significant association was noted between graded concentrations of the extracts, the exposure test-time interval, and adult parasite mortality. Activity was evaluated by noting the time required for paralysis and death of worms by extracts. The findings showed that ethanolic extract (200 mg/ml concentration) possess comparable anthelmintic activity with standard drug. The results show that the plant has the potential to be used as anthelmintic.

Table 6: Anthelimintic activity of *Ziziphus mauritiana*

S. No.	Group	Concentration (mg/ml)	Time taken for Paralysis (in mins Mean)	Time taken for Death (in mins Mean)
1	Control (Distilled water)	-	-	-
2	Standard (Albendazole)	200	26±2	52±4
3	Pet ether extract	200	34±3	65±6
4	Ethanolic Extract	200	28±2	58±6
5	Aqueous Extract	200	31±2	64±7

CONCLUSION

In the current work *Ziziphus mauritiana* plant was selected for the assessment of phytochemical and physicochemical parameters. These parameters studies are carried out to confirm the identity of plant and ascertain the quality and purity of the drug material. The extract of plant leaves of *Ziziphus mauritiana* were evaluated for anthelmintic activity, which showed potential ability of ethanolic extract as compared to other extracts.

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CONFLICT OF INTEREST

None

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