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## **ZIZIPHUS MAURITIANA : A REVIEW ON PHARMACOLOGICAL POTENTIAL OF THIS UNDERUTILIZED PLANT**

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### **ABSTRACT**

*Ziziphus mauritiana* is one of the underutilized herbs having potential to heal various ailments. It is reported in the ancient literature that whole plant as fruits, leaves, seed and root possess pharmacological activity. So this article is focused on potential and reported pharmacological activities of the whole plant.

**Keywords :-** *Ziziphus mauritiana*, root, seed, fruit

### **INTRODUCTION**

*Ziziphus mauritiana* a tropical fruit tree species. It is a spiny, evergreen shrub or small tree up to 15 m high, with trunk 40 cm or more in diameter; spreading crown; stipular spines and many drooping branches. The fruit is of variable shape and size. It is oval, obovate, oblong or round, and it can be 1-2.5 in (2.5-6.25 cm) long, depending on the variety. The flesh is white and crisp. When slightly unripe, this fruit is a bit juicy and has a pleasant aroma. The fruit's skin is smooth, glossy, thin but tight. It is the most commonly found in the tropical and sub-tropical regions. Originally native to India it is now widely naturalized in

tropical region from Africa to Afghanistan and China, and also through Malaysia, Australia and in some pacific regions. It can form dense stands and become invasive in some areas, including Fiji and Australia and has become a serious environmental weed in Northern Australia. It is a fast growing tree with a medium life span that can quickly reach up to 10-40 ft (3 to 12 m) tall.

### **VERNACULAR NAMES:**

**English:** Chinese apple, Chinese date, cottony jujube, Indian cherry, Indian jujube, Indian plum, jujube

**Fijian:** baer

**French:** jujubier, massonnier

**Hindi:** baher, bahir

**Spanish:** azufaifo africano

## CLASSIFICATION



Kingdom:	Plantae
Division:	Magnoliophyta
Class:	Magnoliopsida
Order:	Rosales
Family:	Rhamnaceae
Genus:	Ziziphus
Species:	<b>Z. mauritiana</b>
Binomial name	<b>Ziziphus mauritiana</b> Lam.

### CHEMICAL CONSTITUENTS:

It is a rich source of cyclopeptide alkaloids lupane and triterpenes. cyclopeptidmacrocycles of Ziziphus species showed interesting biological properties, including sedative, analgesic, antibacterial, antifungal and, antiplasmodial activity etc. It have 14-membered ring cyclopeptides to be the largest subgroup of alkaloid obtained, whereas only one 13-membered macrocyclic alkaloid isolated from this plant. These included the 4(14)-membered ring class: mauritineC, amphibine F and frangufoline the 5(14)-membered ring type: mauritines A and B. It also contain protein, carotene and vitamin C. The fruit is eaten raw or pickled or used in beverages. It is quite nutritious and rich in vitamin C. It is second only to guava and much higher than citrus or apples. In India, the ripe fruits are mostly consumed raw, but are sometimes stewed. Slightly unripe fruits are candied by a process of pricking, immersing in

a salt solution. Ripe fruits are preserved by sun-drying and a powder is prepared for out-of-season purposes. It contains 20 to 30% sugar, up to 2.5% protein and 12.8% carbohydrates. Fruits are also eaten in other forms, such as dried, candied, pickled, as juice, or as ber butter. In Ethiopia, the fruits are used to stupefy fish. The leaves are readily eaten by camels, cattle and goats and are considered nutritious. In India and Queensland, the flowers are rated as a minor source of nectar for honeybees. The honey is light and of fair flavor.<sup>1</sup>

### MEDICINAL PROPERTIES

Plant pacifies vitiated pitta, kapha, obesity, fever, burning sensations, cough, wound, skin disease, ulcers, stomatitis, diarrhea, sexual weakness, and general debility. Useful part : Fruit, Seed, Leaves, Root, Bark.<sup>2</sup>

## PHARMACOLOGICAL REVIEW OF LITERATURE:

The alcohol and aqueous extract of *Z.mauritiana* leaves stimulates cell-mediated immune system by increasing neutrophil function and phagocytic activity.<sup>3</sup>

Free radical scavenging activity & inhibitory response of *Ziziphus mauritiana* seed extract exert on alcohol induced oxidative stress.<sup>4</sup>

Anticancer potential of aq. ethanolic extract of *Ziziphus mauritiana* was found against cancer cell liner by MTI assay.<sup>5</sup>

*Ziziphus mauritiana* root exert antidiarrhoeal activity of in rodents . The antidiarrhoeal effect of the methanolic extract as evaluated exhibited a concentration dependent inhibition of the spontaneous pendular movement of the isolated rabbit jejunum and inhibited acetylcholine induced contraction of rat ileum. A dose dependent decrease of gastrointestinal transit was observed with extracts (25 and 50 mg/kg) which also protected mice against castor oil induced diarrhea and castor oil induced fluid accumulation, respectively. The presence of some of the phytochemicals in the root extract may be responsible for the observed effects, and also the basis for its use in traditional medicine as antidiarrhoeal drug.<sup>6</sup>

Chronic alcohol ingestion is known to increase the generation of reactive oxygen species (ROS), thereby leading to liver damage. Pre-treatment of rats with 200, 400 mg/kg body weight of aqueous leaf extract of *Z.mauritiana* resulted reduced the morphological changes that are associated with chronic alcohol administration .Rat liver administered with only alcohol resulted in severe necrosis, mononuclear cell aggregation and fatty degeneration in the central and mid zonal areas which was a characteristic of a damaged liver.<sup>7</sup>

*Ziziphus mauritiana* aqueous ethanol seed extract exert hypoglycemic activity in alloxan induced diabetic mice.<sup>8</sup>

The aqueous extract of *Ziziphus mauritiana* leaf lowers cholesterol and triglycerides level

in serum & liver of rats Aqueous extract of *Ziziphus mauritiana* leaf can be used for the prevention and treatment of fatty liver, atherosclerosis and other diseases associated with high levels of cholesterol and triglyceride. Pretreatment was found to confer more protection than co-treatment, hence pretreatment should be preferred.<sup>9</sup>

The methanolic extract of *Z.mauritianastem* bark was evaluated for its antiulcer activity using two models. Models are ethanol induced gastric ulcers model and aspirin induced gastric ulcer model in mice. It was found that the methanolic extract of stem bark have significant antiulcer activity in dose dependent manner where 3 different oral doses prepared (100 mg/kg of body weight, 250 mg/kg of body weight and 500 mg/kg of body weight). Evaluation was done on both models comparing with reference standard ranitidine (80 mg/Kg/ p. o.). The above result shows that *Z.mauritianastem* bark probably contains some active ingredients that could be developed for above mentioned abnormal condition as have been claimed by traditional system of medicine.<sup>10</sup>

The antimicrobial effects of ethanolic extracts of leaves of two species of genus *Ziziphus* were determined against *Escherichia coli*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Aspergillus niger* and *Candida albicans*. *S. pyogenes* was the most susceptible followed by *E. coli* while *S. aureus* was the least susceptible.<sup>11</sup>

Investigation of the MeOH extract that alkaloids isolated exhibited potent antiplasmodial activity against the parasite *Plasmodium falciparum* with the inhibitory concentration (IC<sub>50</sub>) ranging from 3.7 to 10.3 µM. Compounds **2** and **3** also demonstrated antimycobacterial activity against *Mycobacterium tuberculosis* with the MIC of 72.8 and 4.5 µM, respectively.<sup>12</sup>

The aqueous, methanolic and saponin extracts of *Ziziphus mauritiana* bark were screened for spermicidal activities against human spermatozoa.Saponin extract is found to be

more active to cause immobilization than aqueous and methanolic extract.<sup>13</sup>

### CONCLUSION

Thus from traditional and reported activities of *Z.mauritiana* it may be concluded that this herb has great potential as antimicrobial, hepatoprotective, anticancer, contraceptive and anti-diarrhoeal agent. Other activities mentioned in the literature have to be explored for further development of potential medicinal agent.

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### REFERENCES

1. www.ayurvedicmedicinalplants.com
2. http://commons.wikimedia.org
3. Wadekar R. Effect of *Ziziphus mauritiana* leaf extract on phagocytosis by human neutrophils. *Journal of Pharmacy Research* 2008;1 (1).
4. Bhatia A and Mishra T, Free radical scavenging activity and inhibitory responses of *Ziziphus mauritiana* seed extract on alcohol induced oxidative stress. *An international forum for Evidence Based Practices* 2009;( 1): 8
5. Mishra T, Kullar N and Bhatia A. Anticancer potential of Aqueous ethanol seed extract of *Ziziphus mauritiana* against cancer cell lines and Ehrlich Ascites Carcinoma. *Evidence Based Complementary And Alternative medicines* 2011;2011:11.
6. Dahiru D, Sini J.M. and John Africa L. Antidiarrhoeal activity of *Ziziphus mauritiana* root extract in rodents. *African Journal of Biotechnology* 2006; 5, 10.
7. Dahiru D, Obidoa O. Evaluation of the Antioxidant Effects of *Z.mauritiana* Lam. Leaf Extracts Against Chronic Ethanol-Induced Hepatotoxicity in Rat Liver *Afr J Tradit Complement Altern Med* 2007 ; 5(1): 39-45
8. Bhatia A and Mishra T, Hypoglycemic activity of *Ziziphus mauritiana* aqueous ethanol seed extract in alloxan induced diabetic mice. *Pharmaceutical biology* 2010; 48,604.
9. Dahiru D, Obidoa O, Effect of aqueous extract of *Ziziphus mauritiana* leaf on cholesterol and triglycerides level in serum & liver of rats administered alcohol. *2009, Pakistan j of nutrition*, 2009:1884-1888.
10. Panchal S, Panchal K, Vyas N, Modi K, Patel V, Bharadia P, Pundarikakshudu K. Antiulcer Activity of Methanolic Extract of *Z.mauritiana* stem Bark. *International Journal of Pharmacognosy and Phytochemical Research*, 2010 2(3): 6-11.
11. M. E. Abalaka<sup>1</sup>, S. Y. Daniyan<sup>1</sup> and A. Mann<sup>2</sup> M. E. Abalaka<sup>1</sup>, S. Y. Daniyan<sup>1</sup> and A. Mann Evaluation of the antimicrobial activities of two *Ziziphus* species (*Z.mauritiana* L. and *Ziziphus spinachristi* L.) on some microbial pathogens. *African Journal of Pharmacy and Pharmacology* 2010. 4(4): 135-139.
12. Panomwan P., Kanlaya L., Samran P., Palangpon K., Apichart S, Somsak R and Sunit S. Antiplasmodial and antimycobacterial cyclopeptide alkaloids from the root of *Ziziphus mauritiana*. *Phytochemistry* 2011,72 : 909-915 .
13. Dubey R, Dubey K, Sridhar C, Jayaveera K N. Sperm immobilization activity of aqueous, methanolic and saponins extract of bark of *Ziziphus Mauritiana*. *Pelagia Research Library. Der Pharmacia Sinica*, 2010 , 1 (3): 151-156.