



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Article

Pharmacological Review On: *Ziziphus Mauritiana*

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ARTICLE INFO

Published: 30 Mar. 2025

Keywords:

phytochemical, metabolites,
bioactive, anxiolytic,
Ziziphus mauritiana

DOI:

10.5281/zenodo.15106649

ABSTRACT

According to their taxonomic classification, plants of traditional significance that are members of the Rhamnaceae family are categorized as *Ziziphus mauritiana* (*Z. mauritiana*). Other names for this fruit are Chinese date, Ber, and Indian jujube. This species is believed to have originated in the Indo-Malaysia region of Southeast Asia. In tropical regions such as the Middle East, South Africa, and the Indian subcontinent, the plant species in question has grown much more naturalized. A little arboreal specimen or prickly perennial shrub with evergreen leaves is the subject of this discussion. Despite being underutilized, *Z. mauritiana* is a plant that may be used to cure a number of ailments. According to ancient literary sources, several plant components, including leaves, seeds, and fruits, have healing properties. The remarkable therapeutic qualities of *Z. mauritiana* are linked to a wide range of useful metabolites, including derivatives such alkaloids, flavonoids, and terpenoids. Because it includes a wide range of phytochemicals, bioactive compounds, vitamins, and other substances, this plant can effectively treat or prevent a number of ailments. With a focus on the anxiolytic, antioxidant, antimicrobial, anti-cancer, anti-diabetic, and anti-ulcer qualities of plants, the study examined their pharmacological characteristics and therapeutic advantages. This review article reviews and critically evaluates the available categorized data on *Z. mauritiana*'s pharmacological and toxicological effects, as well as its botanical features, traditional use, and phytochemistry.

INTRODUCTION

India is a biologically and culturally diverse country. It is among the world's most biodiverse nations. The medicinal herb has had a significant

impact on society's development. Many research have reportedly been carried out worldwide to elucidate the efficacy of plants, which are turning out to be really beneficial. Plants are typically found in big groups and are economically

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



complete as industrial basic resources. The cost of using plants as a resource is beneficial to your health since they may be used for inexpensive illness detection and treatment. *Ziziphus mauritiana* is a natural fruit of India that is extremely deficient. Lau, *Z. mauritiana*. The species *Z. jujuba* Lam., non-mill belongs to the "Rhamnaceae" family, which includes *Ziziphus tourn.* Past L. In addition to being linked to the ancient Persian lexis *Zizfum* or *Zizafun*, the Arabic term second hand for *Z. lotus* (L.) Desf. is also tied to the appellation *Ziziphus*. The archaic Greek name *Ziziphon* was used for the jujube. The traditional plant *Z. mauritiana* is a member of the "Rhamnaceae" family. It is generally known in India as "Ber" in Hindi and "Badrah" in Sanskrit. Originally from the India subcontinent or the Middle East, it is currently grown across the tropics and subtropics for its nutritional value. It is a plant with potential uses in both food and phytomedicine. Because of their innate ability to adapt to deficient stress, *ziziphus* plants and bushes live in an uninspired environment on all constituents. The plant provides nourishment for animals, and the pathetic transformed plant is used to make high-quality charcoal, fuel, agricultural tools, and turning.¹ Traditional medicine uses remedial plants to treat a wide range of illnesses, and many of these plants have been studied for their various pharmacological properties.¹ Overview of the Rhamnaceae family^{2, 3}: The Buckthorn, or Rhamnaceae, family is a broad group of flowering plants, primarily trees, shrubs, and some vines. There are perhaps 870–900 species and 50–60 genera in the family. Although they are found all throughout the world, the Rhamnaceae are more prevalent in tropical and subtropical areas. The Eocene provides the oldest fossil evidence for the Rhamnaceae. The simple leaves may be opposing or alternating and spiral. There are stipules. Many taxa have their leaves converted into spines, but some—like *Paliurus spina-christi* and *Colletia cruciata*—do so brilliantly. *Colletia* is unique in that it has two axillary buds rather of just one, with one of them

growing into a thorn and the other into a sprout. Overview of the *Ziziphus* genus:^{4,5,6} In the buckthorn family, Rhamnaceae, the genus *Ziziphus* has over 40 species of tiny trees and thorny shrubs that are found worldwide in warm-temperate and subtropical climates. The leaves are 2–7 cm (0.79–2.8 in) long, alternating, whole, and have three noticeable basal veins; some species are deciduous, while others are evergreen. They are tiny, hardly noticeable yellow-green blooms. The fruit is an edible drupe that is globose or oblong, yellow-brown, red, or black, and is 1 to 5 cm (0.39 to 2.0 in) in length. It is frequently highly sweet and syrupy, with a texture and flavor similar to that of a date.

OVERVIEW OF THE SPECIES:^{6, 7, 8, 9} *Ziziphus mauritiana*, a tropical fruit tree species that is a member of the Rhamnaceae family, is also referred to as Narkeli kul, Ber, Dongs, Boro, Bor, Beri, and Indian plum. With a trunk 40 cm or more in diameter, a spreading crown, stipular spines, and numerous drooping branches, *Ziziphus mauritiana* is a spiny, evergreen shrub or small tree that may grow up to 15 meters in height. The fruit comes in a variety of sizes and shapes. Depending on the variety, it can be round, oval, oblong, or obovate, and range in length from 1 to 2.5 inches (2.5 to 6.25 cm). The meat is crisp and white. This fruit has a nice scent and is a little juicy when underripe. The fruit has a thin, tight skin that is shiny and silky. In tropical and subtropical areas, it is most often found.

CLASSIFICATION IN SCIENCE^{3, 4}

Table No. 1

Kingdom	Plant
Division	Magnoliophyta
Subdivision	Angiosperm
Class	Magnoliopsida
Order	Rosales
Family	Rhamnaceae
Tribe	Paliureae
Genus	<i>Ziziphus</i>
Species	<i>Mauritiana</i>



COMMON NAMES^{3, 4}

Table No. 2

Language (No. of Names)	Vernacular Name
Tamil (1)	Elandhai
Hindi (1)	Ber
Sanskrit (3)	Ajapriya, Badara, Karkandhu
Arabic (6)	Beri, Bor, Nabbak El Fil, Nabbak-El-Fil, Nobig, Sidr
English(38)	Aprin, Baer, Baher, Bahir, Ber, Beri, Bor, Chinee Apple, Chinese Apple, Chinese Date, Chinese-Date, Coolie Plum, Cottony Jujube, Crabapple, Indian Cherry, Indian Jujube, Indian Plum, Indian-Cherry, Indian-Plum, Jujube, Ma-Tan, Malay-Jujube, Mangustine, Manzana (Apple), Manzanas, Manzanita, Perita Haitiana, Phutsa, Ponsigne, Putrea, Sour Jujube, Tao, Tao Nhuc, Widara, Yunnan Jujube, Yunnan Spiny Jujube, Yuyubi, Yuyubo
Gujarati(1)	Bordi
Marathi(1)	Bore



Flowers



Fruits



Dried Fruits



Leaves

METHODS

PHARMACEUTICAL-RELATED ACTIVITIES:

Plants have significant stores of different naturally occurring pharmacological compounds and hold enormous medical promise for the treatment of chronic disorders. It is believed that the usage of herbal remedies and pharmaceutical products made from them contributes significantly to the

advancement of clinical treatments worldwide. Similarly, *Z. mauritiana* has received significant recognition for its ability to effectively treat a variety of illnesses. For example, the leaves of this plant are used to treat tuberculosis and several other diseases connected to the circulatory system. Additionally, it has been demonstrated that buffalo's milk and leaf juice work well together as a medicinal combination to cure smallpox¹⁰. To soothe burning feelings, the leaves of this plant are mashed into a paste and applied to wounds. Urinary tract infections have historically been treated using a mixture of freshly harvested *Z. mauritiana* leaves and cumin¹¹. Additionally, the botanical root of this plant is combined with cow's milk and used as a diarrhea remedy. To ease hoarseness in their throats, traditional healers suggest that their patients eat a fresh *Z. mauritiana* root internally. Most of the components in this plant have potential for healing a variety of ailments. The roots and stems of this plant have long been used as a therapeutic remedy for dysentery and diarrhea. The root bark of this plant contains strong analgesic, anti-inflammatory, and anti-allergic properties¹². It has been demonstrated that *Z. mauritiana* is a very successful treatment for pregnancy-related issues, such as nausea, vomiting, and pain in the abdomen. The leaves of *Z. mauritiana* have demonstrated promising therapeutic qualities that might aid in the treatment of a number of ailments, such as fever, liver issues, and asthma. Empirical studies have shown the value of extracts derived from a number of *Z. mauritiana* components in the treatment of cancer, inflammation, and diabetes¹³. The plant's many pharmacological effects are caused by its main metabolite composition, which includes tannins, saponins, phlobatannins, alkaloids, flavonoids, and steroids. The pharmacological impact of *Z. mauritiana* is caused by the chemical components, extraction sections, or whole plant extracts.

1. Chemotherapy for cancer

Triterpenic acids isolated from *Z. jujuba* were investigated for their in vitro cytotoxicities against tumor cell lines. The triterpenes of the lupane class exhibited strong cytotoxic properties. It was shown that 3-O-p-oumaroylaliphilic acids had superior cytotoxic properties in comparison to non-coumaric triterpenoids. These findings imply that the lupane-type triterpene's coumaroyl moiety at position C-3 could be crucial in boosting cytotoxic action¹⁴. When taken from *Z. jujuba* and *Z. mauritiana*, the triterpenic acid betulinic acid demonstrated specific toxicity to human melanoma cells in vitro¹⁵. Preclinical research of betulinic acid is under underway¹⁶. Other cancers are believed to be susceptible to the effects of betulinic acid. Betulinic acid has recently been shown to be effective against small- and non-small-cell lung, ovarian, cervical, and head and neck carcinomas based on a large body of in vitro evidence¹⁶. According to published studies, betulinic acid causes apoptosis in susceptible cells in a manner that is independent of p53 and CD95^{15, 17, 18}.

2. Antidiabetic Activity

Research on petroleum ether, chloroform, acetone, and aqueous extract of *Z. mauritiana* by Jarald E.E. et al. (2009) revealed that these substances produced specific, useful outcomes. Diabetes is a condition that causes an excess of blood sugar. In rats with glucose overload and hyperglycemia, the antihyperglycemic effects of petroleum ether, chloroform, acetone, and aqueous and crude aqueous extract of *Z. mauritiana* fruit were seen. At two dosage levels (200 and 400 mg/kg, respectively), a small percentage of people reported the hypoglycemic impact of antihyperglycemic extracts. *Z. mauritiana*'s aqueous extract and its non-polysaccharide component were shown to have strong antihyperglycemic and hypoglycemic effects. The non-polysaccharide fraction's activity was on par with that of the common medication "glibenclamide."^{19, 20, 21}



3. Anti-Diarrheal Properties

The antidiarrheal activity of the methanolic root extract was evaluated by the inhibition of acetylcholine-induced contractions in the rat ileum and the concentration-dependent suppression of spontaneous pendular contractions in the rabbit jejunum. Mice were used in an experimental study to evaluate the effects of gastrointestinal transit using extract concentrations of 25 and 50 mg/kg. Researchers looked at the extracts' ability to stop diarrhea and fluid accumulation brought on by castor oil 27. The aqueous leaf extract of *Z. mauritiana* was effective in preventing castor oil-induced diarrhea in Wistar strain albino rats at 200, 400, and 800 mg/kg body weight. The amount of feces decreased 28, and the percentage inhibition was 51.05, 54.48, and 58.10%, respectively. Ay et al. assessed the antidiarrheal properties of the methanolic crude extract derived from *Z. mauritiana* leaves using a mouse model. The administration of a crude extract at a dosage of 400 mg/kg body weight resulted in a significant reduction in diarrhea of approximately 52.02% in comparison to the conventional medication loperamide (administered at a dosage of 50 mg/kg body weight), which showed a reduction of approximately 67.24% in diarrhea ²².

4. Anti-Asthmatic Properties

Mohan et al. assessed how *Z. mauritiana* Lam leaves protected mice's airways against OVA-induced inflammation and LPS-stimulated RAW 264.7 macrophages. In LPS-stimulated RAW 264.7 macrophages, higher doses of *Z. mauritiana* reduced pro-inflammatory cytokines, NO, and ROS. At 500 mg/kg, it efficiently decreased AHR and both total and differential leukocytes. Additionally, it decreased Muc5C, VCAM, and ICAM gene expression. Thus, it reduced lung inflammation by preventing the p65-driven I κ B- α translocation mediated by the NF κ B signaling pathway²³.

5. Anti-Oxidant Activity:

Using the colorimetric technique, the anti-oxidant activity of *Z. mauritiana* methanol extract was examined for its ability to scavenge 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radicals. The radical-scavenging action likewise increases as the sample concentration does. ²⁴. For the DPPH technique, the computed IC₅₀ was 38.07 μ g/ml.

6. Thrombolytic action:

Z. mauritiana methanol extracts exhibit thrombolytic action. The method created by Dagainawala et al. (2006) and slightly modified by Kawsar et al. (2011) used streptokinase (SK) as the standard to assess the extract's thrombolytic activity.

7. Anti-Inflammatory Activity:

Wistar rat cotton pellet-granuloma was used to assess the anti-inflammatory properties of the methanolic extract of *Z. mauritiana* leaves. *Z. mauritiana* leaf methanol extract exhibits dose-dependent inhibitory weight of cotton pellets. In contrast to the 16.9% at 250 mg/kg, the extract at 500 mg/kg showed 31.1% protection against inflammation.²⁴

8. Anti-allergic

By assessing its inhibitory effect on hyaluronidase (bovine testes) activation in vitro, the anti-allergic activity of *Z. jujuba* leaf aqueous extracts was investigated. It was demonstrated that *Z. jujuba* had potent anti-allergic properties ²⁵.

9. Enhancement of Permeability Activity:

Delivery of some medication types, such peptides, results in reduced bioavailability due to issues with cell membrane transport. Permeability enhancers can be employed to help medications move through cell membranes in order to get beyond this obstacle. An aqueous extract of *Z.*



jujuba seeds was compared to two members of a recognized series of permeability enhancement compounds that are part of the alkyl glycosides²⁶ in order to evaluate the permeability boosting activity of the plant.

10. Antiulcer Activity:

The anti-ulcer properties of *Z. mauritiana* stem bark methanolic extract were examined. Two models—the aspirin-induced gastric ulcer model in mice and the ethanol-induced gastric ulcer model in mice—are used in the study.²⁷ *Z. mauritiana* methanolic extracts of 100, 250, and 500 mg/kg decrease the gastric lesion by 8%, 66.67%, and 82.67%, respectively.

11. Reduced Cholesterol Activity:

Lailatusholihah and colleagues examined the effects of lowering cholesterol. The methanol extract from *Ziziphus mauritiana* (Bidara leaf) extract has been shown to dramatically decrease cholesterol levels—by around 80.45%—based on the results. This effect is caused by the presence of several active secondary metabolites, such as triterpenoids, flavonoids, and tannins²⁸.

CONCLUSION:

Z. mauritiana is a significant forestry species, it is concluded. This multipurpose tree produces fibers, fuel wood, charcoal, and feed from its leaves. In addition to its numerous therapeutic properties, such as anticancer, antidiabetic, antiulcer, antioxidant, anti-inflammatory, wound healing, thrombolytic activity, and many more, the plant *Z. mauritiana* has the potential to treat a wide range of illnesses. It is an extremely powerful plant due to the presence of medicinally active components including flavonoids, alkaloids, saponins, terpenes, and more. The literature research comes to the conclusion that the plant is highly significant and beneficial as a medicinal plant and has a wide range of potential future uses. A specialist should

always be consulted before utilizing a plant medicinally.

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HOW TO CITE: Khushal Chaudhari*, Lilachand Patil, Narendrasing Ranjitsing Girase, Shantvan Salunke, Kanhaiyalan Patil, *Pharmacological Review On: Ziziphus Mauritiana*, *Int. J. of Pharm. Sci.*, 2025, Vol 3, Issue 3, 3030-3036. <https://doi.org/10.5281/zenodo.15106649>

