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Review Paper

Ipomoea Mauritiana JACQ: A Complete Review

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ABSTRACT

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Ipomoea mauritiana (Vidari) is a perennial climber belonging to the family Convolvulaceae. The plant possesses tremendous ethnomedicinal value and is traditionally used in the Ayurvedic system of medicine. Phytoconstituents such as scopoletin, taraxerol, and β -sitosterol have been isolated from its tubers and other parts, and are responsible for the extensive pharmacological activities. The various activities which *I. mauritiana* exhibits are antioxidant, antibacterial, antifungal, antiinflammatory, hepatoprotective, hypocholesterolemic, antidiabetic, anti-asthmatic, analgesic, and antianxiety.This gives an indication of its therapeutic potential in the management of a variety of ailments, including chronic diseases, inflammation, asthma, diabetes, and mental health disorders. The use of the plant extract as a natural, safe, and cost-effective alternative to synthetic drugs underlines its relevance to healthcare, especially in developing countries.

INTRODUCTION

Herbal medicine is the oldest form of healthcare known to man. Plants have been a source of medicinal agents throughout history, and many modern drugs have been derived from them, either directly or indirectly. The popularity of herbal remedies persists due to their historical and cultural significance, and they are mainly used in the management of minor and chronic diseases. Natural products, particularly those of higher plants, played a traditionally vital role in the discovery of new therapeutic agents. On the other hand, modern allopathic medication systems have introduced too many advanced and highly costly diagnosis techniques, keeping healthcare beyond common people's reach. Additionally, most synthetic drugs are more harmful than helpful due to their adverse side effects compared to their benefits. Accordingly, populations of developing countries mostly rely on the traditional indigenous medicine in an effort to satisfy their minimum

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health needs [1]. *Ipomoea mauritiana (I. mauritiana)* Jacq. is a climber that belongs to the family of Convolvulaceae. This plant species is of great ethnomedicinal importance and also distributed in different parts of the world. It is more commonly known as "Vidari," an accepted substitute for the normally accepted official raw drug, *Pueraria tuberosa*. Ayurvedic Pharmacopeia of India also quoted *I. mauritiana* as Kshiravidari.



Fig no.1: Flowers of I. mauritiana

The tubers are a constituent in a total of at least about 45 various Ayurvedic formulation drugs and are now commonly prescribed individually also, with one of the very important Ayurveda preparation, notably Chyavanaprasha [2]. Various uses of Vidari include its pharmacological actions as an aphrodisiac, cardiotonic, demulcent, refrigerant and galactagogue. The roots are sweet and cold in action acts as an appetizer, galactagogue, rejuvenator, stimulant, carminative, and tonic. It is also used for the treatment of emaciation, enteric fever and spermatorrhea [3]. This substance is beneficial for nutrition, enhances vocal quality, acts as a diuretic, boosts physical strength, serves as a sexual stimulant, and promotes sperm production and lactation. It is also used to address skin discoloration, such as jaundice, enhances overall vitality, aids in biliary

disorders, purifies the blood, and alleviates burning sensations throughout the body [4]. The leaves and roots are used topically in the treatment of tuberculosis and external infections, including those of the breast [5]. Phytochemical and biological studies reveal that mature tubers contain about twice as much phytoconstituents as immature tubers, which are responsible for its biological activity [6].

Synonym: Ipomoea digitata, Ipomoea eriosperma, Ipomoea paniculata, and Convolvulus paniculatus

Common name: [7]

- Giant Potato, Mauritanian convolvulus
- Bengali: ভুঁইকুমড়া bhumikumra
- Hindi: भुईं कोहड़ा bhuyi kohada, बिलाई कन्द bilayi kand
- Kannada: ಭೂ ಸಕ್ಕರೆ ಗಡ್ಡೆ bhoo sakkare gadde, ನೆಲಗುಮ್ಬಳ nelagumbala
- Konkani: भूमिकुंव्हळी bhumikumvali
- Malayalam: പാൽമുതുക്ക് palmutukk
- Marathi: भुईकोहळा bhuikohala
- Oriya: ଭୁଇଁ କଖାରୁ bhuin kakharu
- Sanskrit: विदारी vidari
- Tamil: நிலப்பூசனி nila-p-pucani, பால்முடங்கி pal-mutanki
- Telugu: భూచుకగడ్డ bhuchakra gadda, నేల గుమ్మడి nela gummadi.

TAXONOMICAL CLASSIFICATION [8]

Kingdom: Plantae Clade: Tracheophytes Clade: Angiosperms Clade: Eudicots Clade: Asterids Order: Solanales Family: Convolvulaceae



Genus: Ipomoea Species: *I. mauritiana*.

BOTANICAL DESCRIPTION

I. mauritiana is a highly branched, smooth, twining perennial shrub with massive tuberous roots. The species is distributed throughout India, in both deciduous and evergreen forests and coastal tracts, and is widely naturalized in tropical regions of the world. Leaves are simple, alternately arranged, long petioled, and are palmately lobed, having 5 to 7 lobes. Flowers are bisexual, purple, and on long-pedicelled axillary cymes. Fruits are ovoid capsules with four cells four seeds woolly [9].

PHYTOCONSTITUENTS

Ipomoea mauritiana is reported to possess high value phytoconstituents such as taraxerol. taraxerol acetate, β -sitosterol, scopoletin, and 7-O- β -D-glycopyranosyl scopoletin. The GC-MS analysis of the tubers indicated 27 major phytochemical constituents present in them, which possess a wide range of pharmacological activities. Examples are 6,8 Dioxabicyclo(3,2,1) octan-3a-ol-2, 4-acetyl butyric acid, 2-methyl-4,5dihydroxybenzaldehyde, thiosulfuric acid, and several fatty acids and alcohols. Scopoletin has been used as one of the major bioactive markers whose content has been quantified in the tubers of Ipomoea mauritiana. It is reported to be a coumarin with the molecular formula $C_{10}H_8O_4$, abbreviated as 6-methoxy-7-hydroxy coumarin, and to occur in at least 27 plant families including Convolvulaceae [10-11].

PHARMACOLOGICAL ACTIVITY

Antioxidant and antibacterial

The methanolic extract of *Ipomoea mauritiana* contained tannins, saponins, terpenoids, alkaloids,

and flavonoids and showed very good antioxidant activity in the DPPH assay and considerable antibacterial activity against gram-negative and gram-positive microorganisms [2].

Analgesic and anti hyperglycemic activity

The callus produced from the nodal explant of *Ipomoea mauritiana* showed promising analgesic and anti-hyperglycemic activities, which could be availed in pain management and management of high blood sugar levels [12].

Antifungal activity

The whole plant extract from *Ipomoea mauritiana* exhibited significant antifungal activity, inhibiting the growth of *Aspergillus flavus* and *Aspergillus parasiticus* by 73% and 50%, respectively. Though the extract had a moderate toxin inhibition ability of about 30% for both fungi, this strong antifungal potential underlines its potential as a natural agent in the control of fungal growth. The outcome places *Ipomoea mauritiana* in a very promising position with respect to application in agricultural and food storage systems due to its ecologically friendly approach in preventing fungal infestation of ware commodities [13].

Anti asthmatic

Ipomoea mauritiana can be included as a very useful plant in the therapy of asthma. The methanol and ethanol extracts of tubers and peels of this plant showed very good inhibition of histamine-induced bronchoconstriction in guinea pigs. The dose-response curve shows that with an increase in dose, the action of extracts also increases. It delays the asthmatic spasm and justifies its use as an herbal complementary agent in asthma treatment [14].

Anti inflammatory



The anti-inflammatory activity of the leaf extracts of *Ipomoea mauritiana* was evident in the carrageenan-induced rat paw edema assay. Two compounds, caffeic acid and β -amyrin acetate, were tentatively identified and are contributing to the bioactivity of the plant. Safety assessment through histopathological studies also established the safety of the extracts with no toxic effects on liver and kidney tissues. These findings confirm the traditional medicinal use of *I. mauritiana* and suggest its potential in therapeutic applications for the treatment of conditions related to inflammation [15].

Hepatoprotective activity

The aqueous extract of Ipomoea mauritiana Jacq has been subjected to considerable hepatoprotective activity against amoxicillininduced hepatotoxicity in male albino rats. Indeed, this extract was able to reduce the hepatic damage induced by the antibiotic amoxicillin when given at a dose of 200 mg/kg body weight, as manifested in an increase in total protein and reductions in triglycerides, cholesterol, bilirubin, and liver enzyme markers such as SGOT, SGPT, ALP, ACP. This protective effect was confirmed by histopathological examination, which showed lessened centrilobular necrosis and vacuolization, with the restoration of normal liver architecture [16].

Hypocholesterolemic and Hypotriglyceridemic activity

The study demonstrated that the tuber root powder of *Ipomoea mauritiana* exhibits significant dosedependent effects, including lowering serum total cholesterol, triglycerides, glucose levels, and LDL-cholesterol, while increasing HDLcholesterol levels. These findings suggest that regular consumption of this tuber root powder may be beneficial for managing coronary disease and diabetes [17].

Antianxiety property

Pooja Jaiswal et al conducted a study to evaluate the antianxiety property of an ethanolic extract of *Ipomea mauritiana* leaves in Swiss albino mice. Results suggest that the administration of such a plant extract significantly elicited an anxiolytic response, analyzed by using EPM and Light-Dark Box models. Both 200 mg/kg and 400 mg/kg body weight of extracts were quite effective, confirming traditional use of *Ipomea mauritiana* as an anxiolytic agent. Further research is recommended to isolate and identify the active constituents responsible for this activity [18].

CONCLUSION

Ipomoea mauritiana has been found to possess a wide range of pharmacological activities, thus justifying its traditional medicinal uses. The phytochemical constituents of the plant provide scientific justification for its use in chronic diseases, inflammation, asthma, diabetes, and anxiety disorders with safety and minimal side effects. The potential of this plant as a natural therapeutic agent underlines its place in modern herbal medicine, hence requiring further research for the exploration of active compounds and optimization of clinical applications

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