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## A Literary Study On *Punarnava (Boerhaavia Diffusa)* Medicinal Plant- A Review Article

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### ABSTRACT: -

The aim of this analysis is to include detailed confirmations on the phytochemical and pharmacological aspects of *Boerhaavia diffusa*, *Nyctaginaceae*, also known as "*Punarnava*." It has a long ethno medical tradition and is a heuristic therapeutic phytochemical reservoir. It is one of the oldest oriental remedies that *Ayurveda* mentions as a possible cure for a variety of ailments. Glycosides, steroids, flavonoids, and numerous polyphenolic compounds are abundant in the plant. Many pharmacological trials have shown its potential to benefit conventional applications as antioxidants, ophthalmic, anti-inflammatory, semen, aphrodisiac, immunostimulants, anti-asthmatic. We have based our interests in phytochemistry, the registration of plant chemicals, those responsible for medicinal principles, common applications and their recorded pharmacological properties in this review article.

**Keywords-***Boerhaavia diffusa*, Pharmacological properties, *Punarnava*.



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## INTRODUCTION

The usage of medicinal plants has a history of several centuries and traditional medical systems from a variety of ethnic groups<sup>[1]</sup>. Medicinal plants have been used to treat many diseases, based on the knowledge of many thousands of physicians and indigenous methods of medicine from various ethnic societies<sup>[2]</sup>. The Indian System of medicine (*Ayurveda*), which relies on plant resources plays a crucial role in the control and management of various medical disorders<sup>[3]</sup>. The time has come to list and study phytochemicals, which have therapeutic results and empirical validity of people's claims contained in medicinal plants. The discovery of a special biomolecule will also prove to be a new discovery to reverse troubling health conditions<sup>[4]</sup>. *Punarnava Boerhaavia diffusa* L. (*Nyctaginaceae*) is a continuous herb that is present in the whole Indian wastelands known as '*Punarnava* in the Indian System of medicine.<sup>[5]</sup>

## AIM AND OBJECTIVE

To evaluate the Study of *Punarnava (Boerhaavia diffusa)* according to *Ayurvedic Text*.

## METHODOLOGY

*Punarnava (Boerhaavia diffusa)* related materials were collected from various journals and books, *Ayurvedic* and contemporary textbooks, authoritative articles, esteemed reviews literature, manuscripts, etc.

### Geographical distribution

The *Boerhaavia* genus is divided up into 40 species and warm weather and is present in the tropical and subtropical regions. It extends throughout China, Africa, America and Pacific islands, across Ceylon, Australia, Sudan, and the Malay Peninsula<sup>[6]</sup>

Six species are present in India, including *B. diffusa*, *B. chinensis*, *B. hirsut* and *B.*

*rubicunda*. Among 40 *Boerhaavia* species. It is a continuous, widespread hogweed, mostly in waste sites, ditches, and marshy sites after rainfall. In West Bengal the plant is also very cultivated<sup>[7, 8, 9, 10, 11]</sup>. The plant is abundant in rainy season.<sup>[12]</sup>

### Gross Features

1. **The seed** are very different in form - ovate, red or underlying at the base and smooth above.
2. **The leave** margins are flat, or wavy. It is green, smooth and globous on the top surface, while it is pink, white and hairy underneath. Before starting the monsoon, the seeds germinate<sup>[13]</sup>.
3. **Flowers** are minute, typically pink, white, and about (10 to 15 cm) long. Fascinated or sub-umbellate on the ultimate branch. These are cream, yellow or rose-red.
4. **On the position of the calyx and corolla** is a perianth that is tubular in shape, the tube on the base is low and thin and on the top funnel-shaped and above the ovary is constrained. There are five small, acute lobes. There are two to three stages and they are exercised slightly. Peltate is the stigma. The achenes are detachable, ovate, oblong, pubescent, glandular, and five-ripened<sup>[14]</sup>. It is cylindrical or snappy to conical or tapering, bright yellow, brown or brownish grey.

**The tap root** is tuberous. It is very thick, fleshy and tasteful. Certain workers have learned tissue culture in order to regenerate this plant<sup>[13]</sup>.

### Microscopic Characters

This powder shows characteristics such as cork cells in surface view, acicular calcium oxalate crystals with a length of up to 40 $\mu$ , calcium oxalate crystals with a length of about 25 $\mu$ , thin narrow fibres with sharp points ends and a narrow lumen with a length of 800 $\mu$ , simple to five-compound oval to rounded starch grains measuring upto 15 $\mu$  in length, simple pitted vessels with a length of up to 200 $\mu$  & few parenchyma with few starch grains<sup>[16]</sup>

### The phyto-chemical components

The following phytochemical constituents are usually - *Punarnavine (Alkaloids)*, *Beta - Sitosterol (Phytosterols)*, *Lirodendrin (lignans)*, *Rotenoid*, *Bogravinones (Xanthones)*, and *Nitrate Potassium* the following constituents are generally found in the whole plant (Salts). In addition to the latest *Alanine*, *Behenic Acid*, *Boerhavone*, *Campestarol*, *Daucosterol*, *Beta-Ecdysone* and *Flavone*, root canals include *rotenoidsboeravinones* AI, BI, C2, D, E and F, 5-7-dihydroxy-3'-4'-dimethyl, XY-6-8-dimethyl, 5-7-dihydroxy-3'-4'-dimethyl. Histadine, Hypoxanthine-9-1-arabinofuranoside, Galactozone, Glutamic Acid, glutamine, glycerol, glycine, centria contane N.<sup>[17]</sup>

### Uses in medicine

1. *Boerhaavia diffusa* having a reputed status in both the traditional and folk streams of indigenous medicine systems with useful medicines.
2. It has an astringent and bitter taste <sup>[18,19,20]</sup>
3. The seeds are cleansers of blood. Seeds are used as energizers and as digestive aid <sup>[21, 22]</sup>. Asthma, urinary diseases, rheumatism and encephalitis are treatment by root juice <sup>[23, 24]</sup>

### Formulations based on Ayurveda

*Ayurvedic* texts and the market contain a variety of formulations, some of which are described below:

#### Traditional Products <sup>[25]</sup>

1. *Punarnavasava*,
2. *Punarnavamandura*
3. *Punarnavasataka*,
4. *Punarnavambu*
5. *Punarnava Guggulu* <sup>[26]</sup>.

### Therapeutic Uses

Herb is used as a diuretic, expectorant, and

stomachic, and is used for jaundice, digestive weakness, spleen enlargement, and relief of abdominal pain<sup>[27]</sup>.

### Bacteriostatic properties

YL Ramchandra et al.,2012<sup>[28]</sup>, demonstrated this by testing the in-vitro antibacterial efficacy of petroleum ether, chloroform, and methanol crude extracts of aerial and root sections from *Boerhaavia diffusa* plant against six microorganisms, including *E.coli* ATCC 69314, *K. pneumoniae* NCIM 2719, *P. aeruginosa* NCIM 2200, and *S. aureus* NCIM 2200. Using the agar well plate process, they tested *A. tumefaciens* NCIM 2943, *S. aureus* NCIM 2080, and *B. subtilis* MTCC 441, which involve Gram-negative and Gram-positive bacteria, and found that methanol crude extract of aerial portion of plant exhibited high antibacterial activity relative to petroleum ether extract and chloroform extract <sup>[28]</sup>. The antibacterial activity of *B. diffusa* leaves against different Gram-negative and Gram-positive bacteria may be due to phytochemicals present in the leaves <sup>[29]</sup>. Ethanol extract inhibited gram-positive bacteria such as well as all gram-negative bacteria.

### Anti-diabetic Activity

Nalamolu et al., 2004<sup>[29]</sup>, found that an alcoholic extract of the entire plant of *B. diffusa* had hepato-protective efficacy in rats and mice when they were exposed to carbon tetrachloride. A study of normal and alloxan-induced diabetic rats found that oral administration of an aqueous solution of *B. diffusa* leaf extract resulted in a substantial decrease in blood glucose and a significant rise in plasma insulin levels. Glibenclamide has a stronger impact on the body<sup>[30]</sup>

### Anti-nociception Activity

In mice, the abdominal induction of acetic acid reversed the analgesic effect of morphine and juice, but not decoction, dramatically in the pre-

treatment of naloxone (5 mg/kg). Active anti-nociceptive *B. diffusa* theory is stated to be primarily found in the juices in fresh leaf and, if tested in these pain models, has a strong antimicrobial effect<sup>[31]</sup>. Hiruma-Lima and others<sup>2000</sup>.

### Hepatoprotection Activity

*B. diffusa* (2ml/kg) aqueous root extract had significant thioacetamide hepato-protection efficacy, as well as marked resistance against a majority of serum parameters including GOT, GPT, ACP, and ALP but not GLDH and bilirubin, according to Rawat et al., 1997<sup>[22]</sup>. Studied have demonstrated more hepato-protective activities in an aqueous drug (2ml/kg) than in the powder<sup>[32]</sup>.

### Anti-inflammation Action

In serotonin, histamine, and dextran mediated rat paw edema models, ethanol extract of leaves at 400mg/kg showed maximal anti-inflammatory effect with 30.4, 32.2, 33.9, and 32 percent with carrageen, respectively. COX-1 was also detected in ethanol extract of stem bark, with an IC<sub>50</sub> value of 100ng/ml, indicating that the medication can be used to treat inflammatory conditions.<sup>[33]</sup> Bhalla et al., 1978. A carrageenan-induced inflammatory model was used to evaluate the anti-inflammatory efficacy of a latex extract from a plant.<sup>[34]</sup> Kulkarni et al, 2003.

### Anti-Convulsant properties

The crude Methanolic extract of *B. diffusa* and its liriiodendrin-rich fraction were found to protect against PTZ-induced convulsions in a dose-dependent manner.<sup>[35, 36]</sup>

### Anti-stress and immuno - modulatory Activity

In a study of ethanol extracts of *B. diffusa* roots, researchers discovered that they improved stress resistance in a swim endurance test and that cold reduces stress. Increased carbon clearance indicated immunomodulatory function, suggesting activation of the reticulo-endothelial system. In mice, the DTH response

to SRBC increased, signalling cell mediated immunity and stimulatory effects on lymphocytes and accessory cell types.

### Anti-Bronchial Asthma Therapy

In bronchial asthma therapy, dried leaves *Dhoompan* has a role to play in treating bronchogenic asthma.<sup>[37]</sup>

### Anti-Viral Property

Maximum antiviral activity was recorded in each case with the aqueous extract of dried root powder added before virus inoculation, according to Verma and Awasthi et al., 1979<sup>[38]</sup>. Antimicrobial properties have been attributed to the *B. diffusa* plant. This plant's antiviral effectiveness against phytopathogenic viruses has recently been discovered. This antiviral property could prevent certain economically valuable crops from natural infection by plant viruses if it was applied as a foliar spray in the field<sup>[39]</sup>

### Anti-genetic Activity

It comprises up of a number of clinically essential compounds. According to Shukla et al., 2003<sup>[40, 41, 42]</sup>, *B. diffusa* is a widely used herbal medicine. Using spontaneous amplified polymorphic DNA,<sup>[43]</sup> the genetic diversity in *Boerhaavia diffusa* between accessions from various geographical origins within the Indian Territory is measured in this analysis (RAPD).

## CONCLUSION

*Punarnava* is most often used to treat kidney and urinary conditions. *Punarnava* has anti-inflammatory and diuretic properties. It is used as a kidney tonic and a heart tonic. It can be found all over India, particularly during the rainy season. *Punarnava* has anti-inflammatory and diuretic properties. It has a bitter and pungent flavour. The entire plant, particularly the roots, possess medicinal properties. *Punarnava* herb is most commonly used in *Ayurvedic* medicine to treat kidney complications and urinary tract infections.

Jaundice, general fever, and obesity are all treated with *Punarnava*. To ensure the authenticity of the events, further study is needed. Pharmacological activity on laboratory animals would be used to confirm these behaviours.

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