

## A review on *Bhueamla* “*Phyllanthus niruri*” and It's pharmacological activities

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### ABSTRACT

*Bhueamla* “*Phyllanthus niruri*” is one of the most important traditional medicines used for various diseases. It is also used to restore liver activity, blood tonic and enhance body defence system. Scientific investigation revealed the therapeutic value of this medicinal plant showed that the plant contains several chemical constituents which have been isolated and characterized and were found to be active against some diseases. It have a wide range of pharmacological activities like antimicrobial, antiviral, hepato protective, antioxidant, anticancer, anti-inflammatory, anti-plasmodial and diuretic.

**Keywords:** *Phyllanthus niruri*, pharmacological activities, chemical constituents.

### Introduction:

Herbal medicine have long been used to maintain health or to provide remedies for various human diseases. Liver disorders, including liver cirrhosis, benefit from therapeutic strategies

employing compounds extracted from plants. *Phyllanthus niruri* is a widespread [tropical](#) plant commonly found in coastal areas, known by the common names **gale of the wind, stonebreaker** or **seed-under-leaf**. “*Phyllanthus niruri*” belong to the family *Euphorbiaceae* and the extract from this plant was widely used in the preparation of various *Ayurvedic* formulations. It grows 50–70 cm tall and bears ascending herbaceous branches. The bark is smooth and light green. It bears numerous pale green flowers which are often flushed with red. The fruits are tiny, smooth capsules containing seeds. It is a small herb having wide range of medicinal properties, and it is used widely across the world. Its taste is bitter and acts as astringent and show laxative effect. This review covers information about medicinal uses of P. Niruri with various pharmacological profile of the plant.

### Botanical classification

*Kingdom* – Plantae

*Division* – Magnoliophyta

*Class* – Magnoliopsida

*Order* – Euphorbiales  
*Family* – Euphorbiaceae  
*Genus* – *Phyllanthus*  
*Species* – *Niruri*

*P. niruri* is a field weed and its genus *Phyllanthus* comprises of 600-700 species with minor distinguishing features among them. In Indian *Ayurvedic* system *Phyllanthus niruri* plant extract is used as a medicine and is recommended for Hepatitis, HIV infection, Bronchitis, Anaemia, Leprosy, Asthma, Urinary disorders etc. They also used the plant to manage irregular menstruation, tachycardia, dysentery, spasmodic cough, itchiness, arthritis, otitis, swelling, skin ulcer and weakness of male organ. The photochemical studies were characterized and the presence of various compounds such as *lignans*, *phyllanthin*, *hypophyllanthin*, *flavonoids*, *glycosinoids* & *tannins* was mentioned. The extracts of *Phyllanthus niruri* have a wide range of pharmacological activities like antimicrobial, antiviral, *hepato* protective, antioxidant, anticancer, anti-inflammatory, *antiplasmodial* and diuretic. *Acharya Charaka* has categorized *Bhueamla* as *Kasahara*, *Swasahara*, *mootrarogahara*, *Kaphapittahara*, relieves the *kaphapitta dosha*, *Kaamalaahara*, and in *Bhava prakasa Nighantu* it cures cough and blood disorders.

### Medicinal Properties of *Bhueamla*

- *Rasa- Tikta, Kashay, Madhura*
- *Guna- Laghu, Ruksha*
- *Veerya- Sheeta*
- *Vipaka- Madhura*
- *Karma- Kaphapitta Shamaka*

### Pharmacological Activity

#### Action of kidney stones & uric acid

Kidney stone is a common problem that accumulates calcium oxalate crystals, and it includes urinary calculi formation, nucleation, growth, and aggregation of crystals. *Phyllanthus niruri*'s extract interferes in the growth and aggregation of calcium oxalate [*caox*] crystals in the calculi. The extract inhibits *caox* crystal aggregation in the early stages of stone formation. The extract has the ability to prevent the growth of calculi and also change the shape and texture of the calculi. The extract decreases the urinary calcium levels and also reduces the excess uric acid in *hyperuricemic* people.

#### Anti spasmodic, pain relieving & anti inflammatory

The wound healing nature of *Phyllanthus niruri* has been evaluated by the healing of wounds by oral and topical administration. *P. Niruri* was proved to have a significant role in wound contraction and epithelialisation.

#### Liver protective, detoxification & antioxidant activity

The carbon tetrachloride and *galactosamine* induced *cytotoxicity* in *hepatocytes* can be decreased by the *P. niruri* hexane extract. *Phyllanthin* and *hypophyllanthin* protects against the *CCl4* induced cell lesions and *GalN* induced Hepato toxicity. *Phyllanthus niruri* can reduce *nimesulide* induced hepatic damage. It protects the liver from *nimesulide* induced liver toxicity & Oxidative stress.

#### Effect on Viral Infections

The extract of *Phyllanthus niruri* in an *in vitro* study inhibited DNA polymerase in

Hepatitis B virus (HBV) and Woodchuck hepatitis virus (WHV). Also, in vivo study shows that the extract has effect against Hepatitis B virus in infected human. Another study revealed that the extract blocked enzymes that play an important role in the reproduction of hepatitis B virus. The aqueous extract of *Phyllanthus niruri* inhibits endogenous DNA polymerase of hepatitis B virus and binds to the surface antigen of hepatitis B virus in vitro. The extract also inhibits woodchuck hepatitis virus DNA polymerase and binds to the surface antigen of WHV in vitro.

### Antioxidant

*Phyllanthus niruri* showed significant improvement of body antioxidant activities in both insulin and non-insulin dependent diabetes mellitus. A protein isolated from *Phyllanthus niruri* has also been showed to act as radical scavenger, thereby scavenging the free radicals released by the toxic effect of carbon tetrachloride in *hepatocytes*. The *hepatoprotective* effect of *Phyllanthus niruri* may be associated with its action at cellular level by reducing oxidative stress as a radical scavenger and promoting anti-oxidative defense mechanism of the cells.

### Lithiasis

*Phyllanthus niruri* has shown inhibitory effect against calcium oxalate crystal growth and aggregation in human urine. This medicinal plant exhibited *anti-urolithic* activity in both in vitro and in vivo studies. The aqueous extract of *Phyllanthus niruri* inhibits the growth of the matrix calculus as well as decrease the number of stone satellites. Oral administration of *Phyllanthus niruri* extract by calcium stone forming patients

reduced urinary calcium in *hypercalciuric* patients.

### Effect on Cardiovascular System

It was reported that methyl *brevifolincarboxylate* (MB) isolated from the leaves of *Phyllanthus niruri* L. Exerted vasorelaxant effect on the aortic rings of rat. It also *antagonised* the vasoconstriction effect of *Norepinephrine*. MB was also found to have potent inhibitory effect against platelet aggregation; the effect was comparable to known inhibitor of platelet aggregation adenosine.

### Discussion and conclusion

*Phyllanthus niruri* is an important medicinal plant which has been used in *Ayurvedic* medicine in the treatment of diseases for over 2000 years. Scientific investigation revealed the therapeutic value of this medicinal plant showed that the plant contains several chemical constituents which have been isolated and characterized, and were found to be active against some diseases. For example *phyllanthin* is a chemical compound isolated from *Phyllanthus niruri*, and reported to have *hepatoprotective* activity. This activity is associated with its radical scavenging activity. *Phyllanthus niruri* belong to the family *Euphorbiaceae* and the extract from this plant was widely used in the preparation of various *Ayurvedic* formulations. The analysis of the extract revealed several bioactive molecules and chemical agents including *phyllanthin*, *hypophyllanthin*, *phyltetralin*, *niranthin*, *nirtetralin*, *hinokinin* and *isolintetralin*. Which are *lignans* belongs to the *polyphenols* group of compounds with well known antioxidant properties. Application of the extract exhibited

antiulcer, antitumor and *anticarcinogenic*, *hypolipidemic*, antiviral, and antioxidant effects. More recent explorations on the role of the extract has confirmed that it possesses potent protective effects against viral hepatitis and toxicity caused by different drugs or environmental toxicants.

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