

Role of *Bhumyamalaki* (*Phyllanthus niruri* L.) in the Management of Chronic Hepatitis B: An Ayurvedic and Modern Pharmacological Review

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Abstract

Chronic Hepatitis B (CHB) is a major global health concern associated with liver cirrhosis and Hepatocellular carcinoma. Although modern antiviral therapies help suppress viral replication, their long-term use is often limited by high cost, adverse effects, and development of drug resistance. This has increased interest in traditional medicinal plants with hepatoprotective and antiviral potential. *Bhumyamalaki* (*Phyllanthus niruri* L.), an important herb in *Ayurveda*, has long been used in the management of liver disorders such as *Kamala* and other hepatobiliary diseases. Ayurvedic texts describe it as having *Tikta-Kashaya Rasa*, *Sheeta Virya*, and *Pitta-shamaka* properties that support liver health. Modern phytochemical studies have identified active compounds such as phyllanthin, hypophyllanthin, flavonoids, and tannins, which exhibit antiviral, antioxidant, anti-inflammatory, and immunomodulatory activities. Experimental and clinical studies suggest that *Phyllanthus niruri* may inhibit hepatitis B viral replication, reduce viral antigen expression, and improve liver enzyme levels. Its antioxidant action also helps protect hepatocytes from oxidative stress and inflammation. Integrating *Ayurvedic* knowledge with modern scientific evidence suggests that *Bhumyamalaki* may serve as a promising supportive therapy in Chronic Hepatitis B, though further clinical studies are needed to establish standardized dosage, safety, and long-term efficacy.

Key words : *Bhumyamalaki*, *Phyllanthus niruri*, Chronic Hepatitis B, Hepatoprotective.

Chronic Hepatitis B (CHB) remains million people and frequently progressing to a major global health crisis, affecting over 250 severe liver diseases such as cirrhosis and

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hepatocellular carcinoma.²¹ While modern antiviral agents like nucleos(t)ide analogues and interferon therapy are available, achieving complete viral eradication is difficult due to the persistence of **cccDNA** within hepatocytes. Furthermore, conventional treatments are often limited by high costs, potential drug resistance, and adverse side effects.⁵ In response to these challenges, research has turned toward Ayurvedic medicine, specifically the herb *Bhumyamalaki* (*Phyllanthus niruri* L.).¹³ Traditionally used to manage liver disorders like *Kamala* (jaundice) and *Yakrit-Pliha Vikara*, this plant is recognized for its potent hepatoprotective and immunomodulatory properties.¹⁷ Modern pharmacological analysis confirms that *Bhumyamalaki* contains active constituents like phyllanthin and hypophyllanthin, which can inhibit HBV replication and reduce viral antigen expression.⁴ Evidence suggests the plant extract may interfere with viral DNA polymerase activity, while its antioxidant properties protect liver cells from the oxidative stress and inflammation characteristic of chronic infection.¹⁹ Consequently, *Bhumyamalaki* represents a significant integrative approach, combining traditional knowledge with modern evidence to provide a safe, supportive therapy for managing the global burden of Chronic Hepatitis B.¹

Review of Bhumyamalaki (Phyllanthus niruri) :

Ayurvedic Profile of Bhumyamalaki :

The name *Bhumyamalaki* translates to “ground-growing gooseberry,” a reference to its appearance and growth habit.⁸ Other traditional synonyms like *Bahuphala* (bearing numerous fruits) and *Bhumidhatri* further

highlight its morphology, while *Tamralochana* refers to its distinct copper-colored hue.⁹ These names serve as botanical markers in classical texts, linking the plant’s physical form to its therapeutic identity.¹⁷

Pharmacodynamics and Therapeutic Action :

The clinical efficacy of *Bhumyamalaki* is rooted in its unique *Ayurvedic* properties (Properties/Karma)³, which allow it to specifically target liver metabolic pathways:

- **Pharmacodynamic Properties:** It possesses a *Tikta-Kashaya* (bitter-astringent) taste, *Laghu-Ruksha* (Light-dry) qualities, and *Sheeta* (Cooling) potency. These attributes are ideal for detoxifying the liver and calming inflammatory conditions.¹⁵
- **Core Actions (Karma):** The herb is primarily *Pitta-shamaka* (Balancing the fire element) and *Yakrit-uttejaka* (liver-stimulating).
- **Systemic Benefits:** Beyond the liver, it acts as a *Mutrala* (Diuretic) and *Rakta-prasadana* (Blood purifier).

By combining *Deepana-Pachana* (digestive and metabolic stimulation) with its cooling nature, *Bhumyamalaki* effectively treats disorders like *Kamala* (jaundice) by correcting impaired hepatobiliary physiology and restoring metabolic balance.⁸

Phytochemistry and Modern Pharmacological Actions of Bhumyamalaki :

Phytochemical Constituents :

Phyllanthus niruri has been extensively investigated for its phytochemical composition, and several bioactive compounds (Table-1)-

responsible for its hepatoprotective and antiviral activities have been identified.¹⁴ Phytochemical screening studies have demonstrated the presence of compounds, which plays an important role in modulating liver enzymes, reducing

oxidative stress, and improving hepatic function. The synergistic action of these bioactive molecules is believed to contribute to the overall therapeutic potential of *Phyllanthus niruri* in liver disorders, including viral hepatitis.⁴

Table-1. Major Phytoconstituents of *Phyllanthus niruri*

Phytochemical Group	Major Compounds	Reported Pharmacological Activity
Lignans	Phyllanthin, Hypophyllanthin	Hepatoprotective, antiviral
Flavonoids	Quercetin, Kaempferol	Antioxidant, anti-inflammatory
Phenolic compounds	Gallic acid, Ellagic acid	Free radical scavenging
Tannins	Geraniin, Corilagin	Antiviral and hepatoprotective
Alkaloids	Phyllantine	Metabolic regulatory effects

Antiviral Activity :

Several experimental studies have demonstrated that *Phyllanthus niruri* exhibits significant antiviral activity against Hepatitis B virus.² The plant extract has been reported to inhibit HBV DNA polymerase activity and suppress viral replication in infected hepatocytes. Additionally, certain compounds present in the plant interfere with viral antigen expression, particularly hepatitis B surface antigen (HBsAg), thereby contributing to reduced viral load. These antiviral effects support the traditional use of the herb in the management of hepatitis and other liver infections.¹⁹

Hepatoprotective Activity :

The hepatoprotective potential of *Phyllanthus niruri* has been widely documented in experimental models of liver injury. Studies have shown that plant extracts can significantly reduce elevated serum liver enzymes such as alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP), which are indicators of hepatic

damage. The hepatoprotective activity is primarily attributed to the antioxidant properties of its phytoconstituents, which help stabilize hepatocyte membranes and prevent oxidative damage.⁷

Antioxidant and Anti-inflammatory Effects :

Oxidative stress plays an important role in the pathogenesis of chronic hepatitis and liver fibrosis. The polyphenols and flavonoids present in *Phyllanthus niruri* exhibit strong antioxidant activity by neutralizing free radicals and reducing lipid peroxidation in hepatic tissues. Furthermore, the plant also demonstrates anti-inflammatory effects by modulating inflammatory mediators and cytokines involved in liver injury. These combined actions contribute to improved liver function and protection against progressive hepatic damage.¹⁰

Studies of Bhumyamalaki (Phyllanthus niruri) in Hepatitis B :

Experimental Studies :

Experimental studies have demonstrated

that *Phyllanthus niruri* possesses significant antiviral and hepatoprotective properties. Its extracts inhibit hepatitis B viral replication, reduce HBsAg expression, and protect hepatocytes from liver injury, while also improving liver enzyme levels (Table-2). These findings highlight its potential role in the management of Chronic Hepatitis B.¹²

Clinical Studies :

Clinical studies on *Phyllanthus* species have shown promising results in Chronic Hepatitis B, including clearance of hepatitis B surface antigen and improvement in liver enzymes such as ALT and AST. However, further well-designed randomized clinical trials are needed to confirm its efficacy and long-term benefits in HBV management.¹⁸

Table-2. Possible Mechanisms of Action

Mechanism	Explanation
Antiviral activity	Inhibition of HBV DNA polymerase and viral replication
Hepatoprotective effect	Protection of hepatocytes and stabilization of liver enzymes
Antioxidant activity	Reduction of oxidative stress and lipid peroxidation
Anti-inflammatory action	Suppression of inflammatory mediators in liver tissue
Immunomodulatory effect	Enhancement of immune response against viral infection

These pharmacological actions collectively support the traditional use of *Bhumyamalaki* in the management of liver disorders and suggest its potential benefit as an adjunct therapy in chronic hepatitis B.¹¹

Chronic Hepatitis B (CHB) is a major global health problem that can progress to cirrhosis and liver cancer. Limitations of long-term antiviral therapy have increased interest in herbal medicines such as *Bhumyamalaki* (*Phyllanthus niruri*), an important Ayurvedic herb used in liver disorders like Kamala. Ayurvedic texts describe it as Pitta-shamaka due to its tikta-kashaya rasa and sheeta veerya. Modern studies support its antiviral, antioxidant, and anti-inflammatory properties, showing its ability to inhibit viral replication, protect hepatocytes, and improve liver function. These findings suggest that *Bhumyamalaki* may serve as a valuable supportive therapy in the manage-

ment of Chronic Hepatitis B.¹⁶

Bhumyamalaki (*Phyllanthus niruri*) is an important medicinal herb with significant hepatoprotective and antiviral properties. Both classical Ayurvedic literature and modern pharmacological studies support its therapeutic potential in liver disorders. The presence of various bioactive phytoconstituents contributes to its antioxidant, anti-inflammatory, and antiviral effects, which may be beneficial in the management of chronic hepatitis B. Although existing evidence suggests promising therapeutic potential, further well-designed clinical studies are required to establish standardized dosage, long-term safety, and clinical efficacy. Integrating traditional Ayurvedic knowledge with modern scientific research may provide a valuable complementary approach for the management of chronic hepatitis B and other liver diseases.

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