

# Bridging Ayurveda and Modern Hepatology A Comprehensive Review on Bhumyamalaki and Shyonaka in Chronic Hepatitis B Management

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**Abstract**—Chronic Hepatitis B (CHB) remains a major global health challenge, often leading to cirrhosis and hepatocellular carcinoma despite advances in antiviral therapy. Limitations such as long-term drug dependence, resistance, and incomplete viral clearance necessitate exploration of complementary approaches. Ayurveda, with its holistic understanding of liver disorders under the spectrum of Yakrit Vikara, offers promising therapeutic insights. This review aims to bridge traditional knowledge with modern hepatology by evaluating the role of Bhumyamalaki (*Phyllanthus niruri*) and Shyonaka (*Oroxylum indicum*) in CHB management. Bhumyamalaki, described as a potent Pittashamaka and Yakrit-Uttejaka, exhibits significant antiviral and hepatoprotective properties, including inhibition of viral replication and improvement in liver enzyme profiles. Shyonaka, an important component of Dashamoola, demonstrates anti-inflammatory and tissue-protective effects, contributing to the restoration of Dhatu Samyata. From an Ayurvedic perspective, these drugs act through Agni Deepana, Ama Pachana, and Srotoshodhana, addressing the root pathology rather than symptomatic suppression. Modern studies support their role in modulating immune responses, reducing oxidative stress, and enhancing hepatic regeneration. When used as adjuncts to standard antiviral therapy, they may improve therapeutic outcomes and reduce disease progression. However, high-quality clinical trials and standardized protocols are still required. This integrative review highlights the potential of combining Ayurvedic principles with contemporary medicine to develop safer, cost-effective, and patient-centric strategies for CHB management.

**Index Terms**—Yakrit Vikara, Bhumyamalaki, Shyonaka, Agni, Ama, Shyonaka

## I. INTRODUCTION

Chronic Hepatitis B (CHB) remains a significant global health concern, affecting approximately 296 million people worldwide and contributing substantially to morbidity and mortality due to cirrhosis and hepatocellular carcinoma. Despite the availability of effective vaccines, the burden of chronic infection persists, particularly in low- and middle-income countries. The disease is characterized by persistent viral replication, hepatic inflammation, and progressive liver damage, often remaining asymptomatic until advanced stages. Modern antiviral therapies, including nucleos(t)ide analogues such as tenofovir and entecavir, have demonstrated efficacy in suppressing viral replication; however, they rarely achieve complete viral eradication. Consequently, patients often require lifelong therapy, which may lead to issues such as drug resistance, adverse effects, and financial burden. [1] In recent years, there has been growing interest in integrative and complementary approaches to enhance therapeutic outcomes in CHB. Traditional systems of medicine, particularly Ayurveda, offer a holistic framework for understanding and managing chronic diseases. Liver disorders in Ayurveda are broadly described under the spectrum of Yakrit Vikara, wherein the functional integrity of Agni and the balance of Dosha and Dhatu play a crucial role. The pathogenesis involves impaired metabolic processes leading to the accumulation of Ama and subsequent disturbance in Rasa and Rakta Dhatu,

which may be correlated with inflammatory and degenerative changes observed in chronic liver diseases. This conceptual framework emphasizes not only disease management but also restoration of systemic balance. [2] Among the various medicinal plants described in Ayurveda, Bhumyamalaki (*Phyllanthus niruri*) has gained considerable attention for its hepatoprotective and antiviral properties. Classical texts describe it as a potent Pittashamaka and Yakrit-Uttejaka, indicating its affinity for liver function modulation. Modern pharmacological studies have demonstrated its role in inhibiting hepatitis B viral DNA polymerase, reducing viral load, and improving liver enzyme profiles. Similarly, Shyonaka (*Oroxylum indicum*), an important constituent of Dashamoola, possesses anti-inflammatory, antioxidant, and tissue-protective properties. Its role in mitigating hepatic injury and restoring tissue homeostasis aligns with its classical indications in managing Dhatu Dushti. [3] The integration of these herbal interventions with modern hepatology offers a promising avenue for improving patient outcomes. By targeting multiple pathways such as viral replication, immune modulation, oxidative stress, and metabolic correction, these interventions may complement standard antiviral therapy. Moreover, their potential for long-term safety and cost-effectiveness makes them particularly relevant in resource-limited settings. However, despite encouraging preliminary evidence, there remains a need for systematic evaluation, standardization, and high-quality clinical trials to validate their efficacy and safety in CHB management. [4] Therefore, the present review aims to bridge the gap between traditional Ayurvedic knowledge and contemporary hepatology by critically analyzing the therapeutic potential of Bhumyamalaki and Shyonaka in the management of Chronic Hepatitis B. The study seeks to explore their pharmacological actions, underlying mechanisms, and clinical relevance, thereby contributing to the development of integrative and evidence-based strategies for liver disease management. [5]

## II. CONCEPTUAL CORRELATION: BRIDGING AYURVEDA AND MODERN HEPATOLOGY

Chronic Hepatitis B (CHB), characterized by persistent viral infection and progressive hepatic

injury, can be conceptually understood in Ayurveda under the broader spectrum of Yakrit Vikara. Although direct disease nomenclature is not described, the functional derangements observed in CHB closely resemble disturbances in metabolic and tissue homeostasis governed by Agni. The liver (Yakrit) is considered a vital organ associated with Rakta Dhatu formation and transformation, and its dysfunction reflects systemic imbalance. Impairment of Jatharagni and Dhatvagni leads to incomplete metabolic processing, resulting in the generation of Ama, which acts as a pathological substrate initiating disease progression. This aligns with the biochemical and immunological disturbances observed in chronic viral hepatitis. [6] The pathological process involves the vitiation of Pitta Dosha, particularly due to its close association with Rakta and hepatic function. The accumulation of Ama in the Rasa-Rakta Dhatu leads to qualitative and quantitative alterations, which may be correlated with inflammatory changes, hepatocellular injury, and altered liver enzyme levels seen in CHB. Additionally, obstruction in microchannels (Srotorodha) further impairs nutrient transport and waste elimination, thereby aggravating hepatic dysfunction. This can be interpreted in modern terms as impaired microcirculation, cellular injury, and fibrosis progression within hepatic tissue. [7] From a mechanistic perspective, the chronicity of Hepatitis B reflects a sustained imbalance between host immune response and viral persistence. In Ayurveda, this can be understood as a state of diminished Vyadhikshamatva (host resistance), where the body fails to effectively eliminate pathogenic factors. The persistence of Ama and deranged Agni contributes to a chronic inflammatory milieu, analogous to immune-mediated liver damage and oxidative stress observed in modern hepatology. Thus, the disease progression in CHB can be viewed as a continuum of metabolic dysfunction, immune dysregulation, and tissue degeneration. [8] Therapeutically, Ayurveda emphasizes correcting the root cause through restoration of Agni, elimination of Ama, and normalization of Dhatu equilibrium. Interventions such as Agni Deepana, Ama Pachana, and Srotoshodhana aim to re-establish metabolic balance and improve tissue function. These principles resonate with modern therapeutic goals, which focus on reducing viral load, controlling inflammation, and preventing fibrosis. The

integrative interpretation highlights that while modern medicine targets viral suppression, Ayurveda provides a systemic approach addressing metabolic and immunological aspects of the disease. [9] Thus, correlating CHB with Ayurvedic principles offers a comprehensive understanding that extends beyond structural pathology to functional imbalance. This integrative framework not only enhances conceptual clarity but also provides a rational basis for incorporating herbal interventions such as Bhumyamalaki and Shyonaka in disease management. Such an approach supports the development of holistic and patient-centered strategies for chronic liver disorders. [10]

### III. PHARMACOLOGICAL REVIEW OF BHUMYAMALAKI (PHYLLANTHUS NIRURI)

Bhumyamalaki (*Phyllanthus niruri*) is a well-documented medicinal plant in Ayurveda, widely recognized for its therapeutic efficacy in liver disorders. Classical texts describe it as possessing Tikta and Kashaya Rasa, Laghu and Ruksha Guna, Sheeta Virya, and Madhura Vipaka, making it particularly effective in alleviating Pitta and Kapha Dosha. Its affinity toward the liver (Yakrit) is reflected in its traditional indications for Kamala and other hepatic dysfunctions. The drug is considered Yakrit-Uttejaka and Pittashamaka, suggesting its role in enhancing liver function and maintaining metabolic balance. [11] From a phytochemical perspective, Bhumyamalaki contains lignans such as phyllanthin and hypophyllanthin, along with flavonoids, alkaloids, and tannins, which contribute to its pharmacological actions. Modern research has demonstrated its potent antiviral activity, particularly against Hepatitis B virus (HBV), by inhibiting viral DNA polymerase and suppressing viral replication. Additionally, it exhibits hepatoprotective effects by stabilizing hepatocyte membranes, reducing oxidative stress, and enhancing antioxidant enzyme activity. These properties are crucial in preventing liver cell damage and promoting regeneration in chronic hepatic conditions. [12] The immunomodulatory potential of Bhumyamalaki further supports its role in CHB management. It has been shown to enhance both humoral and cell-mediated immune responses, thereby improving host defense mechanisms against

persistent viral infections. This aligns with the Ayurvedic concept of improving Vyadhikshamatva, which is essential in chronic diseases. Furthermore, its anti-inflammatory effects help in reducing hepatic inflammation, thereby limiting disease progression toward fibrosis and cirrhosis. [13] From an integrative standpoint, the actions of Bhumyamalaki can be correlated with Agni Deepana, Ama Pachana, and Srotoshodhana. By correcting metabolic dysfunction and clearing pathological substrates, it addresses the root cause of disease rather than merely alleviating symptoms. This multifaceted mechanism makes it a valuable candidate for adjunct therapy alongside conventional antiviral agents, potentially improving therapeutic outcomes and reducing long-term complications. [14]

Table: Classical and Modern Pharmacological Profile of Bhumyamalaki

| Aspect                  | Description                               |
|-------------------------|---|
| Rasa                    | Tikta, Kashaya                            |
| Guna                    | Laghu, Ruksha                             |
| Virya                   | Sheeta                                    |
| Vipaka                  | Madhura                                   |
| Classical Actions       | Pittashamaka, Yakrit-Uttejaka, Kamalahara |
| Main Phytochemicals     | Phyllanthin, Hypophyllanthin, Flavonoids  |
| Antiviral Action        | Inhibits HBV DNA polymerase               |
| Hepatoprotective Effect | Reduces ALT/AST, protects hepatocytes     |
| Immunomodulation        | Enhances host immune response             |
| Ayurvedic Mechanism     | Agni Deepana, Ama Pachana, Srotoshodhana  |

### IV. PHARMACOLOGICAL REVIEW OF SHYONAKA (OROXYLUM INDICUM)

Shyonaka (*Oroxylum indicum*) is an important medicinal plant in Ayurveda, prominently included in the classical formulation group Dashamoola. It is traditionally indicated in inflammatory conditions, respiratory disorders, and systemic diseases involving tissue depletion. Classical texts describe it as possessing Tikta and Kashaya Rasa, Laghu and Ruksha Guna, Ushna Virya, and Katu Vipaka. These

properties make it effective in alleviating Kapha and Vata Dosha, while also contributing to the correction of underlying metabolic disturbances. Its relevance in liver disorders can be understood through its role in mitigating Dhatu Dushti and promoting tissue homeostasis. [15] Phytochemically, Shyonaka is rich in flavonoids such as baicalein, chrysin, and oroxylin A, along with tannins and glycosides. These bioactive compounds are responsible for its wide range of pharmacological actions, including anti-inflammatory, antioxidant, and hepatoprotective effects. Experimental studies have demonstrated that extracts of *Oroxylum indicum* significantly reduce hepatic injury by decreasing lipid peroxidation and enhancing antioxidant enzyme levels such as superoxide dismutase and catalase. This hepatoprotective action is particularly relevant in chronic liver diseases like CHB, where oxidative stress plays a key role in disease progression. [16] In addition to its antioxidant properties, Shyonaka exhibits potent anti-inflammatory activity by modulating pro-inflammatory cytokines and inhibiting pathways such as NF-κB. This action helps in reducing chronic hepatic inflammation, thereby preventing progression toward fibrosis and cirrhosis. Furthermore, its role in stabilizing cellular membranes and promoting tissue repair aligns with its traditional indication in restoring Dhatu Samyata. These findings support its potential use as a supportive therapeutic agent in chronic hepatic conditions. [17] From an Ayurvedic perspective, the therapeutic effects of Shyonaka can be correlated with Ama Pachana, Srotoshodhana, and normalization of Dhatu function. By clearing metabolic toxins and improving microcirculation, it facilitates proper nutrient delivery and waste elimination at the tissue level. This holistic mechanism complements modern approaches that focus on reducing inflammation and preventing structural liver damage. Thus, Shyonaka serves as a valuable component in integrative management strategies for CHB, particularly when combined with hepatoprotective agents like Bhumyamalaki. [18]

Table: Classical and Modern Pharmacological Profile of Shyonaka

| Aspect | Description    |
|--------|----------------|
| Rasa   | Tikta, Kashaya |

|                          |  |
|--------------------------|--|
| Guna                     | Laghu, Ruksha                                  |
| Virya                    | Ushna  |
| Vipaka                   | Katu   |
| Classical Actions        | Kapha-Vatahara, Shothahara, Dashamoola Dravya  |
| Main Phytochemicals      | Baicalein, Chrysin, Oroxylin A                 |
| Anti-inflammatory Action | Inhibits cytokines, NF-κB pathway              |
| Antioxidant Effect       | Reduces oxidative stress, ↑ SOD & Catalase     |
| Hepatoprotective Effect  | Prevents hepatic injury, supports regeneration |
| Ayurvedic Mechanism      | Ama Pachana, Srotoshodhana, Dhatu Samyata      |

#### V. MECHANISTIC INSIGHTS: BRIDGING AYURVEDA AND MODERN HEPATOLOGY

The pathogenesis of Chronic Hepatitis B (CHB) involves a complex interplay of viral replication, host immune response, oxidative stress, and progressive hepatic injury. Modern hepatology emphasizes the role of Hepatitis B virus (HBV) in inducing hepatocellular damage through immune-mediated cytotoxicity and chronic inflammation. Persistent viral replication leads to activation of inflammatory pathways, release of cytokines, and generation of reactive oxygen species, ultimately resulting in fibrosis and cirrhosis. Antiviral therapies primarily target viral replication but have limited influence on restoring complete hepatic homeostasis. [19] In contrast, Ayurveda approaches disease through a functional lens, focusing on disturbances in Agni, accumulation of Ama, and imbalance in Dosha and Dhatu. In CHB, impaired Agni leads to defective metabolism and formation of Ama, which acts as a pathogenic factor disrupting Rasa and Rakta Dhatu. The involvement of Yakrit as a key organ in metabolic transformation further highlights the systemic nature of the disorder. The concept of Srotorodha explains microchannel obstruction, which may be correlated with impaired hepatic microcirculation and fibrosis observed in chronic liver disease. [20] At the mechanistic level, herbal interventions such as Bhumyamalaki and Shyonaka demonstrate actions that can be mapped to both

paradigms. Bhumyamalaki exhibits antiviral activity by inhibiting HBV DNA polymerase and reducing viral load, while also providing antioxidant protection and immunomodulation. Shyonaka, on the other hand, contributes primarily through anti-inflammatory and antioxidant pathways, reducing cytokine-mediated damage and oxidative stress. Together, these herbs influence multiple targets, including viral suppression, immune regulation, and cellular protection. [21]From an integrative perspective, these pharmacological actions correspond to Agni Deepana, Ama Pachana, and Srotoshodhana. Enhancement of Agni improves metabolic efficiency, while elimination of Ama reduces pathological burden. Clearance of Srotas ensures proper nutrient and oxygen delivery, facilitating tissue repair and regeneration. This holistic mechanism complements modern therapeutic goals such as reduction of inflammation, prevention of fibrosis, and maintenance of liver function. [22]

Table: Correlation Between Modern Hepatology and Ayurvedic Mechanisms

| Modern Concept         | Pathophysiology in CHB         | Ayurvedic Correlation      | Therapeutic Action |
|------------------------|--------------------------------|----------------------------|--------------------|
| Viral replication      | HBV DNA persistence            | Ama formation              | Ama Pachana        |
| Immune-mediated injury | Cytokine release, inflammation | Dosha Dushti (Pitta-Rakta) | Pittashamana       |
| Oxidative stress       | ROS generation, cell damage    | Agni Mandya                | Agni Deepana       |
| Fibrosis               | Collagen deposition, scarring  | Srotorodha                 | Srotoshodhana      |
| Hepatocyte injury      | Elevated ALT/AST               | Dhatu Kshaya/Dushti        | Dhatu Samyata      |
| Impaired immunity      | Viral persistence              | ↓<br>Vyadhikshamatva       | Immunomodulation   |

Table: Mechanistic Actions of Bhumyamalaki and Shyonaka

| Herb            | Modern Mechanism                                     | Ayurvedic Interpretation     |
|-----------------|--|------------------------------|
| Bhumyamalaki    | Antiviral, antioxidant, immunomodulatory             | Agni Deepana, Ama Pachana    |
| Shyonaka        | Anti-inflammatory, antioxidant, hepatoprotective     | Srotoshodhana, Dhatu Samyata |
| Combined Effect | Reduces viral load + inflammation + oxidative stress | Restores systemic balance    |

## VI. REVIEW OF CLINICAL AND EXPERIMENTAL STUDIES

Clinical and experimental evidence suggests that Bhumyamalaki exhibits significant antiviral activity against Hepatitis B virus (HBV), primarily by inhibiting viral DNA polymerase and reducing viral load. Several clinical trials have reported improvement in liver function parameters such as ALT and AST, along with seroconversion in some patients. Additionally, its hepatoprotective and antioxidant properties contribute to reduced hepatic inflammation and improved cellular integrity. These findings support its role as an adjunct therapy in CHB management. [23] Experimental studies on Shyonaka demonstrate notable hepatoprotective and anti-inflammatory effects. Animal models have shown reduction in chemically induced liver damage, decreased lipid peroxidation, and enhancement of antioxidant enzymes. Although direct clinical studies in CHB are limited, its pharmacological profile indicates potential benefits in controlling inflammation and preventing fibrosis progression. [24]The combined use of Bhumyamalaki and Shyonaka may offer a synergistic effect by targeting multiple pathological pathways, including viral replication, oxidative stress, and immune dysregulation. However, the lack of large-scale randomized controlled trials highlights the need for further research to validate their efficacy and establish standardized treatment protocols. [25]

Table: Summary of Evidence

| Intervention | Study Type              | Key Findings                                     |
|--------------|-------------------------|--|
| Bhumyamalaki | Clinical + Experimental | ↓ HBV DNA, ↓ ALT/AST, hepatoprotection           |
| Shyonaka     | Experimental            | Antioxidant, anti-inflammatory, hepatoprotective |
| Combined Use | Conceptual/Preclinical  | Multi-target action, potential synergy           |

### VII. DISCUSSION

Chronic Hepatitis B represents a multifactorial disorder involving persistent viral activity, immune dysregulation, and progressive hepatic injury. While modern antiviral therapy effectively suppresses viral replication, it does not fully address metabolic dysfunction, oxidative stress, and long-term tissue damage. This creates a therapeutic gap where integrative approaches can play a meaningful role. From an Ayurvedic perspective, CHB can be understood as a disorder rooted in impaired Agni, accumulation of Ama, and disturbance of Rasa and Rakta Dhatu. This functional interpretation provides a broader understanding of disease progression beyond structural pathology. The role of Bhumyamalaki and Shyonaka becomes particularly relevant in this context, as both drugs act at multiple levels of pathogenesis. Bhumyamalaki demonstrates antiviral, hepatoprotective, and immunomodulatory effects, aligning with the principles of Agni Deepana and Ama Pachana. Shyonaka, with its anti-inflammatory and antioxidant properties, supports tissue repair and restoration of Dhatu Samyata through mechanisms comparable to Srotoshodhana. Their combined use offers a multi-targeted therapeutic approach addressing viral load, inflammation, and metabolic imbalance simultaneously. However, despite promising pharmacological and preliminary clinical evidence, limitations such as lack of large-scale trials, variability in drug standardization, and insufficient

long-term safety data remain. Bridging traditional knowledge with modern research methodologies is essential to validate these interventions and enhance their clinical applicability.

### VIII. CONCLUSION

The integration of Ayurveda and modern hepatology provides a comprehensive framework for the management of Chronic Hepatitis B. Bhumyamalaki and Shyonaka exhibit significant potential as adjunct therapies by targeting key pathological mechanisms, including viral replication, oxidative stress, and immune imbalance. Their actions, interpreted through Agni, Ama, and Dhatu dynamics, offer a holistic approach that complements conventional treatment. Future research focusing on well-designed clinical trials, standardization of formulations, and mechanistic validation is essential to establish their role in evidence-based integrative hepatology.

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