



Phytochemical Screening of Native Plants in Assam for Jaundice Treatment: Ethnobotanical and Pharmacological Perspectives

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Abstract

Medicinal plants are traditionally used for managing jaundice and liver-related disorders. This study evaluated the qualitative phytochemical composition of *Asplenium nidus*, *Raphanus sativus*, and *Carica papaya* traditionally used in Nagaon district, Assam. Fresh leaves were collected, dried, powdered, and extracted separately with methanol and chloroform. Qualitative screening detected flavonoids, steroids, glycosides, saponins, reducing sugars, and terpenoids in both extracts of all three plants. These findings indicate a diverse phytochemical profile that may support their traditional ethnomedicinal importance. However, further quantitative, toxicological, and pharmacological studies are required to validate their therapeutic potential and safety.

Keywords: *Phytochemical screening; Medicinal plants; Jaundice; Asplenium nidus; Raphanus sativus; Carica papaya; Nagaon; Assam.*

Introduction

Jaundice is an important clinical manifestation characterized by the yellow discoloration of the sclera, mucous membranes, and skin, typically resulting from hyperbilirubinemia where serum bilirubin exceeds 34 $\mu\text{mol/L}$ [1]. This condition frequently reflects underlying hepatobiliary or pancreatic disease, which demands appropriate medical investigation. Pathologically, jaundice arises due to excessive bilirubin production, decreased hepatic uptake or conjugation, or compromised biliary excretion [2]. In traditional health systems across developing nations, roughly 80% of the population continues to rely heavily on plant-derived alternatives for primary healthcare, as highlighted in historical medical texts like the Charaka Samhita [3].

The North-Eastern state of Assam, India, possesses rich biocultural diversity and a profound lineage of ethnobotanical knowledge. Local traditional healers routinely employ specific native flora to treat jaundice and support liver recovery [4], [5]. This study evaluates three specific local botanicals: *Asplenium nidus*, an evergreen epiphytic fern whose leaf extracts are traditionally used to alleviate associated fevers. [6]; *Raphanus sativus*, an annual herb whose leaves are traditionally prepared to alleviate skin discoloration and bile stimulation [7]; and *Carica papaya*, whose foliage contains numerous bioactive components linked to hepatoprotective traits [8], [9]. Investigating the phytochemical complexity of these plants is critical to establish a scientific baseline regarding their secondary metabolites.

Materials and Methods

Plant Selection and Collection: Based on informed formal oral questionnaires conducted with local traditional practitioners and herbal healers in Nagaon, Assam, three plant species leaves were selected such as *Asplenium nidus*, *Raphanus sativus* and *Carica papaya* (Fig. 1). Healthy samples were harvested from local farmlands in Nagaon.

Sample Processing and Extraction: The collected leaves were carefully isolated, thoroughly washed under running tap water to eliminate superficial debris, and air-dried at room temperature for several days. Once completely dehydrated, the samples were mechanically ground into a fine powder. For extraction, 0.5 grams of each plant powder was measured and treated separately with 5 mL of methanol and 5 mL of chloroform. The solutions were shaken vigorously and incubated for 24 hours to achieve optimal solvent extraction. Following incubation, the mixtures were filtered using standard filter paper to obtain clear liquid extracts for subsequent biochemical assays.

Qualitative Phytochemical Screening: Biochemical tests were executed using standard qualitative procedures adapted from established protocols such as Harborne [10] and Siddiqui & Ali [11]. The extracts were screened for key groups of secondary metabolites, including flavonoids, steroids, glycosides, saponins, reducing sugars, and terpenoids.

Results and Discussion

The presence of the metabolites flavonoids, steroids, glycosides, saponins, reducing sugars, and terpenoids in the three selected plants aligns well with their proposed therapeutic effects (Table 1). For instance, flavonoids like quercetin and kaempferol found in these families are recognized as strong anti-inflammatory and antioxidative agents that help counteract hepatic oxidative stress and lower transaminase activity. Saponins and glycosides are thought to play modular roles in metabolic regulation and immune stimulation, which appears consistent with the physiological requirements of a body recovering from hepatic duress and hyperbilirubinemia [12], [13]. Experimental models confirm the partial hepatoprotective efficacy of *Raphanus sativus* and *Carica papaya* leaf extracts against hepatotoxin-induced liver injuries [7], [9].

Table 1. Qualitative phytochemical screening of methanolic and chloroform extracts of the selected medicinal plants for major classes of secondary metabolites.

Plant Species	Extract	Flavonoids	Steroids	Glycosides	Saponins	Reducing Sugars	Terpenoids
<i>Asplenium nidus</i>	Methanolic extract	Present	Present	Present	Present	Present	Present
<i>Asplenium nidus</i>	Chloroform extract	Present	Present	Present	Present	Present	Present
<i>Raphanus sativus</i>	Methanolic extract	Present	Present	Present	Present	Present	Present
<i>Raphanus sativus</i>	Chloroform extract	Present	Present	Present	Present	Present	Present
<i>Carica papaya</i>	Methanolic extract	Present	Present	Present	Present	Present	Present
<i>Carica papaya</i>	Chloroform extract	Present	Present	Present	Present	Present	Present

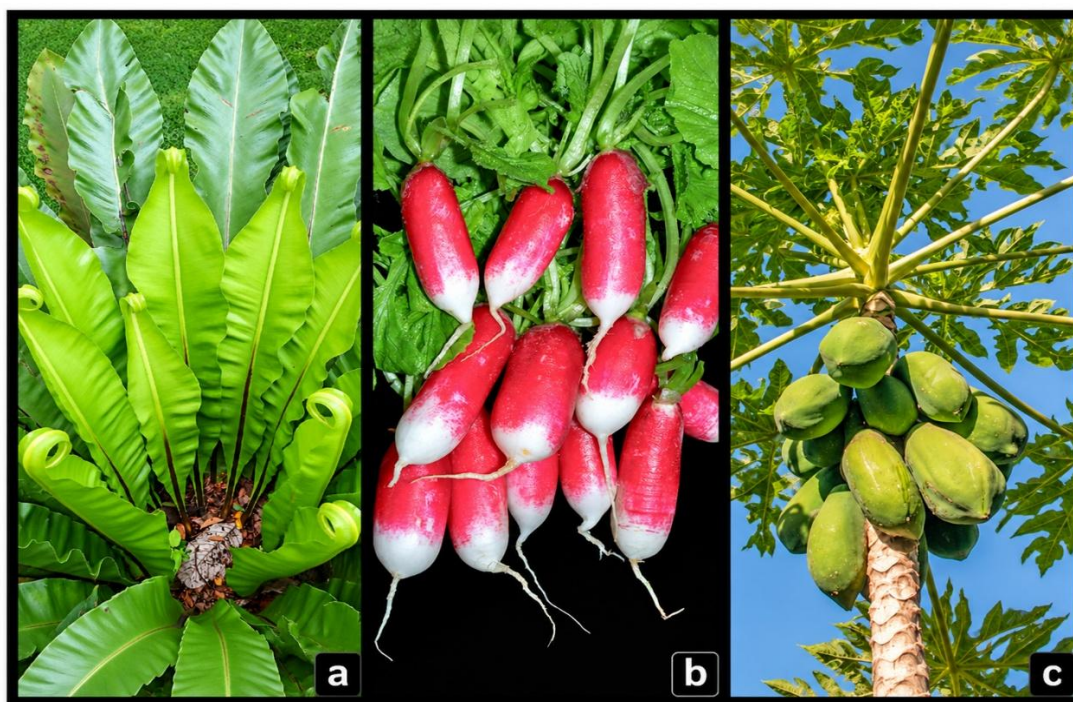


Fig 1. Plant species selected for qualitative phytochemical screening: (A) *Asplenium nidus*, (B) *Raphanus sativus*, and (C) *Carica papaya*.

Conclusion

In conclusion, this study corroborates the historical significance and ethnobotanical relevance of *Asplenium nidus*, *Raphanus sativus*, and *Carica papaya* within the traditional medicine framework of Assam. The extraction via chloroform and methanol revealed a complex phytochemical profile rich in bioactive components including flavonoids, steroids, glycosides, saponins, and terpenoids. These results contribute foundational knowledge validating the traditional use of these botanicals as supportive herbal options. Further quantitative characterization, toxicological evaluations, and in-vivo pharmacological assessments are strongly recommended to unlock their full therapeutic potential in safe and systematic modern healthcare applications.

Declaration

The authors have no conflicts of interest.

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