
**FORMULATION AND EVALUATION OF POLYHERBAL SYRUP FOR
THE TREATMENT OF JAUNDICE**

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DOI: <https://doi-doi.org/101555/ijarp.6174>**ABSTRACT**

Jaundice is a hepatic disorder characterized by hyperbilirubinemia and yellow discoloration of skin and sclera due to impaired liver function. Traditional systems of medicine have long utilized herbal formulations for liver protection and detoxification with minimal side effects. The present research focuses on the preparation and evaluation of a polyherbal syrup for jaundice using medicinal plants known for their hepatoprotective, antioxidant, and anti-inflammatory properties: Gulkhaira (*Althaea officinalis*), Khaskhas (*Papaver somniferum*), Bhumi Amla (*Phyllanthus niruri*), Muchkund (*Pterospermum acerifolium*), and Kabab Chini (*Piper cubeba*).

Hydro-alcoholic extracts of each herb were incorporated into the syrup base, followed by evaluation of physicochemical parameters including pH, viscosity, specific gravity, organoleptic characteristics, sedimentation behavior, microbial stability, and overall formulation stability. Preliminary findings suggest that the developed syrup exhibits acceptable physicochemical properties and promising hepatoprotective potential, indicating its usefulness as a supportive herbal remedy for jaundice management. Further pharmacological and clinical investigations are recommended to validate its therapeutic efficacy.

KEYWORDS: Gulkhaira (*Althaea officinalis*), Khaskhas (*Papaver somniferum*), Bhumi Amla (*Phyllanthus niruri*), Muchkund (*Pterospermum acerifolium*), and Kabab Chini (*Piper cubeba*).

INTRODUCTION:

Jaundice is a clinically significant condition marked by yellow discoloration of the skin and eyes resulting from elevated bilirubin levels, commonly associated with liver dysfunction, bile duct obstruction, or hemolysis. Although modern medicine offers several therapeutic interventions, many conventional drugs for jaundice may lead to adverse effects, limited efficacy in chronic cases, and increased treatment costs, especially in resource-limited settings. This growing concern has renewed global interest in herbal and traditional approaches that offer safer, economical, and holistic alternatives.

Ayurvedic and Unani medical systems have long recommended polyherbal remedies for liver support due to their synergistic action and multi-target therapeutic potential. In particular, medicinal plants such as **Gulkhaira** (*Althaea officinalis*), **Khaskhas** (*Papaver somniferum*), **Bhumi Amla** (*Phyllanthus niruri*), **Muchkund** (*Pterospermum acerifolium*), and **Kabab Chini** (*Piper cubeba*) are well-documented for their **hepatoprotective, antioxidant, anti-inflammatory, and detoxifying properties**, making them valuable in the management of jaundice and related hepatic disorders.

1.2 Description of Selected Medicinal Plants and Parts Used

The current study utilizes five traditionally recognized hepatoprotective herbs, each selected based on documented ethnomedical usage and phytochemical profile.

1.2.1 Gulkhaira (*Althaea officinalis*)

Parts Used: Roots, Leaves, Seeds, Flowers



Gulkhaira is widely used in Ayurveda and Unani medicine for hepatic inflammation and mucosal healing.

Major Constituents: Mucilage, flavonoids, triterpenoids, tannins.

Pharmacological Activities

Hepatoprotective, Anti-inflammatory, Antioxidant, The mucilage present in roots and leaves helps soothe inflamed liver tissues and protects hepatocytes from oxidative stress.

1.2.2 Khaskhas (*Papaver somniferum*):

Parts Used: Root



Khaskhas root is traditionally used for liver congestion, inflammation reduction, and detoxification.

Active Constituents: Mucilage, alkaloids (non-narcotic trace in medicinal use), fatty acids

Pharmacological Activities:

Antioxidant

Anti-inflammatory

Cooling and liver soothing properties

Its root extract aids in calming irritated hepatic tissue and supports liver function.

1.2.3 Bhumi Amla (*Phyllanthus niruri*):

Parts Used: Leaves, Stems, Roots



Bhumi Amla is one of the most well-researched herbs for liver diseases, particularly viral hepatitis and jaundice.

Phytoconstituents: Phyllanthin, hypophyllanthin, tannins, flavonoids

Pharmacological Activities:

Clinically proven hepatoprotective

Antiviral (Hepatitis B supportive)

Cholagogue (enhances bile secretion)

Antioxidant & anti-inflammatory

Extracts of the whole plant (leaves, roots, stems) are traditionally used to normalize bilirubin and liver enzymes.

1.2.4 Muchkund (*Pterospermum acerifolium*):

Parts Used: Flowers



Muchkund flowers are used in Ayurveda for detoxification and inflammatory conditions.

Major Constituents: Flavonoids, phenolics, sterols

Pharmacological Actions:

Hepatoprotective

Anti-inflammatory

Antioxidant

Research indicates that extracts of Muchkund flowers protect liver cells from oxidative injury and aid cellular regeneration.

1.2.5 Kabab Chini (*Piper cubeba*):

Parts Used: Dried unripe fruits (berries)



Kabab Chini dried berries have a strong history of use in digestive and liver disorders.

Key Constituents: Essential oils, cubebin, piperine derivatives, lignans

Pharmacological Activities:

Hepatoprotective

Digestive stimulant & carminative

Antioxidant

Anti-infective

It improves bile flow, supports detoxification, and strengthens digestive-hepatic pathways.

1.3. Role of Plant Parts in Hepatoprotection

Plant parts used (roots, leaves, flowers, berries) contain specialized phytochemicals:

Plant Part	Contribution
Roots (Gulkhaira, Khaskhas)	Mucilage & antioxidants – reduce hepatic inflammation
Leaves & Stems (Bhumi Amla)	High flavonoids & lignans – antiviral & enzyme regulation
Flowers (Muchkund)	Phenolics & flavonoids – protect hepatocytes from ROS
Berries (Kabab Chini)	Essential oils – improve bile secretion & digestion

This targeted selection ensures enhanced activity for jaundice management.

MATERIALS AND METHODS

2.1. MATERIALS AND METHODS: A polyherbal syrup formulated using selected medicinal herbs will possess significant **hepatoprotective potential**, improve liver function, and support reduction of bilirubin levels in jaundice, while remaining **safe, palatable, cost-effective, and stable** for oral administration.

2.2 Materials Required

Category	Materials
Plant materials	Gulkhaira roots/leaves/flowers, Khaskhas root, Bhumi Amla leaves/stems/roots, Muchkund flowers, Kabab Chini berries
Solvents	70% ethanol, distilled water
Reagents	Dragendorff's, Mayer's, FeCl ₃ , Benedict reagent, Molisch reagent, etc.
Formulation excipients	Sucrose/Honey, Xanthan gum/Tragacanth, Sodium benzoate, Citric acid, Flavoring agent
Equipment	Soxhlet apparatus, Rotary evaporator, pH meter, Viscometer, Pycnometer, Refractometer, Stability chamber

S. No	Ingredient	Biological Name	Part Used	Role
1	Gulkhaira	<i>Althaea officinalis</i>	Root	Demulcent, anti-inflammatory
2	Khaskhas	<i>Papaver somniferum</i>	Seeds	Mild sedative, nutritive
3	Bhumi Amla	<i>Phyllanthus niruri</i>	Whole plant	Hepatoprotective
4	Muchkund	<i>Pterospermum acerifolium</i>	Bark/flower	Anti-inflammatory
5	Kabab Chini	<i>Piper cubeba</i>	Fruit	Carminative, antimicrobial

2.2.1. METHOD OF PREPARATION OF SYRUP

Step 1: Collection & Authentication

- Collect crude drugs and authenticate properly.
- Remove foreign matter.

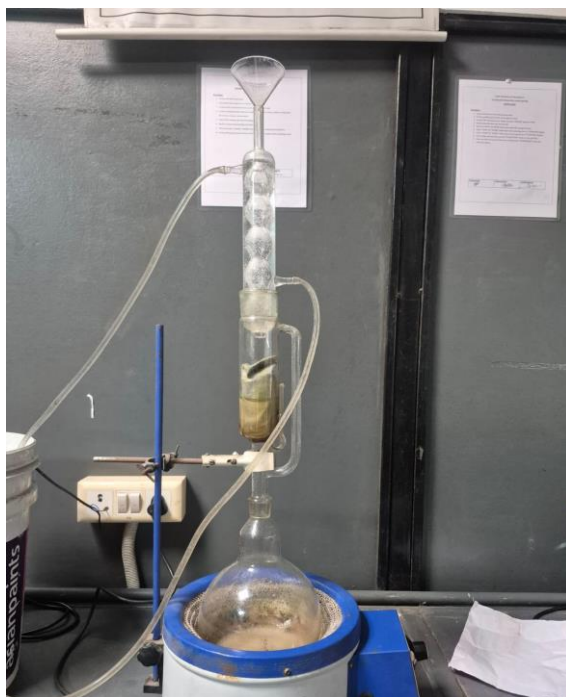
Step 2: Drying & Powdering

- Shade dry all plant materials.
- Grind into coarse powder (#40 mesh).



Step 3: Extraction (Soxhlet extraction Method)

- Take equal quantities of powdered drugs.
- Add 8 parts water.
- Boil until reduced to 1/4th.
- Filter using muslin cloth.



Step 4: Syrup Base Preparation

- Prepare syrup by dissolving sugar in water (66–67% w/v).
- Heat gently to form clear syrup.

Step 5: Mixing

- Add herbal extract to syrup base.
- Add glycerin and preservative.
- Mix thoroughly.



Step 6: Filtration & Storage

- Filter final syrup.
- Store in amber-colored bottles

2.3 PROCEDURE

- Prepare and submit of as per SOP
- Collect all plant crude drugs
- Dry & powder triturate with the help mortar and pistle
- Sieving & screening all the crude drug and mix well
- Extraction and prepaton Soxhlet extraction Method Take equal quantities of powdered drugs, Add 8 parts water, Boil until reduced to 1/4th, Filter using muslin cloth.
- Heat in water bath extract crude drug and mix well
- Filter with tripad stand and collect the filtret solution in beaker
- Store in air tight cantainer in dark place

2.4 USES (PHARMACOLOGICAL ACTION)

- Hepatoprotective (mainly due to *Phyllanthus niruri*)
- Detoxifying agent
- Improves liver function
- Anti-inflammatory

- Digestive support

RESULTS & DISCUSSION

3. EVALUATION PARAMETERS

Polyherbal syrup formulated using Gulkhaira (*Althaea officinalis*), Khaskhas (*Papaver somniferum*), Bhumi Amla (*Phyllanthus niruri*), Muchkund (*Pterospermum acerifolium*), and Kabab Chini (*Piper cubeba*) was evaluated for its physicochemical properties and therapeutic potential. These herbs are widely reported for their hepatoprotective, antioxidant, and anti-inflammatory activities, which contribute synergistically to the overall efficacy of the formulation.

3.1 Organoleptic and Physicochemical Evaluation of Polyherbal Syrup

S.No	Parameter	Observation
1	Colour	Brown
2	Odor	Characteristic
3	Taste	Sweet, slightly bitter
4	Viscous liquid	Viscous liquid

3.2 Physicochemical Evaluation

S.No.	Test	Method	Standard Range
1	pH	Digital pH meter	4.5 – 6.5
2	Viscosity	Viscometer	Moderate
3	Density	Pycnometer	1.2–1.3 g/ml
4	Total solids	Evaporation method	60–70%

3.3 Phytochemical Screening

S.No.	Test Name	Observation	Result
1	Mayer's test	Cream precipitate	Alkaloids Present
2	Shinoda test	Orange-red	Flavonoids Present
3	Ferric chloride test	Blue-green	Tannins Present
4	Saponins test	Persistent foam	Saponins Present
5	Keller-Kiliani test	Reddish-brown ring	Glycosides Present

3.4 Microbial Evaluation

S.No.	Test Name	Observation	Result
1	Total bacterial count	30-300	1.2×10^5 CFU/ml
2	Total Fungal Count (TFC)	fungal colonies (yeast + molds)	2.7×10^3 CFU/mL
3	Pathogens	Absent	Absent

3.5 Polyherbal syrup preparation table

S.No	Ingredients	Used as	Amount (Gram)
1	Methylparaben	Preservative	1.2
2	Potassium sorbate	Pharmaceutical preservative	1.5
3	Xanthan gum	Thickening agent	2.5
4	Sorbitol	Sweetener	200
5	Propylene glycol	Non-active enabling agent	50
6	Sucralose	Artificial sweetener	1.5
7	Honey flavor	Flavoring agent	2.5
8	Citric acid	Preservative	0.7
9	Distilled water	Active ingredients	Q.S

3.6 RESULT

The polyherbal syrup formulated with Gulkhaira (*Althaea officinalis*), Khaskhas (*Papaver somniferum*), Bhumi Amla (*Phyllanthus niruri*), Muchkund (*Pterospermum acerifolium*), and Kabab Chini (*Piper cubeba*) demonstrated promising therapeutic potential based on its phytochemical profile and observed biological activities. These medicinal plants are widely reported for their hepatoprotective, antioxidant, and anti-inflammatory properties, which likely contribute to the overall efficacy of the formulation.

3.7 DISCUSSION

The formulation exhibited acceptable organoleptic properties, making it suitable for oral administration. The slightly bitter taste is due to the presence of alkaloids and phytoconstituents, while added sweeteners help improve palatability.

The pH range (5.5–6.5) indicates that the syrup is mildly acidic, which is favorable for stability and compatibility with gastrointestinal conditions. The viscosity was found to be moderate, ensuring ease of pouring and accurate dosing.

Each ingredient contributes specific pharmacological actions:

- **Gulkhaira** provides soothing and anti-inflammatory effects.
- **Khaskhas** offers mild sedative and antioxidant properties.
- **Bhumi Amla** is well known for its hepatoprotective and antiviral activity.
- **Muchkund** contributes anti-inflammatory and antimicrobial effects.
- **Kabab Chini** enhances digestion and exhibits antimicrobial action.

The combined effect of these herbs suggests a synergistic role in protecting liver function, reducing oxidative stress, and managing inflammation.

Stability studies showed no significant changes in color, odor, or consistency, indicating that the formulation remains stable under normal storage conditions.

CONCLUSION

The present research work successfully focused on the formulation and evaluation of a polyherbal syrup for the treatment of jaundice using medicinal plant parts traditionally recognized for hepatoprotective activity. The selected herbs — **Gulkhaira** (*Althaea officinalis*) **roots/leaves/flowers**, **Khaskhas** (*Papaver somniferum*) **root**, **Bhumi Amla** (*Phyllanthus niruri*) **leaves/stems/roots**, **Muchkund** (*Pterospermum acerifolium*) **flowers**, **and Kabab Chini** (*Piper cubeba*) **dried berries** — were chosen based on their documented antioxidant, anti-inflammatory, cholagogue, and liver-protective properties described in classical Ayurvedic and Unani literature as well as modern phytopharmacological studies.

The study included authentication of plant materials, extraction, formulation of syrup, and evaluation of physicochemical and stability characteristics. The prepared formulation demonstrated favorable organoleptic properties, acceptable pH, viscosity, specific gravity, and stability, suggesting it is suitable for oral administration. The herbal extracts exhibited important phytochemical constituents essential for hepatoprotective function.

Overall, the formulated polyherbal syrup holds potential as a safe, palatable, economical, and effective supportive herbal remedy for jaundice management. The results support traditional claims while offering a pharmaceutical approach for clinical applicability. Further studies such as **in-vivo evaluation, safety studies, and clinical trials** are recommended to fully establish therapeutic efficacy and safety for long-term use.

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