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Formulation and Evaluation of Herbal Syrup For **Liver Detoxification Using Phyllanthus Niruri Plant Extract**

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Abstract: The liver plays a critical role in detoxification, metabolism, and overall physiological homeostasis, making it a primary target for various toxins and diseases. Herbal remedies, particularly those derived from traditional medicine, have gained significant attention for their hepatoprotective properties. Phyllanthus niruri, commonly known as "stonebreaker," is widely recognized for its hepatoprotective, antioxidant, and anti-inflammatory activities. This study aims to formulate and evaluate a liver detoxification herbal syrup using Phyllanthus niruri as the principal active ingredient.

The formulation involved the extraction of Phyllanthus niruri through aqueous and hydroalcoholic methods, followed by incorporation into a syrup base with suitable preservatives, sweeteners, and flavoring agents to enhance patient acceptability. The prepared syrup was evaluated for various physicochemical parameters, including pH, viscosity, density, microbial load, and organoleptic properties. Additionally, preliminary phytochemical screening was conducted to identify active constituents such as flavonoids, alkaloids, tannins, and saponins.

The in vitro hepatoprotective potential of the formulation was assessed using liver enzyme marker assays on hepatocyte cultures exposed to carbon tetrachlorideinduced toxicity.

Keywords: Phyllanthus niruri, liver detoxification, hepatoprotective activity, herbal syrup, formulation, phytochemicals, liver enzymes, traditional medicine, natural remedy, antioxidant

I. INTRODUCTION

The liver is a very important organ in the body. It does many vital jobs like helping with digestion (by making bile), processing food into energy, storing nutrients, and removing harmful substances (toxins) from the body. But because it deals with so many toxins, it can easily get damaged-especially by things like alcohol, certain medicines, infections, and pollution. If liver problems aren't treated, they can lead to serious diseases like cirrhosis, hepatitis, or even liver failure.

Recently, many people have become interested in herbal medicines as a safer option compared to chemical-based drugs. One such helpful plant is Phyllanthus niruri, also known as "Stonebreaker" or "Bhumi Amla." It has been used in traditional Indian (Ayurvedic) medicine for treating liver problems, jaundice, and kidney stones.

Phyllanthus niruri contains natural chemicals like flavonoids, tannins, alkaloids, and lignans that give it powerful antioxidant, anti-inflammatory, and liverprotecting (hepatoprotective) abilities.

This study is about creating a herbal syrup using an extract of Phyllanthus niruri. The goal is to make a syrup that is tasty and easy to take, especially for children and elderly people. The syrup will be tested to check its chemical makeup, natural plant compounds, stability over time, and how well it works to protect liver cells in lab tests.

By making this natural, plant-based liver tonic, the research hopes to combine ancient herbal knowledge with modern science, and offer a safe, effective option for keeping the liver healthy.

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Types:

Table No.1 Types of Liver Disease

Type of Disease	Effects	Cause	Common Symptoms
Hepatitis (A, B, C, D, E)	Inflammation of the liver	Viruses, alcohol, drugs, immune issues	Fatigue, jaundice (yellow skin/eyes), stomach pain
Fatty Liver Disease	Fat buildup in liver cells	Obesity, diabetes, alcohol	Often no symptoms at first, tiredness, discomfort
Cirrhosis	Scarring of the liver from longterm damage	Long-term hepatitis, alcohol, fatty liver	Swelling, confusion, yellow skin, easy bleeding
Liver Cancer	Cancer that starts in the liver	Often from cirrhosis, hepatitis B/C	Weight loss, pain, weakness, no appetite
Liver Failure	Liver stops working properly	Drug overdose, severe liver disease	Confusion, swelling, tiredness, bleeding
Hemochromatosis	Too much iron in the liver	Inherited (genetic condition)	Joint pain, fatigue, liver damage

Liver Detoxification:

Liver detoxification means cleansing or removing harmful substances (toxins) from the body through the liver. The liver acts like a filter for your blood. It:

Breaks down harmful chemicals from food, medicines, alcohol, and pollution

Turns them into less harmful substances

Removes them from the body through urine or bile

Liver Detox is Important:

- Keeps your blood clean
- Helps digestion
- Supports energy production
- Protects your body from harmful substances

Advantages

- Made from Natural Ingredients
- It's made from herbs and plants, so it may have fewer side effects than chemical medicines.
- Helps the Liver Work Better
- Phyllanthus niruri helps clean and protect the liver.
- Beetroot helps remove toxins and improve blood flow.
- Eucalyptus may reduce swelling and fight germs.
- Good Antioxidants
- These ingredients help fight harmful substances in the body (called free radicals).
- Tastes Better
- Sucrose (sugar) and honey make the syrup sweet and easier to take, especially for kids.







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- Also Helps Digestion and Immunity
- Honey and herbs may also help your stomach and protect you from getting sick.

Disadvantages

- Herbs Can Change in Strength
- Each batch might be a little different unless it's carefully tested.
- Not Enough Human Studies
- Most tests are done on animals or in labs-not many real people have tried it in studies.
- Some People May Be Allergic Especially to honey or eucalyptus.
- Contains Sugar and Honey
- Not good for diabetics or people who need to avoid sugar.
- May Affect Other Medicines
- Herbs like Phyllanthus can change how some medicines.

Symptoms:

- Fatigue or Tiredness
- Headaches
- Nausea or Upset Stomach
- Bloating and Gas
- Mood Changes
- Skin Reactions
- Changes in Bowel Movements
- Increased Urination or Sweating
- Bad Breath or Body Odor

MATERIAL AND METHODS: DRUG PROFILE: Phyllanthus Niruri





Figure No.1 phyllanthus niruri plantFigure No.2 phyllanthus niruri powderCommon Name: Stonebreaker, Bhumi Amla, Bhumyamalaki.Botanical Name: Phyllanthus niruri

Family: Phyllanthaceae

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Active Constituents: lignans, tannins, coumarins, terpenes, flavonoids, alkaloids, saponins, and phenylpropanoids. Nature: small, annual herb.

Pharmacological Activities: Phyllanthus niruri is a medicinal plant with a wide range of pharmacological activities, thanks to its rich content of bioactive compounds like lignans, flavonoids, alkaloids, tannins, and phenolic compounds. **Uses:** Phyllanthus niruri has been widely used for centuries in Ayurvedic, Unani, Siddha, and folk medicine systems across Asia, Africa, and South America. Its traditional uses are based on its ability to treat various liver, kidney, and digestive disorders, as well as general health issues.

OTHER INGREDIENTS:

Eucalyaptus Leaves: 10ml		
Beetroot:	5ml	
Honey:	20g	
Sucrose:	30g	
Water:	q.s. to 100ml	

Formulation of Syrup

Step1: COLLECTION OF Plant materials

Fresh leaves of *Phyllanthus niruri* were collected during the summer season in April, 2025 from the Herbal Garden of Gajanan Maharaj College of Pharmacy, Shiva Trust Campus, Nipani, Aurangabad, 431007, Maharashtra, India]..

Step2: Vehicle

The vehicle use for the formulation of Syrup must possess properties such as should effectively deposit and evenly distribute the drug. E.g.: -Water.

Step3: Extraction Method

50g of dried leaves sample weighed and extracted in an extracted in a Conical Flask with 250 ml solvent at room temperature for 24 hours.



Fig No.6 Leaves Sample



Fig No.7 Extraction of sample

Step4: Weighing of Sucrose

Weighing the required amount of sucrose in beaker.

Step5: Solution preparation

Add purified water to beaker 1 and heat on water (below 70°C) until a clear solution form.

Step6:Mixing Solution: Pour the contents of beaker 2 into beaker 1

(containing the sucrose solution) and mix thoroughly

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Fig No. 8 Ingredient

Step7: Addition of Preservative e.g. The substance which preserves the preparation for long period. E.g., Methyl and propyl paraben, Honey, Sugar.

Step8: Volume adjustment:

Add Colouring agent and flavouring agent to beaker 1 to achieve the desired flavour and colour .

In a beaker 3 dissolved additional sucrose in beaker to make up the volume then combine it will beaker 1 and pour it suitable container.



Formulated Syrup

i or indiacou >j i up		
Parameter	Observation	
Density	1.11	
Viscosity	3.81 ср	
pH Paper	Acidic	
PH meter	6.4	

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Colour	Reddish Brown
Odor	Aromatic
Taste	Slightly Aromatic
Appearance	Clear

Result For Evaluation Parameter

CONCLUSION

In conclusion, the formulation and evaluation of Phyllanthus niruri Linn leaf extract syrup demonstrate promising potential for the management of hepatotoxicity. This herbal syrup, known for its antioxidant and hepatoprotective properties, provides a natural and effective approach to mitigating liver damage caused by various toxic agents.

The findings of this study suggest that the syrup could serve as a valuable addition to hepatotoxicity management strategies. However, further research and welldesigned clinical trials are essential to confirm its safety and therapeutic efficacy in real-world applications.

Overall, Phyllanthus niruri Linn leaf extract syrup appears to be both safe and effective in supporting liver health and managing hepatotoxic conditions.

RESULTS

The final formulation (F2) was obtained is stable than formulation F1, the formulation (F2) was obtained by minimizing the erroe in formulation F1. The formulation (F2) having antioxidant property hence it will be very effective for the management of liver detoxification.

Formulation	Colour	Odour	Taste
F1	Reddish-Brown	Slightly Aromatic	Slightly Sweet
F2	Reddish-Brown	Slightly Aromatic	Slightly Sweet

physical Evaluation of Syrup formulation

Phytochemical constitute of the leaf extract of Phyllanthus niruri

Tests	Name of tests	In methanol extract
Terpenoids	Salkowski test	positive
Alkaloids	Wagners reagent	positive
Flavonoids	Ferric chloride test	positive

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