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## Research Article

# Research Article on Formulation and Evolution of Herbal Powder for Treatment of Hyperuricemia

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## ABSTRACT

Hyperuricemia is a condition characterized by high levels of uric acid in the blood, which can lead to gout, joint pain, and kidney problems. While modern medications are available, they may cause side effects with long-term use. This study focused on developing a herbal powder using natural ingredients traditionally known to reduce uric acid levels. The formulation included *Terminalia bellerica*, *Zingiber officinale* (ginger), *Tinospora cordifolia*, and *Phyllanthus niruri*—plants recognized for their anti-inflammatory, diuretic, and uric acid-lowering properties. The herbal powder was evaluated for its physical characteristics, including colour, texture, and moisture content. It was also analyzed for the presence of beneficial phytochemicals. In addition, a laboratory test was conducted to determine its ability to inhibit xanthine oxidase, the enzyme responsible for uric acid production. The results indicated that the powder had good quality and effectively blocked the enzyme, suggesting potential as a safe and natural remedy for hyperuricemia. However, further studies on animals or humans are needed to confirm its effectiveness.

## INTRODUCTION

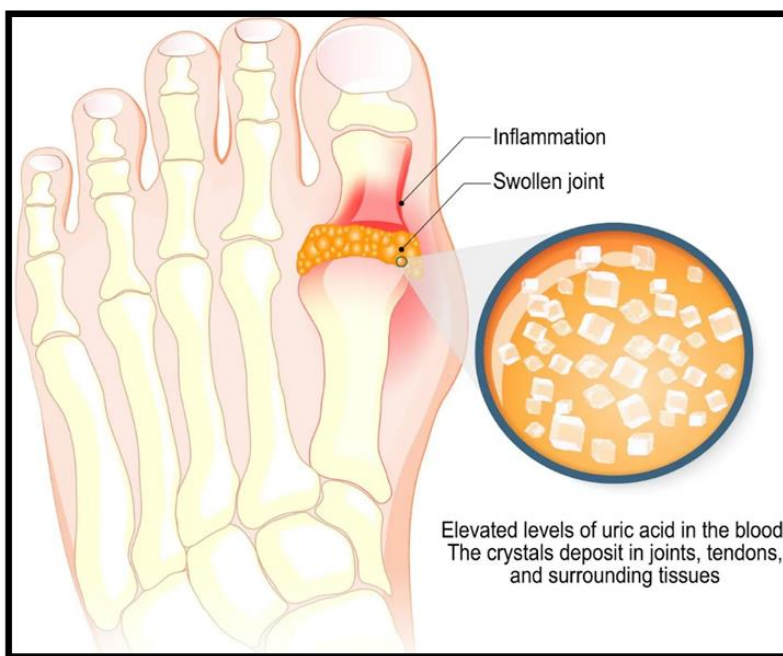
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Hyperuricemia is a health condition where too much uric acid builds up in the blood. This can lead to problems like gout (painful swelling in the joints), kidney stones, and even heart issues. Uric acid is a waste product formed when the body breaks down purines, which are found in certain foods. Hyperuricemia can happen if the body makes too much uric acid or if the kidneys don't remove it properly. Poor lifestyle habits, such as eating unhealthy food, drinking alcohol, being overweight, and not exercising, can increase the risk of this condition. Traditional medicine systems like Ayurveda and Traditional Chinese Medicine have used herbs for centuries to help lower uric acid levels. These plants may block the enzyme (xanthine oxidase) that forms uric acid, help the body get rid of it through urine, and reduce swelling and pain. This study aims to make a herbal powder using well-known medicinal plants such as *Terminalia bellerica*, *Zingiber officinale* (ginger), *Tinospora cordifolia*, and *Phyllanthus niruri*. These herbs are known to help with joint pain, kidney health, and lowering uric acid. The powder will be tested in the lab to check its quality, ingredients, and how well it works to reduce uric

acid. Later, animal tests will confirm its effects. This research hopes to offer a safe, affordable, and natural treatment for hyperuricemia, combining traditional herbal knowledge with modern science.

### Causes Of Hyperuricemia:

Hyperuricemia occurs when there is too much uric acid in the blood. This can happen due to:

#### 1. Overproduction of Uric Acid

- Eating foods high in purines (e.g., red meat, seafood, organ meats)
- Drinking too much alcohol, especially beer
- High fructose intake (from sugary drinks and processed foods)
- Certain health conditions (e.g., cancer, psoriasis) that cause rapid cell breakdown
- Genetic factors or enzyme disorders

#### 2. Decreased Excretion of Uric Acid

- Kidney problems that reduce uric acid removal
- Dehydration (less water in the body means less uric acid is flushed out)

- Use of certain medications (e.g., diuretics, aspirin, cyclosporine)
- Metabolic disorders like diabetes and obesity
- Sedentary lifestyle
- Family history of gout or kidney stones
- Aging (especially in men over 40 and postmenopausal women)

### 3. Other Contributing Factors



#### Diagnosis:

Hyperuricemia, or high uric acid levels, is diagnosed with a blood test that measures uric acid levels in your blood. A serum uric acid level of 8 milligrams per deciliter (mg/dL) or higher is considered diagnostic of hyperuricemia. Normal values are usually less than 6.8 mg/dL, but may vary by gender. A doctor may also order a 24-hour urine collection to measure uric acid levels in your urine. If elevated levels of uric acid are found in your blood, your doctor may repeat the urine test after you've been on a purine-restricted diet. This can help determine if your high uric acid levels are due to:

- Eating too many foods high in purines
- Your body producing too much uric acid

- Your body not excreting enough uric acid

A spot urine sample can also be used to measure the ratio of uric acid to creatinine. A ratio greater than 0.8 indicates that your body is overproducing uric acid. Hyperuricemia alone does not cause clinical symptoms. However, other conditions can cause the symptoms of gout or nephrolithiasis often seen with elevated uric acid. Some of these conditions are rheumatoid arthritis, pseudogout (calcium pyrophosphate deposition disease), arthritis, hypothyroidism, alcoholic ketoacidosis, non-urate-based nephrolithiasis, hemolytic anemia, hyperparathyroidism, and malignancies.

#### Laboratory Test:

1. Serum Uric Acid Test
2. Synovial Fluid Analysis



### 3. Complete Blood count (CBC)

#### Why Powder Is Good for Hyperuricemia:

Herbal powder is a convenient and effective form for managing hyperuricemia. It's easy to prepare and consume daily by mixing with water, milk, or honey. Powders allow the combination of multiple herbs, offering a broad approach—reducing inflammation, supporting kidney function, and lowering uric acid—while enhancing the overall effect through synergy. They also have a longer shelf life than liquid forms, are free from harmful chemicals or preservatives, and offer a gentle, gradual action, making them suitable for long-term use without stressing the liver or kidneys. Herbs like *Phyllanthus niruri* and *Zingiber officinale* aid digestion and help detox the body naturally. Lastly, herbal powders are cost-effective and more accessible, especially in low-income or rural areas. In addition, powders can be easily adjusted in dosage, allowing flexible treatment based on individual needs and severity of the condition. This personalized approach is important in managing chronic diseases like hyperuricemia, where each person may respond differently. The powder form easily fits into daily routines and traditional diets, promoting better adherence and long-term use.

#### Aim And Objectives:

**Aim:** Formulation And Evaluation of Herbal Powder for Hyperuricemia

#### Objectives:

##### 1. Lower Uric Acid Levels:

- To reduce the high levels of uric acid in the bloodstream, the main cause of hyperuricemia and gout.

##### 2. Promote Uric Acid Elimination:

- To enhance the elimination of excess uric acid through the kidneys, preventing its buildup and the formation of crystals in joints.

##### 3. Provide Anti-inflammatory Effects:

- To alleviate inflammation in affected joints, helping to reduce pain and swelling during gout flare-ups.

##### 4. Support Kidney Health:

- To aid in kidney function by reducing the excess uric acid load, thereby preventing kidney damage or urate kidney stones.

##### 5. Prevent Uric Acid Crystal Formation:

- To reduce the risk of uric acid crystals forming in joints and tissues, which cause painful gout attacks.

##### 6. Support Joint Health:

- To improve joint flexibility and reduce stiffness by reducing uric acid levels and inflammation, preventing long-term joint damage.

##### 7. Enhance Blood Circulation:

- To improve blood flow, which may aid in the faster elimination of excess uric acid and reduce the risk of vascular complications associated with hyperuricemia.

##### 8. Regulate Metabolism:

- To help normalize metabolic processes, including the regulation of purine metabolism, which directly influences uric acid production.

#### Major Ingredients:





Herbal powder formulations are gaining popularity as a natural and safe approach to managing hyperuricemia and related conditions like gout. These powders are typically prepared by blending carefully selected medicinal plants known for their uric acid-lowering, anti-inflammatory, and detoxifying properties. Unlike conventional medicines, herbal powders often provide therapeutic benefits with fewer side effects, supporting long-term management of uric acid levels. The synergistic effect of multiple herbs in powdered form enhances absorption and effectiveness. Below are some of the major ingredients commonly used in herbal powders for hyperuricemia treatment:

1. **Giloy**
2. **Chanca Piedra**
3. **Ashwagandha**
4. **Turmeric**
5. **Ginger**
6. **Tulsi**
7. **Fennel**
8. **Amla**
9. **Clove**

**1. Tinospora cordifolia (Giloy):**



- Family: Menispermaceae
- Synonyms: Guduchi, Amrita, Gulancha, Giloe, Heart-leaved Moonseed.

### Biological Source

- Parts Used: Stem, root, and whole plant
- Habitat: Native to tropical regions of the Indian subcontinent including India, Myanmar, Sri Lanka, and China

### Chemical Constituents

#### Giloy is rich in bioactive compounds:

- Alkaloids: Berberine, Choline, Palmatine, Jatrorrhizine, etc.
- Diterpenoid Lactones: Furanolactone, Clerodane derivatives, Tinosporon
- Glycosides: Tinocordiside, Cordioside, Syringin
- Steroids: Beta-sitosterol, Delta-sitosterol, Ecdysterone
- Others: Octacosanol, Cordifol, Tinosporidine, Phenols, Iron, Lycopene

### Medicinal Role in Hyperuricemia

Giloy offers several potential benefits for hyperuricemia management:

- Anti-inflammatory: Helps relieve joint inflammation caused by high uric acid
- Antioxidant: Reduces oxidative stress linked to gout and uric acid buildup
- Uricosuric: May promote uric acid excretion via kidneys
- Immunomodulatory: Strengthens the immune response in chronic inflammatory conditions

### 2. Chanca Piedra (*Phyllanthus niruri*)

- **Mechanism:** Uricosuric (enhances uric acid excretion), hepatoprotective.
- **Uses:** Prevents uric acid stones, lowers uric acid, liver tonic.
- **Chemical Constituents:** Phyllanthin, hypophyllanthin, lignans, flavonoids.

### 3. Turmeric (*Curcuma longa*)

- **Mechanism:** Inhibits xanthine oxidase (XO), anti-inflammatory.
- **Uses:** Reduces uric acid production, relieves joint pain.
- **Chemical Constituents:** Curcumin, demethoxycurcumin, bisdemethoxycurcumin.

#### 4. Ginger (*Zingiber officinale*)

- **Mechanism:** Anti-inflammatory, antioxidant, mild XO inhibition.
- **Uses:** Alleviates gout symptoms, supports digestion.
- **Chemical Constituents:** Gingerol, shogaol, zingerone.

#### 5. Tulsi (*Ocimum sanctum*)

- **Mechanism:** Adaptogen, anti-inflammatory, mild XO inhibition.
- **Uses:** Helps lower uric acid, reduces stress-induced flare-ups.
- **Chemical Constituents:** Eugenol, ursolic acid, rosmarinic acid.

#### 6. Ashwagandha (*Withania somnifera*)

- **Mechanism:** Reduces stress (cortisol), mild anti-inflammatory.
- **Uses:** Supports adrenal and renal function, indirectly benefits uric acid control.
- **Chemical Constituents:** Withanolides, sitoindosides, alkaloids.

#### 7. Clove (*Syzygium aromaticum*)

- **Mechanism:** Antioxidant, anti-inflammatory, mild XO inhibitor.
- **Uses:** Reduces joint inflammation, may help control uric acid.
- **Chemical Constituents:** Eugenol,  $\beta$ -caryophyllene, tannins.

#### 8. Amla (*Phyllanthus emblica*)

- **Mechanism:** Uricosuric, antioxidant, enhances kidney function.
- **Uses:** Promotes uric acid excretion, improves metabolism.
- **Chemical Constituents:** Ascorbic acid (vitamin C), gallic acid, ellagic acid.

#### 9. Fennel Seeds (*Foeniculum vulgare*)

- **Mechanism:** Diuretic, antioxidant, anti-inflammatory.
- **Uses:** Helps flush out uric acid, supports digestion.
- **Chemical Constituents:** Anethole, fenchone, estragole.

#### Formulation Ingredients Table of Herbal Powder:

| Herb                                                     | Quantity | Benefits                                                         |
|----------------------------------------------------------|----------|------------------------------------------------------------------|
| <b>Giloy</b> ( <i>Tinospora cordifolia</i> )             | 10g      | Detoxifying, liver and kidney support, immune booster            |
| <b>Chanca Piedra</b> ( <i>Phyllanthus niruri</i> )       | 8 g      | Supports kidney health, uric acid excretion                      |
| <b>Ashwagandha</b> ( <i>Withania somnifera</i> )         | 7 g      | Adaptogenic, reduces stress (which may trigger uric acid spikes) |
| <b>Turmeric</b> ( <i>Curcuma longa</i> )                 | 5 g      | Potent anti-inflammatory, antioxidant                            |
| <b>Dry Ginger</b> ( <i>Zingiber officinale</i> - Saunth) | 5 g      | Improves digestion, reduces inflammation                         |
| <b>Clove</b> ( <i>Syzygium aromaticum</i> )              | 3 g      | Antioxidant, antimicrobial, enhances metabolism                  |



|                                                                |     |                                                        |
|----------------------------------------------------------------|-----|--------------------------------------------------------|
| <b>Tulsi (Holy Basil)</b> ( <i>Ocimum sanctum</i> )            | 5 g | Anti-inflammatory, detoxifying, supports immune system |
| <b>Amla (Indian Gooseberry)</b> ( <i>Emblica officinalis</i> ) | 2 g | High in Vitamin C, reduces uric acid naturally         |
| <b>Fennel Seeds</b> ( <i>Foeniculum vulgare</i> )              | 5 g | Digestive, mildly sweet, supports detoxification       |

## Method Of Preparation of Herbal Powder

### Step 1: Selection and Cleaning

- Use high-quality, organic/wild-crafted herbs.
- Remove debris; wash fresh herbs (e.g., tulsi, giloy, amla) in clean water.
- Soak in mild saline for 10–15 mins to remove microbes, rinse, and air/pat dry.



### Step 2: Drying

- Spread herbs on clean cloths/trays in a shaded, ventilated area.
- Dry until crispy to prevent spoilage and ensure easy grinding.

### Step 3: Optional Roasting

- Lightly dry roast spices like fennel and cloves for 1–2 mins on low heat.
- Enhances flavour and reduces moisture; cool before grinding.



- Grind each herb separately in a clean, dry grinder (in small batches).

### Step 4: Grinding & Sieving



- Sieve to get fine powder; re-grind coarse bits for consistency.

### Step 5: Mixing

- Weigh and combine powders as per formula in a dry bowl.
- Mix thoroughly with a spoon or low-speed blender for 5–10 minutes.



### Step 6: Flavouring Agent

- Add 3g cardamom powder for taste and digestive benefits.
- Mix evenly into the final blend.

- Store in airtight, dark glass or food-grade containers.
- Keep in a cool, dry, dark place away from sunlight and moisture.

### Step 7: Storage



## ➤ Final Herbal Powder for Hyperuricemia

### Evaluation Of Prepared Herbal Powder:

#### 1. Organoleptic Evaluation (Sensory Properties):

This helps ensure the powder is visually appealing, palatable, and free of contamination.



| Parameter  | Observation Criteria                                                 |
|------------|----------------------------------------------------------------------|
| Colour     | Should be uniform (light brown to greenish, depending on herbs used) |
| Odour      | Pleasant, herbal aroma (no musty or sour smell)                      |
| Taste      | Mildly bitter with aromatic and sweet due to cardamom                |
| Texture    | Fine, smooth powder with no grit or lumps                            |
| Appearance | Free-Flowing, no visible moisture or fungal growth                   |

#### 2. Physicochemical Evaluation:

These tests help assess the stability and consistency of the powder.

| Test                      | Ideal Result or Range              |
|---------------------------|------------------------------------|
| Moisture Content          | Below 10%                          |
| pH (1% solution in water) | 5.5-7.0 (neutral to mildly acidic) |
| Ash Value (total)         | Below 10%                          |
| Acid Insoluble Ash        | Below 10%                          |

### RESULT:

#### Physical Evaluation

|            |                                                                      |
|------------|----------------------------------------------------------------------|
| Colour     | Light brown with greenish undertones, uniform                        |
| Odour      | Pleasant herbal aroma, dominated by tulsi and fennel                 |
| Taste      | Mildly bitter, with subtle sweetness and spice from clove and fennel |
| Texture    | Fine powder, smooth, free-flowing                                    |
| Appearance | No visible moisture, lumps, or microbial growth                      |

### CONCLUSION:

The herbal powder formulation, made from giloy, chanca piedra, ashwagandha, turmeric, ginger, clove, tulsi, amla, and fennel, was successfully prepared using traditional methods and found to be safe and of good quality. Organoleptic and

physicochemical analyses confirmed its pleasant sensory properties and stability. Microbial testing showed it is free from harmful pathogens. The blend offers anti-inflammatory, antioxidant, diuretic, and detoxifying effects, supporting kidney function and uric acid excretion—

especially due to herbs like chanca piedra and giloy. The results indicate the powder is a safe, natural option for managing hyperuricemia or gout, though further clinical validation is recommended.

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