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Research Paper

Formulation And Evaluation of Thyroid-Stimulating Herbal Bauhinia Purpurea Bark Syrup

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ABSTRACT

Herbal drug delivery systems are increasingly recognized for their therapeutic potential in managing endocrine disorders due to their safety profile, affordability, and traditional usage. The present research work was undertaken to formulate and evaluate a thyroid-stimulating herbal syrup using Bauhinia purpurea bark extract. The extract was prepared using a hydroalcoholic maceration method and incorporated into four different formulations (F1–F4) with varying concentrations (3%, 5%, 7%, and 10% w/v). The prepared formulations were subjected to comprehensive evaluation including organoleptic properties, physicochemical parameters such as pH, viscosity, and specific gravity, preliminary phytochemical screening, and stability studies under different storage conditions. The results demonstrated that all formulations possessed acceptable pharmaceutical properties. Among them, F2 (5%) exhibited optimal characteristics in terms of stability, palatability, and viscosity. The study concludes that the developed herbal syrup formulation is stable and promising for use as a supportive therapy in thyroid disorders, although further pharmacological and clinical investigations are required.

INTRODUCTION

Thyroid disorders represent one of the most common endocrine abnormalities worldwide, with hypothyroidism being a major concern. Hypothyroidism occurs due to insufficient secretion of thyroid hormones (T3 and T4), leading to various metabolic disturbances such as

fatigue, weight gain, cold intolerance, constipation, and depression. The standard treatment involves synthetic hormone replacement therapy, which, although effective, requires lifelong administration and careful monitoring of dose to avoid adverse effects such as hyperthyroidism.

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In recent years, there has been a growing inclination towards herbal medicines as alternative or complementary therapies. Herbal drugs are considered safer, cost-effective, and culturally acceptable, especially in countries like India where traditional medicine systems such as Ayurveda are widely practiced. Many medicinal plants possess bioactive phytoconstituents that can influence endocrine function and metabolic pathways.

Bauhinia purpurea, belonging to the family Fabaceae, is commonly known as the Purple Orchid Tree. It has been traditionally used for the treatment of glandular swellings, ulcers, and metabolic disorders. The bark of this plant contains important phytoconstituents such as flavonoids, tannins, and glycosides, which exhibit antioxidant, anti-inflammatory, and possible endocrine-modulating activities. These constituents may support thyroid function by improving metabolic balance and reducing oxidative stress.

Syrup dosage forms are particularly advantageous due to their ease of administration, improved patient compliance, and suitability for both pediatric and geriatric patients. They also allow uniform dispersion of active constituents and enhanced palatability.

The present study aims to develop a stable, palatable, and effective herbal syrup formulation using *Bauhinia purpurea* bark extract and evaluate its pharmaceutical characteristics.

2. OBJECTIVES

The main objectives of the present study are:

- To collect, authenticate, and process *Bauhinia purpurea* bark
- To prepare hydroalcoholic extract of the bark
- To formulate herbal syrup using different concentrations of extract
- To evaluate the formulations for physicochemical properties

- To perform preliminary phytochemical screening

2.1 THEORETICAL BACKGROUND

Role of Herbal Extract in Thyroid Disorders

- Herbal extracts containing flavonoids and glycosides are known to influence metabolic enzymes and endocrine glands. These compounds may enhance thyroid activity either directly or indirectly by improving overall metabolic efficiency.

Role of Syrup as a Dosage Form

- Syrups are concentrated aqueous solutions of sugar used for oral administration. They offer several advantages such as improved taste, ease of swallowing, and uniform dosing. They are particularly suitable for herbal drugs, which often have a bitter taste.

Role of Honey in Formulation

- Honey is a natural sweetening agent with multiple pharmaceutical benefits:
- Acts as a demulcent, providing soothing effect
- Possesses mild antimicrobial activity
- Enhances viscosity naturally
- Improves taste and patient compliance
- Contains antioxidants that may support therapeutic activity
- Thus, incorporation of honey not only improves palatability but also contributes to the stability and therapeutic value of the formulation.

3. MATERIALS AND METHODS

3.1 Materials

All materials and chemicals used in this study were of analytical grade and procured from standard sources.



Ingredient	F1	F2	F3	F4	Function
Extract (% w/v)	3	5	7	10	Active ingredient
Sucrose (% w/v)	40	40	40	40	Primary sweetener
Honey (% v/v)	20	20	20	20	Natural sweetener, demulcent, viscosity enhancer
Sodium benzoate (% w/v)	0.2	0.2	0.2	0.2	Preservative
Distilled water	q.s.	q.s.	q.s.	q.s.	Vehicle

3.2 Collection and Authentication

The bark of *Bauhinia purpurea* was collected from a local area and authenticated by a qualified botanist. The collected material was cleaned to remove impurities.

3.3 Preparation of Extract

The collected bark was shade-dried for several days and then coarsely powdered using a mechanical grinder. The powdered material was subjected to maceration with 70% ethanol for 72 hours with occasional stirring to ensure maximum extraction of phytoconstituents. The extract was filtered and concentrated using a rotary evaporator under reduced pressure to obtain a semi-solid mass, which was stored in an airtight container for further use.

3.4 Formulation of Herbal Syrup

The herbal syrup was prepared using the following steps:

1. Sucrose was dissolved in a portion of distilled water with gentle heating (not exceeding 60°C) to prepare a clear syrup.
2. Honey was added to the cooled syrup base with continuous stirring to preserve its natural constituents.

3. The required quantity of *Bauhinia purpurea* extract was incorporated slowly with continuous stirring.
4. Sodium benzoate was added as a preservative.
5. The final volume was adjusted with distilled water and filtered to remove any particulate matter.
6. The finished product was filled into amber-colored bottles and stored at room temperature.

4. EVALUATION PARAMETERS

4.1 Organoleptic Properties

The formulations were evaluated visually for color, odor, taste, and appearance.

4.2 Physicochemical Evaluation

Note: Inclusion of honey contributes to increased viscosity and improved palatability while providing additional antimicrobial and demulcent properties.

- pH: Measured using a digital pH meter (adjusted naturally without external acidifiers)
- Viscosity: Determined using a Brookfield viscometer
- Specific Gravity: Measured using a specific gravity bottle

Parameter	F1	F2	F3	F4
PH	5.6	5.3	5.2	5.0
Viscosity	1120	1180	1230	1300
Specific Gravity	1.22	1.25	1.27	1.30

4.3 Phytochemical Screening

Standard qualitative tests were performed to detect the presence of major phytoconstituents such as flavonoids, tannins, glycosides, and alkaloids.

4.4 Stability Studies

Stability studies were carried out by storing the formulations at room temperature (25°C) and accelerated conditions (40°C $\pm$ 2°C) for 30 days. Samples were analyzed periodically for changes in pH, viscosity, and appearance.

RESULTS AND DISCUSSION

The formulated syrups exhibited satisfactory organoleptic properties with a pleasant taste and acceptable appearance. The pH values of all formulations were within the acceptable range for oral preparations, indicating good compatibility of ingredients.

Viscosity increased with an increase in extract concentration, which may be attributed to higher solid content. Among all formulations, F2 (5%) showed the best balance between viscosity, stability, and palatability, making it the most suitable formulation.

Phytochemical screening confirmed the presence of flavonoids, tannins, and glycosides, which are known for their therapeutic potential. These compounds may contribute to the thyroid-modulating activity of the formulation.

Stability studies revealed no significant changes in physicochemical properties, indicating good stability of the formulation under different storage conditions.

CONCLUSION

The present study successfully developed and evaluated a herbal syrup formulation containing *Bauhinia purpurea* bark extract. The formulation exhibited acceptable physicochemical properties and stability.

Among all formulations, F2 (5%) was found to be the most suitable. The developed formulation may serve as a promising supportive therapy for thyroid disorders; however, further pharmacological and clinical studies are necessary to establish its efficacy and safety.

FUTURE SCOPE

Detailed pharmacological evaluation in animal models Clinical trials in human subjects Standardization using advanced analytical techniques such as HPTLC and UV spectroscopy

ETHICAL STATEMENT

This study does not involve any human or animal experimentation.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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