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Research On Formulation And Evaluation Of Herbal Syrup Incorporating Bael And Parijat Extracts

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ABSTRACT

The natural qualities, perceived safety, and efficacy of herbal medicines have contributed to their increasing popularity. This study's goal was to prepare, test, and assess the medicinal qualities of vegetable oils using extracts from two plants with established uses in conventional medicine: bael (Aegle marmelos) and parijat (Nyctanthes arbor-tristis). Santi syrup was used in accordance with standard protocols, and it was assessed for a number of physicochemical parameters, such as pH, viscosity, specific gravity, and microbial load, before being subjected to in vitro and in vivo studies of the syrup's pharmacological activities, including antimicrobial, antioxidant, anti-inflammatory, and gastroprotective effects.

The findings demonstrated the herb syrup's strong antibacterial, anti-inflammatory, antioxidant, and gastroprotective properties, which are ascribed to the combined actions of the bioactive substances found in the plant extracts. A potential therapeutic application of the syrup is suggested by this information regarding the herbal formulation in pathological disorders associated with inflammation, microbial infections, oxidative stress, and stomach ulcers.

Keywords: Herbal Syrup, Bael (Aegle Marmelos), Parijat (Nyctanthes Arbor-Tristis), Antioxidant, Antimicrobial, Anti-Inflammato.

Introdution

Due to a rising knowledge of their potential therapeutic advantages and a desire for more sustainable and natural healthcare solutions, herbal medicines have seen a comeback in popularity globally in recent years. Bael (Aegle marmelos) and Parijat (Nyctanthesarbor-tristis) are two of the many medicinal plants that have gained attention because of their long history of traditional usage and intriguing pharmacological characteristics. This aims to clarify the possible therapeutic uses of a herbal syrup made using extracts from various plants by examining its formulation, assessment, and pharmacological analysis.

1. Background and Rationale

Due to their abundance of bioactive chemicals with a wide range of pharmacological effects, medicinal plants have been an integral part of healthcare systems throughout human history. Herbal treatments are still important even with the development of contemporary medicines, especially in areas with limited access to conventional medicine or where traditional healing methods are preferred by the local population. Furthermore, there is now more interest in herbal medicines as potential substitutes or

complementary therapies as a result of growing worries about the efficacy and safety of synthetic pharmaceuticals.

Two such plants, Bael (Aegle marmelos) and Parijat (Nyctanthesarbor-tristis), are valued for their therapeutic qualities in a number of ancient medical systems, such as Ayurveda, Siddha, and Unani. Native to the Indian subcontinent, bael, often referred to as the "wood apple" or "bilva," has long been used to treat diabetes, respiratory conditions, and gastrointestinal issues. Numerous phytoconstituents, including as alkaloids, flavonoids, tannins, and essential oils, are responsible for its pharmacological actions. Likewise, Parijat, often referred to as "Harsingar" or the "night-flowering jasmine," is valued for its antipyretic, anti-inflammatory, and analgesic qualities. It is frequently used in traditional medicine to treat rheumatic disorders, lower fever, and relieve pain.

2. Significance of Herbal Medicines in Modern Healthcare

Numerous factors, such as the perception of plant-based therapies' safety and tolerability, their holistic therapeutic approach, and their capacity to meet unmet medical needs, contribute to the global resurgence of interest in herbal medicines. Additionally, attempts to investigate accessible, reasonably priced, and sustainable alternative treatment methods have been prompted by the growing incidence of chronic illnesses, the development of antibiotic resistance, and the rising expenses of healthcare. A substantial reservoir of possible therapeutic agents is available through the diverse combinations of bioactive molecules found in herbal medicines, making them a promising path for drug discovery and development.

3. Overview of Bael and Parijat Plants

The Rutaceae family includes the bael (Aegle marmelos), which is distinguished by its fragrant fruits with a unique flavor and nutritional makeup. Because of its therapeutic qualities, the leaves, roots, bark, and fruits of the Bael tree are all used in traditional medicine. The phytoconstituents in Bael, such as marmelosin, umbelliferone, rutin, and quercetin, have been linked to a variety of pharmacological actions, including antidiabetic, anti-inflammatory, anti-microbial, anti-ulcer, and hepatoprotective properties. In contrast, the Oleaceae family includes parijat (Nyctanthesarbor-tristis), which is well-known for both its decorative and therapeutic qualities. The plant is known for its fragrant, star-shaped blooms, which bloom in large quantities at night and have a heady scent.

Aim and Objectives

Aim:

To develop a stable and effective herbal syrup formulation using Bael & Parijat extracts.

Objectives:

1. **Optimization of Extraction Process:**

To optimize the extraction process for obtaining high-quality Bael and Parijat extracts with maximal yield and phytochemical content.

2. **Formulation of Herbal Syrup:**

To formulate a herbal syrup incorporating standardized extracts of Bael and Parijat, ensuring stability, palatability, and uniformity of dosage.

3. **Physicochemical Characterization:**

To characterize the physicochemical properties of the herbal syrup, including pH, viscosity, and solubility.

4. **Pharmacological Investigation:**

Antimicrobial activity screening against selected bacterial and fungal strains using agar well diffusion method.

5. **Exploration of Therapeutic Applications:**

To explore the potential therapeutic applications of the herbal syrup in various disease conditions, including gastrointestinal disorders, respiratory ailments, inflammatory conditions, diabetes, and microbial infections.

Plant Profile

Bael (Aegle marmelos):

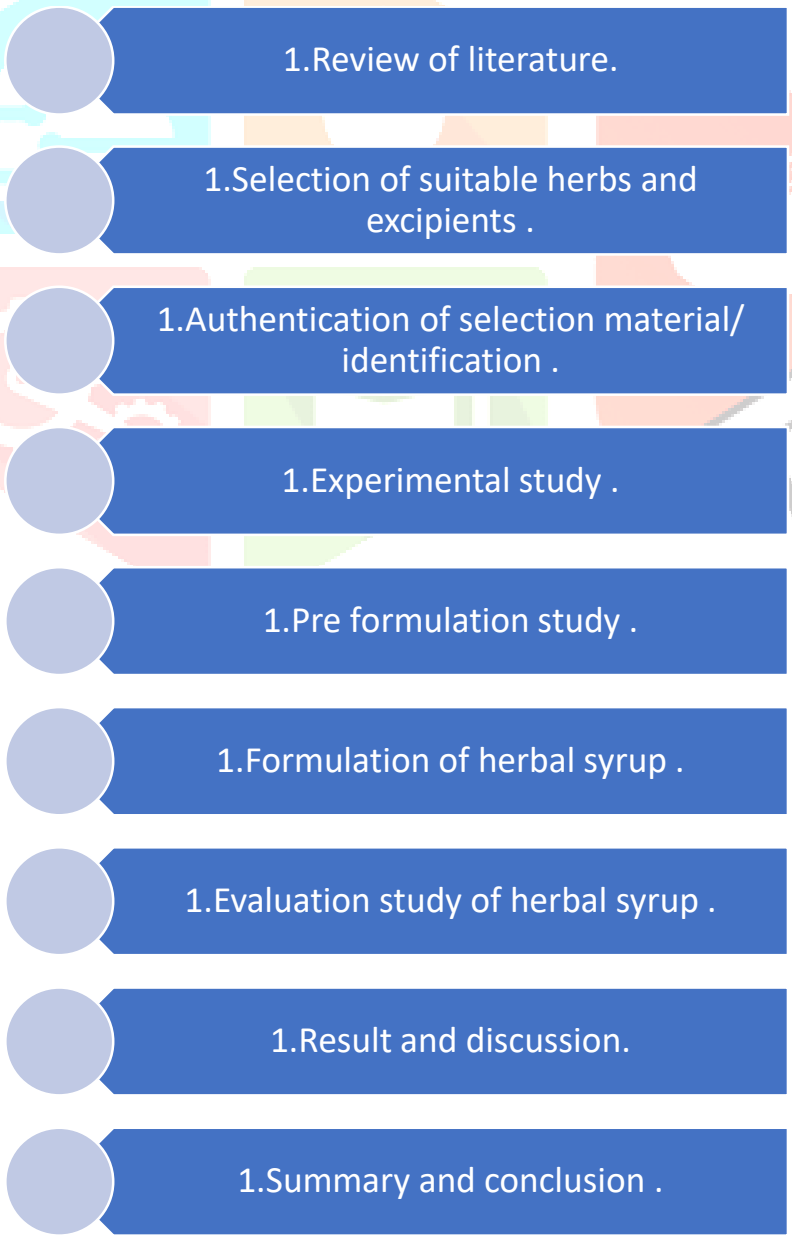
Fig: Bael (Aegle marmelos):

Botanical Name: Aegle marmelos
Common Names: Bael, Wood Apple, Bilva
Family: Rutaceae
Description: Bael is a medium to large-sized deciduous tree with a short trunk and spreading branches. It typically reaches a height of 8 to 12 meters. The leaves are alternate, trifoliate, and aromatic, with ovate leaflets that have serrated margins. The flowers are greenish-white, fragrant, and borne in clusters. The fruit, known as the Bael fruit or Wood Apple, is round, woody, and yellowish-green when ripe, with a hard shell and a sweet, aromatic pulp containing numerous seeds.
Distribution: Bael is native to the Indian subcontinent and is widely distributed across India, Nepal, Sri Lanka, Pakistan, and Bangladesh. It is also cultivated in other tropical and subtropical regions of Asia, Africa, and South America.
Traditional Uses: Bael has a long history of use in traditional medicine, particularly in Ayurveda, Siddha, and Unani systems. Various parts of the Bael tree, including the leaves, roots, bark, and fruits, are used to treat gastrointestinal disorders, respiratory ailments, diabetes, fever, and skin conditions. The fruit pulp is consumed fresh or dried and is believed to have digestive, laxative, and anti-diabetic properties.
Phytochemical Constituents: Bael contains a variety of phytochemicals, including alkaloids (e.g., marmelosin), flavonoids (e.g., rutin), tannins, essential oils, coumarins, and terpenoids.
Parijat (Nyctanthesarbor-tristis):

Fig: Parijat (Nyctanthesarbor-tristis):

Botanical Name: Nyctanthesarbor-tristis
Common Names: Parijat, Night-flowering Jasmine, Harsingar
Family: Oleaceae
Description: Parijat is a small to medium-sized deciduous tree or shrub with a short, crooked trunk and spreading branches. It typically grows up to 10 meters in height. The leaves are simple, opposite, lanceolate to elliptic, and dark green with serrated margins. The flowers are fragrant, white with an orange center, and bloom profusely during the night, fading by morning. The fruit is a small, brown capsule containing numerous seeds.
Distribution: Parijat is native to the Indian subcontinent and is found throughout India, Nepal, Bangladesh, and Myanmar. It is also cultivated as an ornamental plant in tropical and subtropical regions worldwide.
Traditional Uses: Parijat has been valued in traditional medicine for its analgesic, anti- inflammatory, anti-pyretic, and anti-rheumatic properties. The leaves, flowers, and seeds are used in various traditional remedies to relieve pain, reduce fever, treat arthritis, and improve digestion. Parijat is also used in aromatherapy and as a decorative plant in gardens and temples. **Phytochemical Constituents:** Parijat contains bioactive compounds such as nyctanthic acid, oleanolic acid, flavonoids, terpenoids, and tannins, which contribute to its medicinal properties.

Plan of work



Material and methods

Formulation table: -

Sr. No	Ingredients	F1	F2	**F3**
1	Bael Extract	15ml	16ml	**16ml**
2	Parijat Extract	10ml	8ml	**8ml**
3	Honey	12ml	24ml	**24ml**
4	Citric acid	0.15gm	0.2gm	**0.30gm**
5	Water	QS	QS	**QS**

- Note: - For 60 ml

Method: -

Collection and Authentication of Plant Materials:

- Collect mature and healthy dried leaves and fruits of Aegle marmelos (Bael) and Nyctanthesarbor- tristis (Parijat).
- Authenticate the plant materials by an expert botanist.
- Determine the appropriate concentration of each extract based on preliminary studies or literature review.
- Mix the concentrated extracts with suitable excipients such as sugar syrup, honey to formulate the herbal syrup.
- Ensure proper homogenization of the mixture.

Extraction of Plant Materials:

A Extract for bael:-

1.Take a fruit of Bael (and outer Coat was cut into small (Weigh aroung 250gm) removed pieces.
2.The pieces are added into 100ml of distilled water and apply heat slowly to get extract.
3.then cool extract and filtered it.

B. Extract of Parijat:

1. Take 10gm dried seeds of Parijat. Form coarse powder of its add 100ml of distilled waterc
2. Apply heat upto the extract get half of the original solution. the extract cool and filtered it.

Fig: Extraction Formulation of Herbal Syrup:

Formulation of syrup

1. From bael extractweigh accurately 16 ml of extract
2. Weigh accurately 8 ml of Parijat extract
3. Mix the both extracts and add 24 ml of honey and add 0.30 mg of citric acid as a buffering agent.
4. Apply heat if necessary to form uniform syrup
5. Volume makeup 60ml with distilled water
6. Fill into the amber colour bottle and store in cool place .

Fig: Formulated Syrup

Evaluation parameter

1. **The density determination process**
   1) Use nitric acid or chromic acid to thoroughly clean the specific gravity bottle.
   2) Use distilled water to rinse the bottle at least two or three times.
   3) Rinse the bottle with an organic solvent, such as acetone, if necessary, then pat dry.
   4) Use a capillary tube stopper (W1) to weigh an empty, dry bottle.
   5) Pour an unknown liquid into the bottle, cover it with a stopper, then use tissue paper to remove any extra liquid from the tube's outside.
   6) Use an analytical balance (w2) to weigh a container containing an unknown liquid.
   7) Determine the unknown liquid's weight in grams (w3).

   Density formula: Density of liquid being tested (syrup) W3/V is the weight of the liquid being tested divided by its volume.

2. **The steps involved in calculating specific gravity**
   1)Using chromic or nitric acid, carefully clean the specific gravity bottle.
   2) Rinse the bottle with pure water at least two or three times.
   3) If necessary, rinse the bottle with acetone or another organic solvent and pat dry.
   4)Utilizing a capillary tube stopper, weigh the empty, dry bottle.
   5) Pour distilled water into the container, cover with a stopper, and use tissue paper (w2) to empty the side tube of any extra liquid.
   6) Use the analytical balance to weigh the bottle with the cork and water.
   7) Follow steps 4 through 6 again, replenishing the water after emptying and drying the liquid under test.
   8) Using an analytical balance, weigh the container with the stopper and the liquid being tested (wa).

3. **Method for Calculating Viscosity**
   1) add warm chromic acid to thoroughly clean the Ostwald viscometer. If required, add an organic solvent like acetone.
   2) Position the viscometer vertically on an appropriate stand.
   3) Fill the dry viscometer with water until mark G is reached.
   4) Determine how many seconds it takes for water to go from point A to mark B.
   5) Repeat step 3 at least 3 times to obtained accurate reading.
   6) Rinse viscometer with test liquid and then fill it up to mark A, find out the time required for liquid to flow to mark B.
   7) Determination of densities of liquid as mentioned in density determination experiment.

4. **pH determination**: The pH determination of syrup by using two techniques.
   1) pH paper.

Therapeutic Actions:

Combined Therapeutic Actions of Bael (Aegle marmelos) and Parijat (Nyctanthesarbortristis):

- **Digestive Health:** Both Bael and Parijat exhibit carminative, digestive stimulant, and anti-diarrhoeal effects, making them beneficial in treating digestive disorders such as indigestion, diarrhoea, and dysentery.
- **Anti-inflammatory Activity:** The anti-inflammatory actions of Bael and Parijat are beneficial in alleviating inflammation associated with conditions like arthritis, gastritis, and respiratory ailments.
- **Immune Modulation:** Parijat demonstrates immunomodulatory properties, enhancing the body's natural defence mechanisms and potentially aiding in the management of autoimmune conditions and infections.
- **Antimicrobial Effects:** The antimicrobial properties of both herbs make them valuable in combating microbial infections, including bacterial, fungal, and parasitic infections.
- **Analgesic Properties:** Parijat exhibits analgesic effects, providing relief from pain associated with conditions like arthritis, headaches, and menstrual cramps.
- **Gastrointestinal Disorders:** Herbal syrups containing Bael and Parijat can be used to manage various gastrointestinal issues, including gastritis, irritable bowel syndrome, and peptic ulcers.
- **Natural and Holistic Approach**: Incorporating Bael and Parijat in herbal syrup aligns with the principles of traditional medicine, offering a natural and holistic approach to health and wellness. The synergy between these botanicals maximizes their therapeutic potential while minimizing side effects.

Advantages of Combining Bael (Aegle marmelos) and Parijat (Nyctanthesarbor-tristis) in Herbal Syrup:

- **Synergistic Therapeutic Effects:** By combining Bael and Parijat in herbal syrup, one can leverage their synergistic therapeutic actions. Their combined anti-inflammatory, antimicrobial, and digestive properties create a potent formulation that addresses multiple health concerns simultaneously.
- **Enhanced Digestive Support:** Bael is renowned for its digestive stimulant properties, while Parijat complements this action with its carminative effects. Together, they provide comprehensive support for digestive health, alleviating symptoms of indigestion, diarrhoea, and dysentery.

- **Comprehensive Immune Modulation:** Parijat's immunomodulatory properties, when combined with Bael's antimicrobial effects, offer a holistic approach to immunesupport. This combination strengthens the body's natural defences, making the herbal syrup beneficial for preventing and managing infections.
- **Improved Pain Relief:** Parijat's analgesic properties complement Bael's anti- inflammatory effects, providing enhanced pain relief. This combination is particularly advantageous for managing various types of pain, including arthritis, headaches, and menstrual cramps.
- **Versatile Respiratory Support:** Bael's anti-inflammatory properties help alleviate respiratory inflammation, while Parijat's antimicrobial effects target respiratory infections. This dual action makes the herbal syrup effective for relieving symptoms of cough, cold, bronchitis, and asthma.
- **Balanced Formulation:** Bael and Parijat offer a balanced combination of bioactive compounds, including flavonoids, alkaloids, and essential oils. This ensures that the herbal syrup provides comprehensive therapeutic benefits without overwhelming any particular physiological system.

Result and Discussion

Physicochemical Evaluation:

Table : result of evaluation test

Sr.No.	Test	F1	F2	F3
1.	Organoleptic Characters			
	Color	Light Brown	Light Brown	Light Brown
	Odor	Aromatic	Aromatic	Aromatic
	Test	Sweet	Sweet	Sweet
2.	pH Determination			
	1.pH paper	3	3	4
3.	Viscosity	1.8	1.9	2.0
4.	Specific gravity	1.38	1.35	1.36
5.	Density(g/cm^3)	1.36	1.36	1.35

conclusion

A thorough investigation was carried out in this study to create, assess, and pharmacologically examine a herbal syrup that included extracts of Parijat (Nyctanthesarbor-tristis) and Bael (Aegle marmelos). After careful testing and analysis, a number of important conclusions were drawn that provided insight into the syrup's safety profile and its therapeutic uses.

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