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Formulation And Evaluation of Herbal Cough Syrup Using Limonia Acidissima

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ABSTRACT

This exploration focuses on the development of an herbal cough saccharinity exercising Limonia acidissima, a medicinal factory known for its antitussive, expectorant, andanti-inflammatory parcels. The study aims to offer a safer, natural volition to conventional synthetic bathos, which frequently beget adverse goods. fresh natural constituents similaras gusto oil painting, honey, ajwain oil painting, and peppermint oil painting were incorporated to enhance remedial benefits. The birth of active ingredients from Limonia acidissima pulp was performed using the cold maceration fashion. Five saccharinity phrasings were prepared and estimated grounded on organoleptic parcels, pH, density, and stability. All phrasingsshowed respectablecolor, odor, and taste with pH situations within safe oral limits(5.8 – 6.6). density was suitable for liquid lozenge forms, and no physical changes were observed under accelerated stability conditions. The phytochemicals in Limonia acidissima — including flavonoids, saponins, and tannins contribute to its efficacity in managing cough. Honey and essential canvases handed fresh antimicrobial and soothing parcels. The saccharinitywas set up to be palatable, stable, and effective. This expression holds implicit for use in both pediatric and adult populations. unborn exploration should include clinical trials to assess efficacity in a real- world setting. The study demonstrates that traditional herbal constituents can be effectively exercisedfor ultramodern remedial applications.Further clinical trials are recommended to validate efficacity and safety in broader populations.

Keywords: *Limoniaacidissima, Antitussive, Expectoration, Phytochemicals.*

1. INTRODUCTION

Coughing is a normal physiological response that clears the respiratory system of annoyances, origins, and accumulated mucus. Although coughing is generally inoffensive and tone- limiting, habitual or patient coughing can be ansuggestion of underpinning respiratory diseases similar bronchitis, asthma, or infections, and it can have a negative influence on quality of life(1). Conventional curatives include synthetic antitussives, expectorants, and decongestants, which, although useful, are constantly linked with side goods, particularly in youths and the senior(2). Factory- grounded phrasings have gained fashionability in recent times because to their minimum side- effect biographies, low cost, and expansive traditional use(3). Herbal drug, also known as phytomedicine, is a centuries-old discipline that uses factory- deduced composites having medicinal characteristics(4).

Limonia acidissima(also known as wood apple) is one similar medicinal factory that has been employed in traditional systems similar as Ayurveda to treat respiratory and digestive issues(5). The factory contains several bioactive factors, including flavonoids, saponins, alkaloids, and tannins, numerous of which are honored to have antitussive, antibacterial, andanti-inflammatory parcels(6)(7). In addition, mixing this factory with other natural constituents like as honey(a demulcent and antioxidant)(8), gusto oil painting(anti-inflammatory)(9), ajwain oil painting(antimicrobial)(10), and peppermint oilpainting(coolingand seasoning)(11) may ameliorate the expression's medicinal eventuality.

The purpose of this study is to develop and test a polyherbal cough saccharinity with Limonia acidissima as the main active element and synergistic botanicals as a support. The thing is to estimate its physicochemical rates, stability, and implicit as a safe and effective relief for synthetic cough drugs.

2. DRUG PROFILE

- Common Names :woodapple, giant apple, monkey fruit, and curd fruit.
- Antonyms :Feroniaelephantum, Schinuslimonia, and Feronia limonia.
- Family :Rutaceae
- Part Used :Pulp, leaves, dinghy, seeds, fruit rind, and roots
- Habitat and Distribution

Indian tropical and tropical areas, including Maharashtra, Tamil Nadu, Gujarat, West Bengal, Rajasthan, and the Andaman and Nicobar islets. Prefers flaxento earthy soil with moderate downfall(11).

Figure 1: Tree Of LimoniaAcidissima Linn

- Kingdom :Plantae
- Division :Magnoliophyta
- Class :Magnoliopsida
- Order ;Sapindales
- Family;Rutaceae
- Genus Limonia
- Species L. acidissima

Phytochemical constituents

- Leaves lavonoids(imperatorin, bergapten), alkaloids, phenols, tannins, saponins, terpenoids, steroids(stigmasterol), glycosides, and goo(12)(13).
- Fruit alkaloids, saponins, cardiac glycosides, vitamins(A, B, C), minerals(Ca, Mg, Fe, Zn), and flavonoids(13).
- Seed Tannins, psoralen, orientin, flavonoids, fixed oils, proteins(13)(14).
- Dinghy oumarins(marmesin, bergapten), steroids, terpenoids, and alkaloids(13)(15).
- Root umbelliferone, xanthotoxin, and several coumarins(15).
- Pulp Carbohydrates, proteins, anthocyanins, goo, fixed oils, carvacrol, thymol(12)(14).

Figure 2: Fruit of limoniaacidissima linn.

Traditional Uses

- Expectorant, antitussive, and tangy
- Tonic for liver and lungs
- Treatment of respiratory diseases, sore throat, diarrhea, dysentery, and goo infection.
- habituated in Ayurveda for balancing the Vata and Pitta doshas(16)(17).

Pharmacological Conditioning

Antitussive and expectorant(18).

Antioxidant(19).

Antibacterial and antifungal(20).

Hepatoprotective(21).

Anti-inflammatory(19).

3. MATERIAL SYSTEM

1. Plant Material Collection and Authentication

Limonia acidissima pulp was collected and authenticated through a botany department(25). Other constituents, similaras gusto, peppermint, and ajwain canvases , were sourced from pukkasuppliers(26).

2. Birth system

Active compositeswere uprooted from dried Limonia pulp using cold maceration over 72 hours using distilled water(27)(28).

4. METHODOLOGY

Preparation of Plant Material

1.Cold maceration method

- Fresh Pulp Before using fresh pulp, wash the fruit precisely to excludeany contaminations.
- Drying To ameliorate shelf life and help microbial development, dry the pulp in a thin subcaste in the shade until crisp.
- Grinding Grind dry pulp into coarse greasepaint using a clean grinder.

2. Maceration Process

- Container Transfer 10 grams of ground pulp to anwatertight vessel.
- Solvent AdditionTo add detergent, fill the bottle with 50 mL of distilled water.
- Mixing To achieve invariant dissipation of pulp in water, roundly stir the admixture

- Sealing Seal securely to help impurity.
- Storage To cover the excerpt's integrity, store the jar in a cold wave, dark area, such a refrigerator.
- Duration impregnate the admixture for 24- 72 hours.

3. Filtration and attention

- Straining after maceration, strain through fine mesh or cheesecloth to remove solid factory debris.
- Pressing To remove any residual liquid, press the factory material.

Fig: 3 Maceration

Fig: 4: Filtration

FORMULATION TABLE

Sr.no	Ingredients	Quantity Taken				
		F1	F2	F3	F4	F5
1	Limoniaaccadismia (Water extract)	18ml	9ml	15ml	6ml	7ml
2	Honey	24ml	35ml	30ml	40ml	38ml
3	Ginger oil	3ml	2ml	1ml	1.5ml	2.5ml
4	Ajwain oil	2ml	**1**ml	1ml	1.5ml	2.5ml
5	Peppermint oil	2ml	2ml	1ml	1.5ml	2.5ml
6	Preservative (sodium benzoate)	0.5gm	1gm	0.5gm	0.1gm	O.2gm

Evaluation parameter

Colour examination

1. To estimate the color of herbal saccharinity, a 2 ml sample was put in a watch glass and tested against a white background using a white tube light.

2. The colorwas estimated using the naked eye.(18)

Odor examination

1. Conduct an odor assessment by smelling two milliliters of ready saccharinity.

2. Scent was detected.(18)

Taste examination

1. A bitsy quantum of finished saccharinity was tested to determine flavor.(18)

PH examination

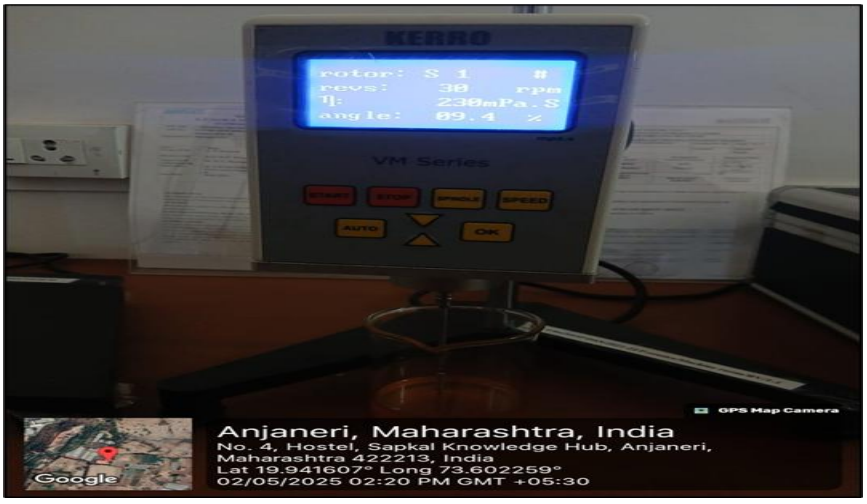
1.Glass electrode was cleaned and washed with disturbed water.
2. Insert the electrode into a PH 7 buffer solution and calibrate the PH meter to 7.

3.Distilled water was used to rinse and wash the electrode once it had been removed.

4.A solution of PH 4 buffer was used to put the electrode. Alter the value.
5. The pH was then measured when the electrode was placed into the syrup. [19-33]

VISCOSITY EXAMINATION:

- Turn on the viscometer and allow standing, must be auto zero, after the few seconds the screen appears which indicates 2 digits.
- Now press the key, the screen displays to remove spindle, after removing the spindle and pressing the key the instrument begins, it is auto zeroed.
- After approximately 15 see, the screen displays the instruction to replace spindle
- Attach the spindle to viscometer by screwing then on the lower shaft using left hand thread.
- Press the spindle key and up and down arrow keys. When the desired code is displayed release the arrow key.
- To select spindle, first press either up and down key which cause the area to show current speed, press the set speed key for adjusting the speed.
- Insert center of this spindle in the test material until the fluid level is at the immersion groove on the spindle shaft. Tilt the spindle slightly while immersing to avoid air entrapment.
- To measure high viscosity choose a small spindle and to slow speed if the chosen spindle/speed result in torque above 1 00% and then reduce the value.
- Allow time for the individual reading to stabilize, record the value.
- Press the motor on/off/escape key to turn off motor.



5. RESULT AND DISCUSSION

FORMULATION	COLOUR	ODOUR	TASTE
F1	Yellowish-brown	Sweet	Pungent
F2	Yellowish-brown	Sweet	Pungent
F3	Yellowish-brown	Sweet	Pungent
F4	Yellowish-brown	Sweet	Pungent
F5	Yellowish-brown	Sweet	Pungent

Fig: 5 Result for Physiochemical parameter

SR NO	PARAMETER	F1	F2	F3	F4	F5
1	pH	6	6.62	5.8	6.4	6.68
2	Viscosity	200 cp	350 cp	230 cp	300 cp	390 cp

Fig:Quantative test of herbal cough syrup

6. CONCLUSION

The present study successfully formulated a stable and effective herbal cough syrup incorporating *Limonia acidissima* along with honey, peppermint, ginger, and ajwain—each known for their traditional use in managing respiratory ailments. The syrup demonstrated acceptable physicochemical properties including appropriate pH, viscosity, and palatability. Evaluation results indicated promising antitussive and soothing effects, likely due to the synergistic action of the herbal ingredients. *Limonia acidissima* contributed antioxidant and antimicrobial properties, while honey acted as a natural demulcent, ginger and ajwain provided anti-inflammatory and bronchodilatory effects, and peppermint offered a cooling, decongestant action. Overall, the formulated syrup can serve as a natural, safe, and effective alternative to conventional cough treatments, supporting the continued integration of herbal medicines in respiratory care.

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