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Formulation And Evaluation Of Herbal Anti-Pyretic Syrup

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Abstract: Herbal syrup is prepared by adding concentrated decoction of herbs with either honey or sugar and we also use alcohol. The herbal syrup is made by decoction process. Mixing a decoction of herbs with sugar it helps to the formulation for thicken and preserve the formulation[1]. Most of herbal syrup was originally derived from plant herbal medicine refers to use of extract of leaves, fruit for medicinal purpose. The anti-pyretic syrup is used for fever management, offering relief from high temperatures while addressing inflammation and oxidative damage. The extraction of Ivy Gourd, Ginger, Tulsi is used for medicinal purpose. In this Ivy Gourd used as anti-pyretic, Ginger as anti-inflammatory and Tulsi as anti-oxidant while Fennel used as flavoring agent and black pepper used as preservative. Three formulation viz. F1, F2 and F3 were prepared with variation in quantity of ingredient like sugar, black pepper and final volume of syrup. All prepared formulation was by parameters like density, specific gravity, organoleptic characteristics. The results shown that herbal syrup formulation number F3 is more stable and elegant as compared to other formulation.

KEYWORDS: Herbal syrup, Ivy Gourd, Ginger, Tulsi, Fennel, Evaluation.

I. Introduction

Herbal syrup it is a defined as concentration decoction with Honey sugar or either some time use alcohol. That is a natural remedies using honey or sugar[2] as base along with medicinal herbs to provide many multiple benefits to body.

Herbal Syrup contain active ingredients dissolved in the base. Syrup is commonly used to deliver medicinal compounds, easy to consume from.

This are widely used in traditional systems of medicines like Ayurveda, Unani to treat various disease.

Characteristics of syrup

Syrups are sweet and viscous.

Syrup can be formulated with natural plant extract.

Quickly and easy absorption in the body due to liquid form.

Types:

1. Simple Syrup

2. Medicated Syrup

3. Flavored Syrup

4. Herbal Syrup

Formulated Syrup

Advantages:

No adverse or side effects

Easily Available

Good patient compliance

No harmless

Less expensive

Disadvantages

May not suitable for diabetic patients.

Shorter shelf life.

Challenging ton achieve precise dosing.

Interact with other medications.

About Diseases

Fever

A fever is when your body temperature rises above the normal range, usually above 100.4°F (38°C). It's a common response to infection, but it can also result from other causes such as inflammation, medications, or other medical conditions.

The average normal body temperature is typically around 98.6°F (37°C), but it can vary slightly from person to person.

Inflammation:

Inflammation is the body's natural response to injury, infection, or harmful stimuli, where the immune system activates to protect and heal the affected area. It typically causes redness, swelling, heat, pain, and sometimes loss of function in the affected tissue. It can be acute (short-term) or chronic (long-term), depending on the cause and duration of the irritation.

Oxidation

Oxidation is a chemical reaction where a substance loses electrons, often interacting with oxygen, leading to processes like rusting, aging, or cellular damage[3].

Anti-Pyretic Herbal Syrup

The anti-pyretic syrup is used is used for fever management, offering relief from high temperatures while addressing inflammation and oxidative damage. Provides safe and effective alternative to synthetic medicines. This herbal formulation combines the therapeutic properties of medicinal plants. This herbal syrup provides **fever management**, offering relief from high temperatures while simultaneously addressing inflammation and oxidative damage. It is suitable for individuals of all ages, including children and the elderly, offering a **gentle and effective** remedy for fevers caused by infections, viral illnesses, or inflammatory conditions. In addition to its fever-reducing properties, the syrup helps boost immunity system, improve digestion, and support overall health. As more people seek natural alternatives to conventional medicine, this herbal formulation stands out as a reliable and **holistic solution** that promotes health without the risk of synthetic drug side effects and adverse effects like liver damage.

Mechanism of Action

Ivy Gourd as anti-pyretic

Coccinia grandis exhibits antipyretic effects by inhibiting prostaglandin E2 synthesis in the hypothalamus, thus reducing fever. Its flavonoids and alkaloids suppress COX enzymes and inflammatory cytokines like IL-1β and TNF-α. These actions help modulate the body's thermoregulatory center. As a result, it lowers elevated body temperature during fever.[4]

Ginger as anti-inflammatory

Ginger's anti-inflammatory mechanism is primarily attributed to bioactive compounds like (6)-gingerol and (6)-shogaol. These compounds inhibit pro-inflammatory signaling pathways such as NF-κB and MAPK. They reduce the production of cytokines like TNF-α, IL-6, and IL-1β in immune cells. Ginger compounds also modulate oxidative stress by enhancing antioxidant enzyme activity[5].

Tulsi as anti-oxidant

Tulsi as anti-oxidant due to compounds like flavonoids, phenolic acids, and eugenol. These compounds scavenge free radicals and reduce oxidative stress by enhancing the activity of antioxidant enzymes such as superoxide dismutase (SOD) and catalase. Tulsi also helps in neutralizing reactive oxygen species (ROS), which contribute to cellular damage and inflammation. This antioxidant action protects cells from oxidative damage and supports overall immune health[6].

II. PLANT PROFILE AND INGRIDIENTS

Leaves of Ivy Gourd

Ginger

Leaves of Tulsi

Black Pepper

Fennel

Table No:- 1

Sr No.	Plant Name	Biological Source	Family	Role of ingredient
1.	Ivy Gourd	Leaves of Coccinia grandis	Cucurbitaceae	Anti-pyretic
2.	Ginger	Rhizome (underground stem) of the plant Zingiber officinale	Zingiberaceae	Anri-inflammatory
3.	Tulsi	Fresh and dried leaves of Ocimum sanctum Linn	Lamiaceae	Anti-oxidant
4.	Black pepper	Dried, matured fruits of Piper nigrum	Piperaceae	Preservative
5.	Fennel	Dried ripe fruits of *Foeniculum vulgare*	Apiaceae	Flavoring Agent

Ingredients

Honey

Role: Base, Viscosity modifier

Sugar

Role: Sweeting agent, Preservative

Sweetening agent[7]

III. METHOD OF PREPARATION

1.Collection

Leaves of Ivy Gourd is collected from Saroda village of Balasinor, Ginger and Tulsi leaves are collected from Karanpur village of Balasinor, Black pepper and Fennel collected from local market of Balasinor.

2.Extraction Method of Herbs

i. Ivy Gourd

33gm of ivy gourd leaves taken, then cut it into small pieces, then obtained pieces were added into 100ml of water then heated slowly to get extract. The extract got was filtered and then cooled. From whole extract 25ml of solution is measured.

ii. Ginger

About 15gm ginger was cut into small piece added to 60 ml of water then heated slowly to get extract. The extract got was filtered and then cooled. From whole extract 15ml of solution is measured.

iii. Tulsi

About 25 gm of Tulsi leaves added into 100 ml of water, heated slowly to get extract. The extract got was filtered and then cool. From whole extract 15 ml of solution is measured

iv. Black Pepper

About 5gm of Black pepper added in 30ml of water, heated slowly to get extract. The extract got was filtered and then cool. From whole extract 7 ml of solution is measured[8].

v. Fennel

About 5gm of fennel[9] added in 30ml of water, heated slowly to get extract. The extract got was filtered and then cool. From whole extract 7 ml of solution is measured.

IV. Formula for Herbal Syrup

Table No:- 2

Sr. No	Ingredients	Quantity		
		F1	F2	F3
1.	Ivy Gourd	22 ml	24 ml	**25 ml**
2.	Ginger	16 ml	20 ml	**16 ml**
3.	Tulsi	18 ml	14 ml	**16 ml**
4.	Honey	20 ml	17 ml	**19 ml**
5.	Black Pepper	8 ml	9 ml	**7 ml**
6.	Fennel	6 ml	7 ml	**7 ml**
7.	Sugar	10 ml	9 ml	**10 ml**

Procedure

After extraction all extracts are combined and that was taken in beaker.

⬇

Then Weight accurately 19ml of honey.

⬇

Boil 5gm of sugar in water then add honey in sugar solution stir well sugar honey mixture.

⬇

All extract are mixed with sugar[10] honey mixture each other and 100ml of syrup was obtained.

⬇

This obtained syrup was transferred to amber color bottle, close it tightly and place it into cool place.

V. EVALUATION

1. Organoleptic evaluation:

The organoleptic evaluation includes:

Color: Yellowish brown

Odor: Aromatic

Taste: Sweet

Appearance : Clear

2. Specific Gravity

Method

1) Clean the specific gravity bottle with acetone/nitric acid.

2) Rinse the bottle at least two to three times with purified water.

3) Take weight of empty dry bottle with capillary stopper.(w_1)

4) Fill the bottle with distilled water and place stopper; wipe out excess liquid from out side of bottle by tissue paper.

5) Weight bottle with stopper and distilled water on analytical balance (w_2).

6) Repeat the procedure for liquid under test(syrup) by replacing the water after emptying and drying the bottle.

7) Weight bottle with stopper and syrup on analytical balance (w_3).

Calculation Specific Gravity

W_1 = Weight of specific gravity bottle = **32.23 g**

W_2 = Weight of specific gravity bottle + distilled water = **81.65 g**

W_3 = Weight of specific gravity bottle + syrup = **91.83 g**

Mass of syrup = W_3 - W_1
= 91.83 - 32.23
= **59.6 g**

Mass of water = W_2 - W_1
= 81.65 - 32.23
= **49.42 g**

Specific Gravity = Mass of syrup / Mass of water

= 59.6 / 49.42
= **1.20 g/mL**

Specific gravity bottle

3. Density

Density was calculated by the value of specific gravity multiply with density of std. solution.

Density= Specific Gravity × Density of water =1.20×0.997
= 1.196 g/mL

4. Viscosity

Method

1) Thoroughly clean the U tube viscometer with acetone.

2) The viscometer mounted in vertical position on a stand.

3) Fill water in dry viscometer up to mark G.

4) Count time required for water to flow from mark A to mark B in second.

5) Repeat step 3 at least 2-3 times to obtained accurate reading.

6) Rinse viscometer with syrup 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 syrup.

Calculation Viscosity

$\eta_1 = \eta_2 \times (t_1 \times t_2) \times (\rho_1 \times \rho_2)$

η_1= Viscosity of the herbal syrup

t_1 = Flow time of herbal syrup=**52.08 s**

t_2 = Flow time of water=**7.5 s**

ρ_1 = Density of herbal syrup=**1.196**

ρ_2 = Density of water =**1.15**

$\eta_1 = 0.89 \times (52.08 \times 7.5) \times (1.196 \times 1.00)$

$= 0.89 \times 1.6827 \times 1.196$

$=$ **1.79 cP**

U Tube Viscometer

5. pH

Method:

1) pH checked by pH meter.

2)Take 10 ml of herbal syrup and placed electrode of pH meter in this.

3) Checked pH on the display on pH meter.

4)The elevated pH is measured.

Solutions: Stock solution: Acetic acid 0.2molar: Dissolve 1.2ml of glacial acetic acid in 100ml of distilled water in a volumetric flask. Molecular weight of glacial acetic acid is 60.605; weight per ml is 1.050. a) Buffer solution: Dissolve 10.21 gram of potassium hydrogen phthalate in sufficient carbon dioxide free water to produce 1000ml[11].

pH meter

VI. RESULT

Sr. no.	Parameter	F1	F2	**F3**
1	Color	Yellowish Brown	Yellowish Brown	**Yellowish Brown**
2	Odor	Aromatic	Aromatic	**Aromatic**
3	Taste	Sweet	Bitter	**Sweet**
4	Appearance	Cloudy	Slightly Cloudy	**Clear**
5	Specific Gravity	1.18 g/mL	1.14 g/mL	**1.20 g/mL**
6	Density	1.172 g/mL	1.131 g/mL	**1.196 g/mL**
7	pH	6	5.45	**5.84**
8	Viscosity	1.90 cP	1.74 cP	**1.79 cP**

VII. DISCUSSION

The prepared herbal syrup is having anti-pyretic activity. The physical evaluation confirms that the herbal syrup exhibits the expected color and aroma. The pH of 5.84 indicates a slightly acidic nature, which is typical for many herbal preparations. The viscosity of 1.79 cp suggests a moderate thickness, contributing to the syrup's ease of administration. Additionally, the specific gravity of 1.20 g/ml signifies the density of the syrup compared to water. Overall, these results indicate that the herbal syrup meets the required quality parameters for use as a natural remedy for fever relief.

VIII. CONCLUSION

This research focuses on formulating and evaluating a herbal anti-pyretic syrup, comprising natural ingredients like ivy gourd, ginger, black pepper, tulsi and honey as a base. The present study demonstrates the efficacy of herbal remedies in treating fever. It is suitable for individuals of all ages, including children and the elderly, offering a gentle and effective remedy for fevers caused by infections, viral illnesses, or inflammatory conditions. In today's era the herbal products are the symbol of safety in contrast to the synthetic drugs which are regarded as unsafe to human being and environment. Although, herbs had been priced for their medicinal, flavoring and aromatic qualities for centuries. It's time to promote them globally.

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