



Formulation and Evaluation of Herbal Immunity Booster Syrup using Moringa Oleifera and Lemon

Assistant professor

1) Reena D Kokate

student

2) Gayatri A patil

3) Tejaswini B patil

4) Harshal m pagar

5) mayuri A pagar

6) Siddhesh G pagar

7) shreyash s bacchav

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ABSTRACT:

The present study focuses on the formulation and evaluation of a herbal immunity booster syrup using *Moringa oleifera* leaves and lemon juice. Herbal medicines are widely used because they are natural, safe, economical, and associated with fewer side effects compared to synthetic products. *Moringa oleifera* is known as a highly nutritious medicinal plant rich in vitamins, minerals, proteins, flavonoids, tannins, polyphenols, and antioxidants, which help improve immunity and overall health. Lemon is an excellent source of Vitamin C and provides antioxidant and immune-enhancing properties. Honey was used as a natural sweetening agent and sodium benzoate as a preservative in the formulation.(15)

The syrup was prepared by hydroalcoholic extraction of *Moringa oleifera* leaves followed by formulation using suitable excipients. The prepared syrup was evaluated for various physicochemical parameters such as color, odour, taste, pH, density, viscosity, and stability. The formulation showed acceptable organoleptic properties with a yellowish-brown color, characteristic odour, sweet and slightly sour taste, pH in the range of 5.56–5.84, and viscosity between 3.2–3.4 cP. Stability studies indicated that the syrup remained stable in closed containers.(11)

Phytochemical screening confirmed the presence of alkaloids, flavonoids, tannins, phenolic compounds, vitamins, and minerals, which contribute to antioxidant, antimicrobial, and immune-boosting activities. The study concludes that the formulated herbal syrup possesses good physicochemical properties, acceptable stability, and potential health benefits. Therefore, Moringa oleifera and lemon-based herbal syrup can be considered a safe, effective, and economical natural immunity booster for daily health support.(6)

Keywords: *Moringaoleifera*, Herbalsyrup, Immunitybooster, Antioxidants, Flavonoids, Vitamin C, Phytochemicals, Antimicrobial activity, Herbal formulation, Stability study



INTRODUCTION.

Traditional medicine, as defined by the World Health Organization, includes ancient healing practices that existed long before the development of modern medicine and are still widely used today. Herbal medicines are an important part of traditional medicine and mainly rely on medicinal plants for the prevention and treatment of diseases. Since ancient times, countries such as India, China, Egypt, Greece, and Rome have used herbal remedies for maintaining health and treating illnesses.

Moringa is a well-known medicinal plant belonging to the family Moringaceae, which consists of 13 different species mainly found in Africa, Arabia, and India. Among these, *Moringa oleifera* and *Moringa stenopetala* are the most important for nutritional and medicinal purposes. *Moringa oleifera*, commonly called the Indian Moringa, originates from India, while *Moringa stenopetala* is native to East Africa, especially Ethiopia and Kenya. Both species are popularly known as the “Miracle Tree” because of their multiple health benefits and wide range of uses. The seeds of Moringa contain a high amount of edible oil rich in polyunsaturated fatty acids, especially oleic acid, making it comparable to olive oil. The remaining seed material after oil extraction is traditionally used for water purification because of its natural flocculating properties. The leaves are highly nutritious and commonly consumed as food in countries like India and Ethiopia. In Southern Ethiopia, Moringa leaves are eaten like vegetables and serve as an important source of nutrition for many families.

Apart from its nutritional value, almost every part of the Moringa plant has been traditionally used in medicine. It is commonly used for the management of infections, malaria, diabetes, hypertension, and other metabolic disorders. Due to its rich content of vitamins, minerals, antioxidants, and bioactive compounds, Moringa leaves are now widely marketed as herbal teas and dietary supplements.

Because of its natural therapeutic properties, nutritional richness, safety, and medicinal effectiveness, *Moringa oleifera* is considered a valuable herbal ingredient for the development of herbal immunity booster syrup formulations.(1)

❖ Why Moringa oleifera is Selected for Immunity Booster Syrup :

Moringa oleifera is selected for immunity booster syrup because it is a highly nutritious medicinal plant with strong antioxidant, anti-inflammatory, and immune-boosting properties. It contains important nutrients like Vitamin C, Vitamin A, iron, calcium, potassium, and proteins that help improve body immunity and overall health.

Moringa also contains antioxidants such as flavonoids, quercetin, and polyphenols, which protect the body from free radical damage and reduce oxidative stress. It helps the body fight infections, weakness, cold, and cough naturally.

It is widely used in traditional medicine systems like Ayurveda, is easily available in India, low in cost, and suitable for syrup formulation with honey and lemon for better taste and acceptability.(7)

❖ Need of Study - Moringa oleifera Immunity Booster Syrup:

1. Increasing Demand for Herbal Products:

People prefer herbal medicines because they are natural, safer, and have fewer side effects. Moringa oleifera is rich in nutrients and useful for immunity boosting.

2. Side Effects of Synthetic Products:

Synthetic immunity boosters may cause side effects like nausea, allergy, and stomach irritation. Herbal products can be a safer alternative.

3. Nutritional and Antioxidant Benefits:

Moringa contains vitamins, minerals, and antioxidants that help improve immunity. Lemon is rich in vitamin C and supports immune function.

4. Convenient Dosage Form:

Syrup is easy to consume, improves taste, and is suitable for children and adults. Therefore, moringa-lemon syrup can be useful for daily health support.(4)



AIM AND OBJECTIVE

Aim : Formulation and evaluation of herbal immunity booster syrup using *moringa oleifera* and lemon.

Objective:

1. To prepare herbal immunity booster syrup using *Moringa oleifera*.
2. To improve body immunity naturally.
3. To evaluate the syrup for pH, viscosity, and appearance.
4. To make a safe and effective herbal formulation.
5. To provide nutritional and health benefits using Moringa.

DRUG PROFILE

❖ *MORINGA OLEIFERA* :



Fig.No 1: *Moringa oleifera*.

- **Synonyms :** Guilandina moringa, Hyperanthera moringa, Shevaga
- **Biological source :** it can consist of dried long slender, triangular seed-pods of *moringa oleifera*.
- **Family:** *Moringaceae*.
- **Chemical Constituents:**

Moringa oleifera contains various chemical constituents, such as alkaloids, flavonoids, phenol stannin, terpenes, proteins, minerals, glycosides, vitamins.

Some of the major compounds found in drumstick leaves are vitamins, proteins, mineral.

- **Uses:**

- i. Used as an immunity booster.
- ii. Rich source of vitamins and minerals.
- iii. Acts as antioxidant and anti-inflammatory agent.
- iv. Helps in anemia and malnutrition.(2)

❖ CITRUS (LEMON):



Fig.No 2:Citrus

- **Synonyms:**Lemon,nimbu,citrus fruit.
- **Biological Source:**Lemon consists of the fresh or dried fruit of Citrus limon (family Rutaceae).
- **Chemical Constituents:**Citric acid,Vitamin-C(Ascorbic acid),Flavonoids,Essential oils (Limonene).
- **Uses:**
 - i. Antiscorbutic (Vitamin C source).
 - ii. Digestive aid.
 - iii. Flavoring agent.
 - iv. Antioxidant.(2)

❖ HONEY:



Fig. No 3: Honey

- **Synonym:**Madhu,Bee hony,Natural hony
- **Biological source:** Honey is a sweet viscous substance produced by honey bees (Apis species) from the nectar of flowers.
- **Family:**Apidae.
- **Chemical Constituents:**Fructose,Glucose,Sucrose,Enzymes(Invertase,Diastase),Vitamins ,Minerals,Organic acids,Amino acids.
- **Uses:**
 - i. Natural sweetening agent
 - ii. Used in cough syrups
 - iii. Wound healing agent
 - iv. Antioxidant and antimicrobial uses
 - v. Used in cosmetics and herbal preparations.

MATERIAL AND METHOD

COLLECTION, AUTHENTICATION & PREPARATION OF *MORINGA OLEIFERA*

LEAVES:

❖ Collection:

A fresh whole plant *Moringaoleifera* was collected from area of nashik district , Maharashtra, India.

Preparation of crude drug for extraction:-

The collected leaves was washed with fresh water and dried shade for 3-4days. The dried plant leaves were coarsely powdered with the help of mechanical grinder. The powder was stored in an airtight container for further use.



Fig. No 4: Dried leaves of *Moringa Oleifera*.



Fig. No 5: Dried Powder Of Moringa Leaves

❖ Extraction of plant material:

Extraction of *Moringa oleifera* Leaves by Hydroalcoholic Maceration. Fresh leaves of *Moringa oleifera* (sehjan) were collected from the in-house botanical garden and washed thoroughly with water to remove dust and impurities. The leaves were shade-dried for 3-4 days (covered with muslin cloth) until completely free from moisture. The dried leaves were coarsely powdered using a grinder. About 5 g of powdered drug was taken in a clean, dry conical flask. A hydroalcoholic solvent (Water : Ethanol = 70 : 30 v/v, approx. 125 mL) was added to completely immerse the powder. The mixture was kept for maceration for 48 hours at room temperature with occasional stirring/shaking to ensure proper extraction.

After maceration, the mixture was filtered through muslin cloth followed by filter paper to obtain a clear filtrate.







Fig. No 6: Maceration Extraction Process.

❖ **PRE-FORMULATION STUDY:**

Pre-formulation study is the investigation of physical and chemical properties of a drug substance alone and when combined with excipients. It is the first step in the rational development of dosage forms.(12)

❖ **PHYTOCHEMICAL TEST FOR EXTRACTION:**

<p>Dragendroff's Test.</p>		<p>Reagent :Dragendroff's reagent + Extraction. Procedure:2-3 ml filtrate add few drops dragendroff's reagent. Positive result:Orange brown ppt is presence of alkaloids .</p>
<p>Hager's Test.</p>		<p>Reagent:Hager's reagent+Extraction Procedure:- 2-3 ml filtrate add Few drops of hagers reagent. Positive result:- yellow ppt is presence of alkaloids .</p>
<p>Flavonoid Test. [Sulfuric acid test.]</p>		<p>Reagent:Sulfuric acid+Extraction. Procedure:Addition of sulfuric acid [60% or 80%]flavones and flavono dissolve on it. Positive result:A deep yellow colour is presence of flavanoids</p>
<p>Tannins Test. [Lead acetate test]</p>		<p>Reagent :Alcoholic extract +Lead acetate. Procedure:2-3 ml aqueous or alcoholic extract add Few drops of lead acetate solution. Positive result:white ppt is presence of tanins .</p>




<p>Tannins test. [Phenolic acid Test.]</p>		<p>Reagent :Acetic acid. Procedure:2-3 ml Acetic acid solution add Few drops of lead acetate solution. Positive result:Red ppt is presence of tanins .</p>
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Table No 1: Phytochemical test for extraction.

METHODS

❖ Method of preparation of syrup:

1. Solution method with heat.
2. Solution by agitation method.
3. Addition of sucrose to a liquid medication or flavoured liquid percolation.
4. Percolation method.

1. Solution Method with Heat

This method is suitable when ingredients are non-volatile and heat-stable. Purified water is heated to 80–85°C and then removed from the heat source.

The required quantity of honey (as a sucrose alternative) is added with continuous stirring until dissolved. Other heat-stable ingredients are added to the hot mixture.

The solution is allowed to cool. Finally, the volume is adjusted using purified water.

2. Solution by Agitation Method (Without Heat)

In this method, honey and other ingredients are dissolved in purified water by continuous stirring. No heat is used, making it suitable for heat-sensitive substances.

3. Addition of Sweetening Agent to Medicated Liquid

This method is commonly used with herbal extracts such as drumstick.

The medicated liquid (e.g., drumstick extract + lemon juice instead of tamarind) is prepared first. Honey is added to the liquid and mixed thoroughly.

Sodium benzoate (instead of methyl paraben) is added as a preservative. The mixture is stirred until uniform syrup consistency is obtained.

4. Percolation Method (Cold Process)

Honey is placed in a suitable percolator. Purified water is allowed to pass slowly through it. The neck of the percolator is packed with cotton to control flow.

The rate of percolation is adjusted to ensure proper dissolution and uniform syrup formation. Procedure for Formulation of Syrup (25 ml Batch)

Take a beaker and add 0.036 ml of honey along with about 15 ml of distilled water. Heat the mixture on a water bath at 60°C with continuous stirring until it becomes uniform. Allow the solution to cool. Add 0.012 ml of Moringa (drumstick) extract and

0.012 ml of lemon juice with continuous stirring using a magnetic stirrer. Add 0.02 g (20 mg) of sodium benzoate as a preservative and mix thoroughly until dissolved.

Add xanthan gum gradually with continuous stirring to obtain the required viscosity. (10)

Make up the final volume to 25 ml with distilled water. Transfer the prepared syrup into an amber-colored bottle and store properly. (14)



❖ PROCEDURE FOR FORMULATION OF SYRUP :

1. Take a beaker and add 0.036 ml of honey along with about 15 ml of distilled water.
2. Heat the mixture on a water bath at 60°C with continuous stirring until it becomes uniform.
3. Allow the solution to cool.
4. Add 0.012 ml of Moringa (drumstick) extract and 0.012 ml of lemon juice with continuous stirring using a magnetic stirrer.
5. Add 0.02 g (20 mg) of sodium benzoate as a preservative and mix thoroughly until dissolved.
6. Add xanthan gum gradually with continuous stirring to obtain the required viscosity.
7. Make up the final volume to 25 ml with distilled water.
8. Transfer the prepared syrup into an amber-colored bottle and store properly.

SR.NO	INGREDIENT	Formula	ROLE
1.	<i>Moringa oleifera</i>	0.03ml	API
2.	Lemon Juice	0.03ml	API
3.	Honey	0.09ml	Sweeting agent
4.	Sodium Benzoate	0.05gm	preservative
5.	Xanthan Gum	0.01 gm	Viscosity agent
6	Distilled water	q.s to 25ml	Vehical

Table No 2: Formulation Table.

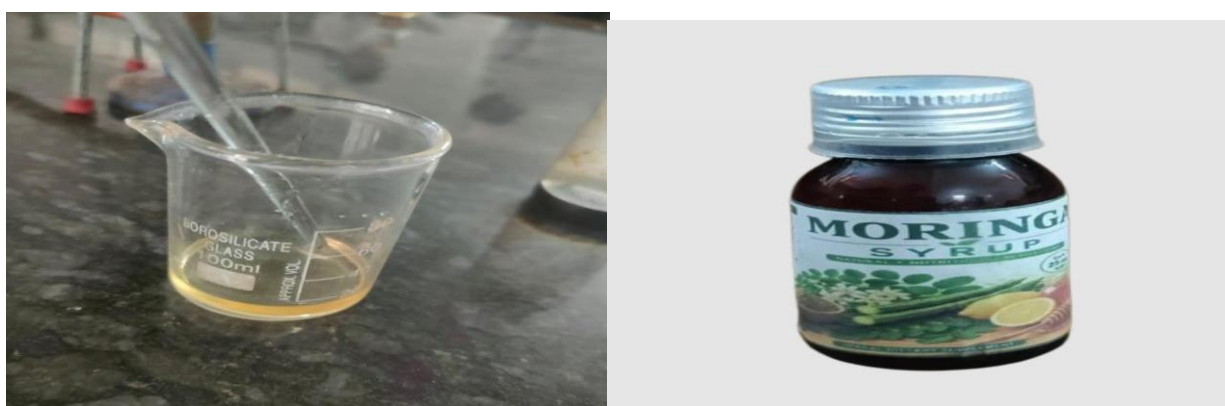


Fig. No 7: Moringa syrup



EVALUATION OF SYRUP

1. pH Evaluation:

The pH of the formulated *Moringa oleifera* syrup was found to be 5.84, indicating that the syrup is slightly acidic and suitable for oral herbal formulation.



Fig. No 8: pH meter

2. Density:

Density is an important property because it helps to determine whether a substance will float or sink in a liquid

Mass

Formula $\rho = \frac{\text{Mass}}{\text{Volume}}$

Density of syrup = 1.99g/ml



Fig. No 9: density Measure



3. Viscosity:

The viscosity of the formulated *Moringa oleifera* syrup was found to be 3.4 cP using an Ostwald viscometer.(11)

Fig. No 10:Viscosity measure



4. Stability Study:

The syrup should be protected from sunlight and stored in a cool and dry place.

RESULT AND DISCUSSION

RESULT:

In the present research work, the herbal immunity booster syrup was successfully formulated using suitable active ingredients and excipients. The prepared syrup was evaluated for various physicochemical parameters according to the standard procedures described in the methodology chapter. The obtained results are presented and discussed in this section.(9)

❖ *Moringa oleifera* leaves extract:

SR.NO	TESTS GRADE	OBSERVATION	STANDARD G/100	REMARK
1	Discription	Brown colour	Black colour	Passes the test
2	Odourand test	Aromatic	Aromatic	Passes the test
3	Solubility	Miscible	Miscible	Passes the test
4	Nature	liquid	Semisolid	Passes the test

Table No 3 *Moringa Oleifera* Leaves extract



❖ LEMON JUICE:

SR.NO	TEST	OBSERVATION	STANDARD(G/100)	REMARK
1	Description	Light yellow colour	Light yellow colour	Passes the Test
2	Odour and taste	Characteristic citrus odour and sour taste	Characteristic citrus odour and sour taste	Passes the Test
3	Solubility	Miscible	Miscible	Passes the Test
4	Nature	Liquid	Liquid	Passes the Test

Table No 4:Lemon Juice.

❖ Honey Composition:

Honey composition	Specification
Hydroxymethylfurfural (HMF)	Not more than 60mg/kg
Total reducing sugar	Not less than 60%
Fructose	27-44.3%
Sucrose	22-40.7%
Glucose	Not more than 5%
Fructose/Glucose ratio	Not less than 0.95%
Heavy metal and other additives	Absent or not exceed
pH	3.24-6.1
Pollen	Present

Table No 5: Honey composition.

DISCUSSION :

Moringa Oleifera leaves are an excellent source of nutrition and natural.



❖ Evaluation Parameter of syrup:

- **Organoleptic evaluation:**

SR.NO	Physiological Appearance	Observation
1	Colour	Yellowish colour
2	Odour	Characteristic
3	Taste	Sweet with slight sourness
4	Homogeneity	Good

Table No 6: Organoleptic evaluation (9) (6)

- **pH and Viscosity:**

The pH of syrup formulation of select batch was measured by using digital pH meter in arrange 6 Viscosity of formulation, where measured by Ostwald viscometer viscosity of syrup are show in table the formulation F1, F2 batch show the viscosity between 3.2 to 3.4¹. (11)

FORMULATION	VISCOSITY(Cp)	pH
F1	3.2	5.56
F2	3.4	5.84

Table No 7: pH and Viscosity

- **Stability Study:**

Open Container	Close Container
Not stable	Stable

Table No 8: Stability study

One month stability study was done with an open an close container and it show that open container containing syrup are not stable. Close container syrup was stable . (15)



CONCLUSION:

The present research successfully formulated and evaluated a herbal immunity booster syrup containing *Moringa oleifera* leaves and lemon juice. The prepared syrup showed good physicochemical properties, acceptable taste, suitable viscosity, and stability for oral use. Phytochemical studies confirmed the presence of important bioactive constituents such as flavonoids, tannins, alkaloids, phenolic compounds, vitamins, and antioxidants, which contribute to immune-enhancing and health-supporting activities.

The combination of *Moringa oleifera*, lemon juice, and honey provides a natural, safe, and cost-effective herbal formulation with antioxidant and antimicrobial potential. The syrup may help improve immunity, nutritional status, stamina, and resistance against infections with minimal side effects compared to synthetic immunity boosters.

Therefore, the formulated herbal syrup can be considered a promising natural immunity booster suitable for daily health support in both children and adults. Further pharmacological and clinical studies can be carried out to establish its therapeutic efficacy and long-term safety.(1) (

LABELLED OF CONTAINER

COMPOSITION (Each 25 ml)	
Moringa oleifera (Leaf Powder)	0.030 gm
Lemon juice	0.030 ml
Honey	0.090 ml
Sodium benzoate	0.050 ml
Xanthan gum	0.01 gm
Distilled water	qs to 25 ml

MORINGA SYRUP

NATURAL • NUTRITIOUS • REVITALIZING

Each 25 ml

STORAGE CONDITION
Store in a cool, dry place. Protect from direct sunlight. Do not refrigerate.

DOSAGE
As directed by the physician.

WARNING
Keep out of reach of children. Do not exceed the recommended dose. Not to be used by pregnant or lactating women without medical advice.

USES

- Supports immunity and overall wellness
- Helps in improving energy and stamina
- Rich in antioxidants and essential nutrients
- Supports digestion and detoxification

Mfg Date : 14 April 2026
Exp Date : 05 October 2027
Mfg By : Swami Institute Of Pharmacy
College Abhona Tal Katwan
Dist Nashik

HERBAL DIETARY SUPPLEMENT

REFERENCES.

1. Nadkarni KM. Indian Materia Medica. 3rd ed. Mumbai: Popular Prakashan; 2007.
2. Kokate CK, Purohit AP, Gokhale SB. Textbook of Pharmacognosy. 56th ed. Pune: Nirali Prakashan; 2021.
3. Evans WC. Trease and Evans Pharmacognosy. 16th ed. London: Saunders Elsevier; 2009.
4. Fahey JW. *Moringa oleifera*: A review of the medical evidence for its nutritional, therapeutic and prophylactic properties. *Trees for Life Journal*. 2005;1(5):1-15.
5. Fuglie LJ. *The Miracle Tree: The Multiple Attributes of Moringa*. Dakar, Senegal: Church World Service; 2001.
6. World Health Organization. *Quality Control Methods for Medicinal Plant Materials*. Geneva: WHO; 1998.



7. World Health Organization. WHO Traditional Medicine Strategy 2014–2023. Geneva: WHO; 2013.
8. Kokate CK. Practical Pharmacognosy. 5th ed. Pune: Vallabh Prakashan; 2010.
9. Remington JP. Remington: The Science and Practice of Pharmacy. 21st ed. Philadelphia: Lippincott Williams & Wilkins; 2005.
10. Rowe RC, Sheskey PJ, Quinn ME. Handbook of Pharmaceutical Excipients. 6th ed. London: Pharmaceutical Press; 2009.
11. Subrahmanyam CVS. Textbook of Physical Pharmaceutics. 3rd ed. Delhi: Vallabh Prakashan; 2017.
12. Shah B, Seth AK. Textbook of Pharmacognosy and Phytochemistry. 2nd ed. New Delhi: Elsevier; 2010.
13. CSIR. The Wealth of India: Raw Materials. New Delhi: Council of Scientific and Industrial Research; 2003.
14. Rawlins EA. Bentley's Textbook of Pharmaceutics. 8th ed. London: Bailliere Tindall; 2008.
15. Agrawal SS, Paridhavi M. Herbal Drug Technology. Hyderabad: Universities Press; 2007.