

Development, Formulation and Evaluation of *Moringa oleifera* Syrup

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Abstract:

Objective: The study focuses on formulation and evaluation of five different formulations of herbal syrup. **Method:** The herbal syrup was formulated by using *Moringa oleifera* leaf extract as main ingredient. Honey and glycerin were added. **Results:** The prepared herbal syrups were carefully evaluated to ensure its quality, stability and suitability for therapeutic use. Several physicochemical parameters such as color, odor, taste, pH, specific gravity, and stability were assessed. **Conclusion:** These characteristics gave valuable insight into the overall acceptability and consistency of the product.

Keywords: syrup, moringa oleifera, honey, glycerin

I. INTRODUCTION:

Moringa oleifera, the “miracle tree”, thrives globally in almost all tropical and subtropical regions, but it is believed to be native to Afghanistan, Bangladesh, India, and Pakistan.^[1] Herbal syrups are liquid dosage forms containing herbal extracts in a sweetened vehicle, making them convenient, palatable, and suitable for both pediatric and geriatric patients.^[2] Syrup formulations provide improved patient compliance, easy administration, and better stability of herbal ingredients.^[2] Natural sweeteners such as honey and glycerin can be used to enhance taste while contributing to the stability and viscosity of the formulation.^[3] Pharmaceutical syrups are concentrated aqueous solutions containing 60% to 85% sugars (such as sucrose) or sugar substitutes, combined with APIs, preservatives and flavorings. They mask unpleasant tastes and are ideal for pediatric or geriatric patients, providing smooth, easily swallowed oral delivery.^[4] The medicinal properties of *Moringa oleifera* are reported that the leaves possess antihyperglycemic, anti-inflammatory, antimicrobial, and antioxidant activities.^[5]

II. MATERIALS AND METHODS:

2.1: Collection of plant materials: Fresh *Moringa oleifera* leaves were collected from healthy plants available in the local area / college medicinal plant garden. The collected leaves were washed thoroughly with clean water to remove dust and other impurities, shade-dried to remove surface moisture, and used for the preparation of the methanolic extract.

Honey and glycerin used in the formulation were purchased from the local market. All other chemicals and reagents used in the study were of analytical grade and procured from the Department of Pharmacy laboratory.

2.2. Formulation of herbal syrup: Different concentrations of *Moringa oleifera* methanolic extract was taken in a clean beaker. 5 mL of honey was added and mixed thoroughly. 5 mL of glycerin was added and stirred continuously until homogeneous syrup was obtained. The volume was made up to 100 mL. The prepared syrup was transferred into a clean amber-colored bottle, labeled, and stored in a cool and dry place.

III. RESULTS AND DISCUSSION

III.1. Physical Evaluation: The physical characteristics of herbal syrup compositions such as color, texture, and odor, were assessed. The physical qualities of all syrup formulas were nearly identical, including their light brown color, distinct smell with characteristic odour and sweet taste.

III.2. pH: 10% herbal syrup was prepared in distilled water and pH was measured using a digital pH meter. The formulation shows a near-neutral pH indicating suitability for oral consumption.

III.3. Foam test (Saponins): 0.5 mL of syrup was taken dispersed in 25 ml distilled water. Then, transferred it into 100ml measuring cylinder; volume was make up to 50 ml with water. 25 strokes were given and stand till aqueous volume measured up to 50 ml and measured the foam height, above the aqueous volume were measured.

III.4. Mayer's test (Alkaloids): To 2–3 ml syrup extract Mayer's reagent was added and mixed gently. The appearance of cream yellow precipitate indicates the presence of alkaloids.

III.5. Alkaline reagent test: 2 ml extract was taken and few drops Sodium hydroxide was added. Intense yellow color appears on addition of dilute Hydrochloric acid. Formation of white precipitate indicates the presence of alkaloids.

III.6. Ferric chloride test (Phenolic content): To 2 ml syrup extract few drops Ferric Chloride solution was added. Formation of Greenish black colour indicates phenolic compounds.

IV. CONCLUSION

The present study was formulation and evaluation of five different formulations of herbal syrup containing moringa leaf extract. The prepared syrup formulations exhibited satisfactory organoleptic characteristics, including an attractive appearance, pleasant aroma, smooth texture, and acceptable taste. Therefore, the herbal syrup formulations can be considered a promising and patient-friendly nutraceutical dosage form with potential health benefits. However, further phytochemical standardization, stability studies and clinical investigations are required to confirm its safety, efficacy, and long-term therapeutic potential. Among all the five formulation F5 showed better results as it has highest concentration of extract.

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Table1: Formulation of the herbal syrup

S.No.	Ingredients	F1	F2	F3	F4	F5
1	Moringa oleifera extract (mL)	5	10	15	20	25
2	Honey (mL)	5	5	5	5	5
3	Glycerin (mL)	5	5	5	5	5
4	Distilled water	q.s.	q.s.	q.s.	q.s.	q.s.

Table2: Evaluation parameters of the herbal syrup

S. No.	Parameters	F1	F2	F3	F4	F5
1	Colour	Light brown	Light brown	Light brown	Light brown	Light brown
2	Odour	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
3	Consistency	slightly	slightly	slightly	slightly	slightly
4	Texture	smooth	smooth	smooth	smooth	smooth
5	Stability	2months	2months	2months	2months	2months
7	Taste	sweet	sweet	sweet	sweet	sweet
8	Foam test(Cm)	0.6	0.9	1.1	1.4	2.1
9	Mayer test	Creamy yellow ppt	Creamy yellow ppt	Creamy yellow ppt	Creamy yellow ppt	Creamy yellow ppt
10	Saponin test	foam	foam	foam	foam	foam
11	Ferric chloride test	Greenish black	Greenish black	Greenish black	Greenish black	Greenish black