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FORMULATION AND EVALUATION OF POLY HERBAL SYRUP FOR THE MENSTRUAL HEALTH

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ABSTRACT

Menstrual health disorders such as dysmenorrhea, irregular menstrual cycles, excessive bleeding, fatigue, and hormonal imbalance are common problems affecting the quality of life of women worldwide. Herbal formulations have gained increasing attention due to their therapeutic potential, safety, affordability, and minimal side effects compared to synthetic drugs. The present study aimed to formulate and evaluate a polyherbal syrup intended for the management and improvement of menstrual health. The syrup was prepared using selected medicinal plants known for their gynecological and therapeutic properties, including Saraca asoca (Ashoka), Asparagus racemosus (Shatavari), Zingiber officinale (Ginger). The herbal extracts were incorporated into a syrup base and evaluated for various physicochemical parameters such as color, odor, taste, pH, viscosity, specific gravity, and stability. The prepared formulation was also assessed for phytochemical constituents and microbial load to ensure quality, safety, and efficacy. Stability studies were performed under different storage conditions to determine the shelf life and consistency of the formulation. The evaluation results indicated that the formulated polyherbal syrup possessed acceptable organoleptic properties, suitable pH, good stability, and satisfactory viscosity. Preliminary phytochemical screening confirmed the presence of bioactive constituents such as flavonoids, alkaloids, tannins, saponins, and phenolic compounds, which contribute to its therapeutic activity. The formulation demonstrated potential effectiveness in supporting menstrual health by providing relief from menstrual discomfort and improving overall reproductive wellness.

The study concludes that the developed polyherbal syrup can serve as a safe, effective, and economical herbal alternative for menstrual health management. Further pharmacological and

clinical studies are recommended to establish its therapeutic efficacy and safety on a larger scale.

KEYWORDS: Polyherbal Syrup, Menstrual Health, Dysmenorrhea, Saraca asoca, Shatavari, Herbal Formulation, Phytochemical Evaluation, Herbal Medicine, Women's Health, Stability Studies.

INTRODUCTION

Menstrual health is an essential aspect of women's reproductive health and overall well-being. Menstruation is a natural physiological process regulated by hormonal balance; however, many women experience menstrual disorders such as dysmenorrhea, irregular menstruation, menorrhagia, premenstrual syndrome (PMS), and fatigue during the reproductive age. These conditions may adversely affect physical health, emotional stability, daily activities, and quality of life. Modern treatment options such as analgesics, hormonal therapy, and non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used for the management of menstrual problems, but prolonged use may lead to adverse effects including gastrointestinal irritation, hormonal imbalance, and dependency. Therefore, there is an increasing interest in herbal medicines as safer and more economical alternatives for menstrual health management.

Herbal formulations have been used since ancient times in traditional systems of medicine such as Ayurveda for the treatment of gynecological disorders. Medicinal plants contain various bioactive constituents including flavonoids, alkaloids, tannins, glycosides, and phenolic compounds that possess anti-inflammatory, analgesic, antispasmodic, antioxidant, and hormone-balancing properties. Polyherbal formulations are considered more effective than single-herb preparations due to the synergistic action of multiple herbs, which enhances therapeutic efficacy and reduces side effects.

In the present study, a polyherbal syrup was formulated using selected medicinal plants such as Saraca asoca (Ashoka), Asparagus racemosus (Shatavari), Zingiber officinale (Ginger), and Trigonella foenum-graecum (Fenugreek). Saraca asoca is well known for its uterine tonic and anti-inflammatory properties, while Shatavari acts as a female reproductive tonic and hormonal regulator. Ginger possesses analgesic and anti-inflammatory activities that help reduce menstrual pain, whereas Fenugreek is traditionally used to relieve menstrual discomfort and weakness.

The objective of the present research work was to formulate and evaluate a stable and effective polyherbal syrup for menstrual health. The prepared formulation was subjected to organoleptic, physicochemical, phytochemical, and stability evaluations to determine its quality, safety, and suitability for therapeutic use. The study aims to develop a herbal preparation that may provide a safe, effective, and affordable approach for improving menstrual health and managing menstrual disorders.

MATERIALS AND METHODS

Source of Plant Materials

The medicinal plants used in the present study were Saraca asoca (Ashoka bark), Asparagus racemosus (Shatavari roots), Zingiber officinale (Ginger rhizomes), and Alovera. The plant materials were procured from a local herbal market and authenticated by a pharmacognosy expert. The collected materials were washed thoroughly with distilled water to remove dirt and impurities and then shade dried for 7–10 days. The dried plant materials were powdered separately using a mechanical grinder and stored in airtight containers for further use.

Extraction of Herbal Materials

The powdered plant materials were subjected to extraction by maceration method. About 250 g of each powdered drug was soaked separately in 70% ethanol in a ratio of 1:5 for 72 hours with intermittent stirring. After completion of maceration, the mixtures were filtered using muslin cloth followed by Whatman filter paper. The filtrates obtained were concentrated using a rotary evaporator at 40–50°C until semisolid extracts were obtained. The concentrated extracts were weighed and stored in a refrigerator for further studies.

Phytochemical Screening of Herbal Extracts

Preliminary phytochemical screening of the extracts was carried out to identify the presence of various phytoconstituents such as alkaloids, flavonoids, tannins, saponins, glycosides, and phenolic compounds using standard procedures.

Tests Performed

Alkaloids Test: Extract solution was treated with Mayer’s reagent. Formation of cream-colored precipitate indicated the presence of alkaloids.

1. **Flavonoids Test:** Extract was treated with sodium hydroxide solution. Yellow coloration confirmed the presence of flavonoids.

2. **Phenolic Compounds Test:** Ferric chloride solution produced bluish-black coloration indicating phenolic compounds.
3. **Saponins Test:** Persistent foam formation after shaking with water confirmed the presence of saponins.
4. **Tannins Test:** Addition of ferric chloride solution produced greenish-black coloration indicating tannins.
5. **Glycosides Test:** Formation of brown ring after addition of concentrated sulfuric acid indicated the presence of glycosides.

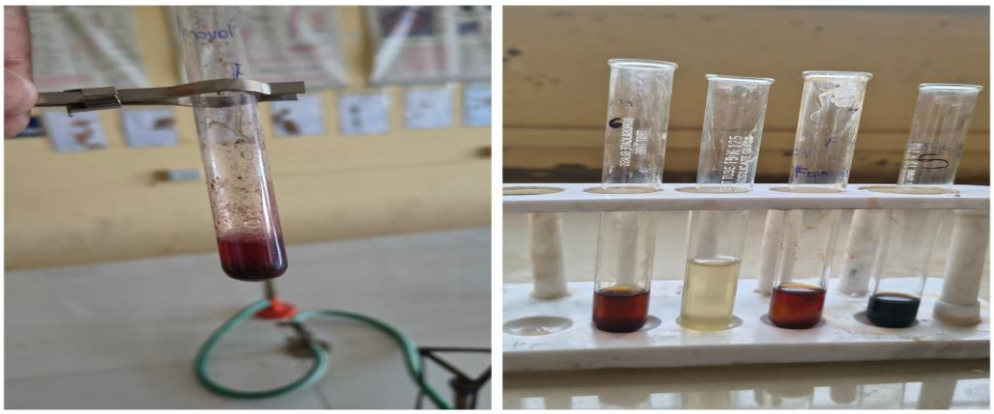

Figure 1: Phytochemical testing.

Formulation of Polyherbal Syrup for Menstrual Health

The polyherbal syrup containing extracts of Saraca asoca, Asparagus racemosus, Zingiber officinale, and Alovera was prepared by simple syrup method. All apparatus and amber-colored bottles were cleaned and sterilized before use.

Sucrose was dissolved in a sufficient quantity of purified water with continuous heating on a hot plate. The measured quantity of herbal extracts was added slowly with continuous stirring until a uniform mixture was obtained. Sodium benzoate was dissolved in a small quantity of warm water and added as a preservative. Glycerin was incorporated to improve viscosity and palatability of the formulation. Citric acid was added to adjust the pH and enhance stability. Flavoring and coloring agents were then added to improve taste and appearance. Finally, purified water was added to make up the final volume and the syrup was mixed thoroughly to obtain a homogeneous preparation. The prepared syrup was filtered and filled into amber-colored bottles and stored at room temperature.

Table: Formulation Composition of Herbal Syrup Containing Ashoka, Shatavari, Aloe vera, and Ginger (F1–F3).

Sr. No.	Ingredients	Function	F1 (50 mL)	F2 (50 mL)	F3 (50 mL)
1	Ashoka	Uterine tonic, reduces heavy bleeding	2.0 gm	2.5 gm	3.0 gm
2	Shatavari	Hormonal balance, female reproductive tonic	1.5 gm	2.0 gm	2.5 gm
3	Aloe vera	Regulates menstruation	0.5 gm	0.75 gm	1.0 gm
4	Ginger	Anti-inflammatory, reduces cramps	0.5 gm	0.75 gm	1.0 gm
5	Glycerin	Sweetening agent, viscosity enhancer, vehicle	5 mL	10 mL	15 mL
6	Methyl Orange	Colouring agent	q.s	q.s	q.s
7	Preservative	Prevents growth of microorganisms	0.1% w/v	0.15% w/v	0.2% w/v
8	Purified Water / Syrup Base	Vehicle / Base	q.s to 50 mL	q.s to 50 mL	q.s to 50 mL

Evaluation of Polyherbal Syrup for Menstrual Health

1. Organoleptic Evaluation

The prepared polyherbal syrup was evaluated for color, odor, taste, and appearance by visual inspection. The formulation showed a pleasant odor, sweet taste, smooth appearance, and uniform consistency.

2. pH Determination

The pH of the syrup was measured using a calibrated digital pH meter at room temperature. The pH was found to be within the acceptable range suitable for oral herbal formulations.

3. Viscosity Determination

The viscosity of the syrup was determined using a Brookfield Viscometer at suitable spindle speed and room temperature. The formulation exhibited appropriate viscosity for easy pouring and administration.

4. Homogeneity Test

The prepared formulation was visually examined for uniformity and absence of particulate matter. The syrup was found to be homogeneous without any phase separation or precipitation.

5. Clarity Test

The clarity of the prepared polyherbal syrup was evaluated by visual inspection against black and white backgrounds under normal light conditions. The formulation was found to be clear and free from suspended particles, turbidity, and foreign matter, indicating proper filtration and good quality of the syrup.

6. Sedimentation Test

The formulated syrup was observed for sedimentation by keeping the preparation undisturbed for a specific period. No visible sedimentation or settling of particles was observed during the study period. The formulation remained physically stable throughout the evaluation.

7. Stability Study

The stability study of the polyherbal syrup was carried out by storing the formulation at room temperature and observing changes in color, odor, pH, and appearance over time. The syrup showed no significant changes during the storage period, indicating good stability of the formulation.

RESULT AND CONCLUSION

The polyherbal syrup formulated for menstrual health using Saraca asoca (Ashoka), Asparagus racemosus (Shatavari), Zingiber officinale (Ginger), and alovera was successfully prepared and evaluated for its physicochemical, phytochemical, organoleptic, and stability parameters. Phytochemical screening confirmed the presence of important secondary metabolites such as flavonoids, alkaloids, phenolic compounds, tannins, saponins, and glycosides, which are known to contribute to anti-inflammatory, analgesic, antioxidant, and hormonal balancing activities beneficial for menstrual health.

The evaluation parameters showed acceptable values for pH, viscosity, specific gravity, homogeneity, and stability, indicating good quality and purity of the prepared formulation. Organoleptic evaluation revealed that the syrup possessed acceptable color, odor, taste, and appearance during the storage period. The formulation exhibited a pleasant aromatic odor and sweet taste with slight herbal bitterness due to the presence of medicinal plant extracts. No phase separation or precipitation was observed during the evaluation period, indicating good physical stability and compatibility of the ingredients used in the formulation.

1. Organoleptic Evaluation

The prepared polyherbal syrup showed satisfactory organoleptic characteristics. The syrup appeared as a brown-colored liquid with characteristic herbal odor and sweet taste. The formulation remained uniform without any visible particulate matter or phase separation.

Figure: Organoleptic Test.

2. pH Determination

The pH of the formulated syrup was found to be in the range of 5.2–5.8, which is considered suitable for oral herbal syrup preparations. The pH remained almost constant during the storage period, indicating chemical stability of the formulation.

Figure: pH meter.

3. Viscosity Determination

The viscosity of the syrup measured using a Brookfield Viscometer was found to be within acceptable limits for syrup preparations. The formulation exhibited smooth flow properties and appropriate consistency, ensuring ease of pouring and administration.

Figure: Brookfield viscometer.

4. Stability Studies

The prepared syrup remained physically and chemically stable under room temperature and accelerated storage conditions. No significant changes in color, odor, taste, pH, or viscosity were observed throughout the study period.

5. Clarity Test

The clarity of the formulated polyherbal syrup was evaluated by visual inspection against a black and white background under adequate light conditions. The syrup was found to be clear and free from suspended particles, turbidity, or any foreign matter. No visible impurities were observed, indicating proper filtration and good quality of the formulation.

Figure: Clarity Test.

6. Homogeneity Test

The formulated syrup was evaluated for homogeneity by visual examination after thorough shaking. The preparation showed a uniform distribution of all ingredients without any

aggregation or phase separation. The syrup remained smooth and homogeneous throughout the evaluation period, indicating proper mixing and formulation stability.

Figure: Homogeneity Test.

7. Sedimentation Test

The sedimentation behavior of the polyherbal syrup was observed by storing the formulation undisturbed for a specified period. The syrup did not show any significant sediment formation or settling of particles at the bottom of the container. This indicated good physical stability and uniform dispersion of herbal constituents in the formulation.

Figure: Sedmentation Test.

CONCLUSION

The developed polyherbal syrup demonstrated satisfactory physicochemical and phytochemical characteristics with good stability and acceptability. The synergistic action of Ashoka, Shatavari, Ginger, and Alovera may help in supporting menstrual health, reducing menstrual discomfort, and improving overall reproductive wellness. Therefore, the formulated polyherbal syrup can be considered a safe, effective, and economical herbal

preparation for menstrual health management. However, further pharmacological and clinical studies are recommended to establish its therapeutic efficacy and safety on a larger scale.

Phytochemical Parameter	Result	Observation
Tannins	+	Dark green/blackish-green colour observed
Saponins	+	Stable froth formation observed
Alkaloids (Dragendorff's Test)	+	Orange precipitate formed
Alkaloids (Mayer's Test)	+	Cream/white precipitate formed
Alkaloids (Wagner's Test)	+	Reddish-brown precipitate formed
Flavonoids	+	Yellow/orange colour developed
Steroid/Triterpenoid	+	Red-purple colour observed
Glycosides	+	Brown ring formed
Phenolic Compounds	+	Blue-black coloration observed
Carbohydrates	+	Brick red precipitate formed
Proteins & Amino Acids	+	Violet colour observed
Terpenoids	+	Reddish-brown interface formed

Figure 2: Polyherbal syrup preparation.

Table 3: Organoleptic test result of Polyherbal Syrup (Ashoka, Shatavari, Ginger, and Aloe).

Time (Day)	Parameter	F1 Observation	F2 Observation	F3 Observation
0	Shape	Liquid	Liquid	Liquid
	Color	Orange	Orange	Orange
	Smell	Characteristic aromatic	Characteristic aromatic	Characteristic aromatic
	Taste	Sweet slightly bitter	Sweet slightly bitter	Sweet slightly bitter
3	Shape	Liquid	Liquid	Liquid
	Color	Orange	Orange	Orange
	Smell	Characteristic aromatic	Characteristic aromatic	Characteristic aromatic
	Taste	Sweet slightly bitter	Sweet slightly bitter	Sweet slightly bitter
6	Shape	Liquid	Liquid	Liquid
	Color	Orange	Orange	Orange
	Smell	Characteristic	Characteristic	Characteristic

		aromatic	aromatic	aromatic
	Taste	Sweet slightly bitter	Sweet slightly bitter	Sweet slightly bitter

The organoleptic test is a crucial evaluation in herbal formulation, focusing on the sensory characteristics of the product. For a polyherbal syrup, this test assesses the stability and consumer acceptability of the blend.

Below is a detailed breakdown of the organoleptic results and what they indicate for a formulation involving complex botanical extracts.

Table 4: Organoleptic Evaluation Summary.

Parameter	Observation	Significance
Physical State	Clear, viscous liquid	Confirms proper solubility and lack of precipitation.
Color	Characteristic (e.g., Orange to Brownish)	Indicates the concentration of pigments from the extracts.
Odor	Characteristic aromatic	Confirms the presence of volatile oils and absence of fermentation.
Taste	Sweet with a slightly bitter/pungent aftertaste	Balances the therapeutic bitterness of herbs with sweetening agents.

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