A Research Article On A Formulation And Evaluation Herbal Syrup For The Management Of Polycystic Ovarian Disease (PCOD)

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ABSTRACT

Polycystic Ovarian Disease (PCOD) is a common endocrine disorder affecting women of reproductive age, characterized by hormonal imbalance, irregular menstrual cycles, and metabolic disturbances. Conventional treatments are often associated with side effects and limited long-term efficacy, which has led to increased interest in herbal alternatives. The present study aims to formulate and evaluate a polyherbal syrup for the management of PCOD using selected medicinal plants such as Shatavari (Asparagus racemosus), Ashoka (Saraca asoca), Lodhra (Symplocos racemosa), Cinnamon (Cinnamomum zeylanicum), and Liquorice (Glycyrrhiza glabra).

KEYWORD

Polycystic Ovarian Disease (PCOD), Herbal Syrup, Herbal Formulation, Shatavari, Ashoka, Lodhra, Hormonal Imbalance, Women's Reproductive Health.

1. INTRODUCTION

PCOD Herbal syrup is an Ayurvedic, plant-based formulation designed to manage Polycystic Ovary Syndrome (PCOS) by regulating hormones, improving ovarian health, and reducing insulin resistance. It combines ingredients like Ashoka, Shatavari, Ashwagandha, and Cinnamon to promote menstrual regularity and alleviate symptoms such as acne and excessive hair growth (hirsutism). Medicinal plants have been widely used in traditional systems of medicine such as Ayurveda for the management of female reproductive disorders. In the present study, selected herbs including Shatavari (Asparagus racemosus), Ashoka (Saraca asoca), Lodhra (Symplocos racemosa), Cinnamon (Cinnamomum zeylanicum), and Liquorice (Glycyrrhiza glabra) have been chosen based on their reported pharmacological activities. Shatavari is known for its phytoestrogenic and adaptogenic properties, while Ashoka is traditionally used for regulating menstrual disorders. Lodhra exhibits anti-inflammatory and uterine tonic effects, whereas Cinnamon has been reported to improve insulin sensitivity. Liquorice.

2.PLANT PROFILE

1. Shatavari

Fig. No. 1 : Shatavari Root

- Biological Name: Asparagus racemosus
- Family: Asparagaceae
- Part Used: Roots
- Chemical Constituents: Saponins (Shatavarins), alkaloids, flavonoids
- Uses: Shatavari is well known for its phytoestrogenic and adaptogenic properties. It helps in regulating hormonal imbalance, improving fertility, and supporting female reproductive health. It is widely used in the management of menstrual disorders and PCOD.

2. Ashoka

Fig. No. 2 : Ashoka Bark

- Biological Name: Saraca asoca
- Family: Fabaceae
- Part Used: Bark
- Chemical Constituents: Tannins, flavonoids, glycosides
- Uses: Ashoka is traditionally used as a uterine tonic. It is effective in managing irregular menstruation, dysmenorrhea, and excessive bleeding. It helps in maintaining hormonal balance in women.

3. Lodhra

Fig. No. 3 : Lodhra Bark

- Biological Name: Symplocos racemosa
- Family: Symplocaceae
- Part Used: Bark
- Chemical Constituents: Alkaloids, glycosides, flavonoids

- Uses: Lodhra possesses anti-inflammatory and astringent properties. It is used in gynecological disorders and helps in reducing excessive discharge and improving uterine health.

4.Cinnamon

Fig. No. 4 : Cinnamon Bark

- Biological Name: Cinnamomum zeylanicum
- Family: Lauraceae
- Part Used: Bark
- Chemical Constituents: Cinnamaldehyde, eugenol, essential oils
- Uses: Cinnamon is known for its insulin-sensitizing activity, which is beneficial in PCOD patients with insulin resistance. It also exhibits antioxidant and anti-inflammatory properties.

4. Liquorice (Yashtimadhu)

Fig. No. 5 : Liquorice Powder

- Biological Name: Glycyrrhiza glabra
- Family: Fabaceae
- Part Used: Roots
- Chemical Constituents: Glycyrrhizin, flavonoids, saponins
- Uses: Liquorice has anti-androgenic and hormone-balancing effects. It is useful in reducing excess androgen levels and improving symptoms associated with PCOD such as acne and hirsutism.

3. AIM and objective

Aim : Formulation and Evaluation of a Polyherbal Syrup for the Management of PCOD

Objective : To formulate and evaluate a polyherbal syrup for the management of Polycystic Ovarian Disease (PCOD).

4. MATERIAL HANDLING

Proper material handling is essential to ensure the quality, safety, and consistency of the formulated polyherbal syrup. All raw herbal materials were collected, processed, and stored under controlled conditions to maintain their phytochemical integrity.

1. Collection of Plant Materials

- The medicinal plants used in the formulation were :

a. Shatavari (Asparagus racemosus)
b. Ashoka (Saraca asoca)
c. Lodhra (Symplocos racemosa)
d. Cinnamon (Cinnamomum verum)
e. Liquorice (Glycyrrhiza glabra)
f. The plant materials were procured from authenticated herbal suppliers or cultivated sources and verified for botanical identity.

2. Cleaning and Drying

a. Fresh plant parts were washed thoroughly with distilled water to remove dust and impurities.
b. They were shade-dried at room temperature (25–31°C) to preserve active constituents.
c. Drying was continued until constant weight was achieved to avoid microbial growth.

3. Size Reduction

a. The dried materials were ground using a mechanical grinder.
b. The powders were passed through sieve No. 40 to obtain uniform particle size.

4. Storage of Raw Materials

a. The powdered extracts were stored in airtight glass containers.
b. Containers were kept in a cool, dry place away from direct sunlight and moisture.
c. Labels were properly affixed for identification and traceability.

5. Handling of Extracts

a. Decoction and maceration were prepared using standard extraction techniques.
b. Extracts were filtered, concentrated, and stored at 4°C until further formulation.

6. Safety and Hygiene Measures

a. All handling was done using gloves, masks, and lab coats.
b. Equipment was sterilized before and after use to prevent contamination.

5. PROCEDURE

5.1 Preparation of Plant Material

All selected medicinal plants (Shatavari, Ashoka, Lodhra, Cinnamon, and Liquorice) were collected, authenticated, washed, shade-dried, and coarsely powdered using a mechanical grinder. The powdered drugs were passed through sieve No. 40 to obtain uniform particle size.

5.2 Extraction Methods

A. Maceration Process

Fig. No. 6 : Maceration Of Shatavari

Fig. No. 7 : Beetroot Extract

- Accurately weighed quantities of selected powdered plant materials were placed in a clean, dry conical flask.
- A suitable solvent (distilled water or hydroalcoholic mixture) was added in sufficient quantity to completely immerse the drug.
- The flask was tightly closed and kept at room temperature for 48–72 hours with occasional shaking to enhance extraction.
- After completion of maceration, the mixture was filtered using muslin cloth followed by Whatman filter paper.
- The filtrate obtained was concentrated using a water bath at low temperature (below 60°C) to obtain a thick extract.

B. Decoction Process

Fig no- 7. Decoction of Lodhra

- Required quantity of powdered plant material was added to distilled water in a round-bottom flask.
- The mixture was heated at gentle boiling for 15–30 minutes.
- Continuous stirring was maintained to ensure uniform extraction of active constituents.
- After boiling, the mixture was allowed to cool and then filtered through muslin cloth followed by Whatman filter paper.
- The filtrate was concentrated on a water bath to obtain a semi-solid or thick extract.

5.3 Combination of Extracts

The concentrated extracts obtained from maceration and decoction were mixed in specific ratios depending on formulation design.

The combined extract was used for preparation of the polyherbal syrup.

5.4 Syrup Preparation (Brief Integration Step)

The combined extract was incorporated into a prepared simple syrup base under continuous stirring.

Preservatives, flavoring agents, and stabilizers were added as per requirement.

Final volume was adjusted with distilled water.

5.5 Storage

The prepared syrup was stored in airtight amber bottles at cool and dry conditions for further evaluation.

6. PLANT MATERIAL COLLECTION

The medicinal plants selected for the formulation of polyherbal syrup for the management of PCOD were collected from authenticated and reliable sources. The plant materials included Shatavari (Asparagus racemosus), Ashoka (Saraca asoca), Lodhra (Symplocos racemosa), Cinnamon (Cinnamomum verum), and Liquorice (Glycyrrhiza glabra).The fresh plant parts such as roots, bark, and stems (as applicable) were collected based on their traditional medicinal usage. All plant materials were collected during their appropriate harvesting season to ensure maximum phytochemical content.

7.EXTRACTION OF HERBS

i. The dried and powdered plant materials of Shatavari, Ashoka, Lodhra, Cinnamon, and Liquorice were subjected to extraction using suitable methods.
ii. Maceration was carried out by soaking the powdered drugs in solvent (distilled water or hydroalcoholic mixture) for 48–72 hours with occasional shaking, followed by filtration.
iii. Decoction was prepared by boiling the powdered drugs in distilled water for 15–30 minutes, then cooling and filtering.
iv. The obtained filtrates were concentrated using a water bath to obtain thick extracts, which were stored in airtight containers for further formulation.
v. After collection, the plant materials were subjected to proper authentication by a botanist or pharmacognosist to confirm their botanical identity. The collected materials were then cleaned to remove dust, soil, and foreign particles.
vi. The plant materials were transported in clean, dry containers and stored under suitable conditions to prevent contamination, degradation, and loss of active constituents until further processing.

8.CLARIFICATION OF EXTRACT

a) The obtained herbal extracts were allowed to stand undisturbed so that suspended particles and insoluble matter could settle at the bottom.
b) The supernatant liquid was carefully decanted or separated to obtain a clearer extract.
c) If required, the extract was further filtered using Whatman filter paper or fine filtration to improve clarity.
d) The clarified extract was stored in airtight containers under cool conditions until further use in formulation.

Fig. No. 8 : Filter The Extract For Clarity

- **Concentration of Extract**

a) The clarified filtrates obtained from maceration and decoction were concentrated using a water bath.
b) Gentle heating was maintained at a temperature below 60°C to avoid degradation of heat-sensitive phytoconstituents.
c) Continuous evaporation of solvent was carried out until a thick, semi-solid extract was obtained.

d) The concentrated extracts were stored in airtight containers and preserved under cool conditions for further formulation.

Fig. No. 9 : Prepared PCOD Herbal Syrup F1, F2, F3

9. EVALUATION PARAMETERS

a) Physical appearance: The prepared polyherbal syrup was evaluated for colour, odour, taste, and overall appearance.

b) pH determination: The pH of the syrup was measured using a calibrated pH paper to ensure compatibility and stability.

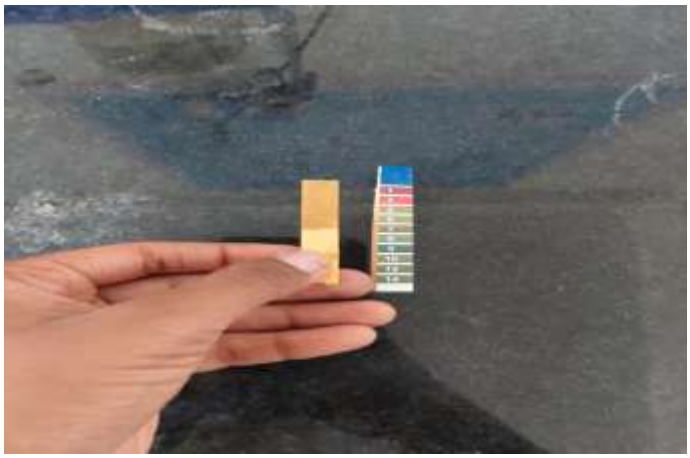

Fig. No. 10 : pH Test

F1 Formulation	F2 Formulation	F3 Formulation
Colour : Amber to reddish brown slightly brownish	Colour : Amber to reddish brown slightly brownish	Colour : Amber to reddish brown slightly brownish
Odour : Mild herbal and slightly sweet	Odour : Mild herbal and slightly sweet	Odour : Mild herbal and slightly sweet
Taste : Sweet with the slightly herbal taste	Taste : Sweet with the slightly herbal taste	Taste : Sweet with the slightly herbal taste

Table No. F1, F2, F3 Formulation

Observation : pH range 4.0 to 5.5

Conclusion : pH likely within acceptable limits

Result : Positive test conclusion

c) Viscosity: Viscosity was determined using a suitable simple flow method to assess the flow properties of the formulation.

Method: Simple flow method

Procedure :

i. Take a clean, dry measuring cylinder or pipette.
ii. Add a fixed volume of syrup (e.g., 10 mL).
iii. Allow it to flow freely and record the time required to empty.
iv. Compare with water .

Observation:

i. Time taken for syrup to flow = ~16–26 seconds
ii. Flow was smooth and continuous, without interruption

Result : The syrup showed a smooth, moderately thick (pourable) consistency. Within acceptable range.

d) Clarity test

Procedure:

i. Take a clean, transparent beaker with the syrup sample.
ii. Place it in front of a white background firstly.
iii. Observe the sample for any turbidity, suspended particles, or cloudiness.
iv. Then place the same sample in front of a black background.
v. Again observe carefully for any visible particles, cloudiness.

Fig. No. 11 : Clarity Test In Black Background

Fig. No. 12 : Clarity Test In White Background

- Result of clarity test in black and white background :

i. Black background : Syrup appears slightly orange red clear solution, no turbidity, but slight foam formation on the upper surface.

ii. White background: Syrup appears slightly orange, clear solution, no turbidity, but slight foam formation on the upper surface.

- Conclusion :

Clarity test : negative (due to presence of foam)

10. RESULT

The Herbal syrup was successfully formulated using extracts of Shatavari, Ashoka, Lodhra, Cinnamon, and Liquorice. The prepared formulation exhibited good organoleptic characteristics with a uniform appearance and without any phase separation or precipitation. The pH of the syrup was found to be within the acceptable range for oral preparations, indicating suitability for administration. The viscosity was in optimum level, showing good consistency and flow properties. The formulation remained physically stable throughout the evaluation period with no signs of instability or microbial contamination. Overall, the developed Herbal syrup was found to be stable and suitable for further studies.

Sr. No.	Parameters	Results
1	pH	5.5
2	Total solid content test	48.5%
3	Clarity test	Clear and free from suspending agent
4	Viscosity	Moderate viscosity

Table No. 2 : Result of PCOD Herbal Syrup

11. DISCUSSION

The present study was undertaken to formulate and evaluate a Herbal syrup using Shatavari, Ashoka, Lodhra, Cinnamon, and Liquorice for the management of PCOD. The selection of these medicinal plants was based on their traditional claims and reported pharmacological activities such as hormonal regulation, uterine tonic effect, anti-inflammatory action, and endocrine balancing properties, which are relevant in PCOD management.

The extraction of herbal constituents using maceration and decoction methods proved to be simple and effective for obtaining water-soluble phytoconstituents. These methods are commonly used in herbal formulations as they help in preserving active components while maintaining cost-effectiveness.

The prepared syrup showed good organoleptic properties, indicating that the formulation was acceptable in terms of colour, taste, and odour, which is important for patient compliance. The incorporation of syrup base and flavoring agents helped in masking the bitterness of herbal extracts.

12. CONCLUSION

The present study successfully formulated a Herbal syrup using Shatavari, Ashoka, Lodhra, Cinnamon, and Liquorice for the management of PCOD. The extraction, formulation, and evaluation processes were carried out effectively using standard methods. The prepared syrup showed acceptable organoleptic properties, appropriate pH, and satisfactory viscosity. Stability studies confirmed that the formulation remained physically stable without any signs of precipitation, phase separation, or microbial growth. Overall, the developed polyherbal syrup was found to be stable, safe in preliminary evaluation, and suitable for further pharmacological and clinical investigation in PCOD management.

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