



ORIGINAL ARTICLE

Formulation and Evaluation of Polyherbal churna for the Management of Infertility

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ABSTRACT

Infertility is a significant reproductive health issue affecting many couples worldwide, with increasing prevalence in India due to lifestyle changes, stress, hormonal imbalance, and environmental factors. Conventional treatments such as hormonal therapy and assisted reproductive techniques are often expensive and may have side effects, leading to growing interest in safer herbal alternatives. The present study focuses on the formulation and evaluation of a polyherbal churna using medicinal plants like Shatavari (*Asparagus racemosus*), Gokhru (*Tribulus terrestris*), Amla (*Emblica officinalis*), Ashoka (*Saraca asoca*), Anardana (*Punica granatum*), and Alsi (*Linum usitatissimum*), known for their fertility-enhancing and antioxidant properties. The formulation was subjected to phytochemical screening for constituents such as alkaloids, flavonoids, saponins, tannins, and phenols. It was also evaluated for organoleptic properties including colour, odour, and taste, along with flow properties like bulk density, tapped density, Carr's index, Hausner's ratio, and angle of repose to assess its quality and handling characteristics. The study highlights the potential of polyherbal formulations as a natural approach for supporting reproductive health and managing infertility, further scientific and clinical research is necessary to fully establish the safety and effectiveness of these herbal therapies in the management of infertility.

KEYWORDS: Shatavari, Amla, Anardana, Gokhru, Alsi, Ashoka, Herbal Medicine, Infertility, Reproductive Health, Polyherbal Formulation.

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INTRODUCTION

Infertility is medically defined as a disease of the male or female reproductive system characterized by the failure to achieve a clinical pregnancy after 12 months or more of regular, unprotected sexual intercourse. It represents a pathological state in which the physiological processes required for conception are impaired, including gametogenesis, fertilization, or implantation, and may arise from functional, anatomical, hormonal, or genetic abnormalities within the reproductive tract (Tripathi et al., 2010). The two main types are primary infertility and secondary infertility. Primary infertility refers to a condition in which a couple has never been able to conceive even after one year of regular, unprotected sexual intercourse. On the other hand, secondary infertility occurs when a couple has previously achieved pregnancy at least once but is unable to conceive again despite trying for a year without contraception. Infertility may result from factors affecting either the male partner, the female partner, or both. In some cases, multiple causes may coexist. The causes are broadly classified into male-specific and female-specific factors.

Female causes: Female infertility can occur due to several physiological, hormonal, and lifestyle-related factors that interfere with normal reproductive processes such as ovulation, fertilization, and implantation (Smith et al., 2003). Some of the common causes of female infertility are described below.

- Ovulatory Disorders
- Polycystic Ovary Syndrome (PCOS)
- Blocked Fallopian Tubes
- Endometriosis
- Hormonal Imbalance

Male Causes: Male infertility occurs when a man has difficulty contributing to conception due to problems related to sperm production, sperm function, or reproductive health. Several medical, hormonal, and lifestyle factors can affect male fertility.

- a) Low Sperm Count (Oligospermia)
- b) Poor Sperm Motility
- c) Hormonal Imbalance
- d) Varicocele
- e) Lifestyle and Environmental Factors

Herbal Treatment in Infertility

Herbal therapy has been traditionally used in reproductive disorders to improve hormonal balance, enhance gamete quality, and strengthen reproductive tissues. The following medicinal plants are commonly used in polyherbal formulations for promoting fertility in both males and females (Ried, 2015). Medicinal plants such as Shatavari (*Asparagus racemosus*), Gokhru (*Tribulus terrestris*), Amla (*Phyllanthus emblica*), Ashoka (*Saraca asoca*), Anardana (*Punica granatum*), and Alsi (*Linum usitatissimum*), all known for their significant role in improving reproductive health. These herbs act synergistically to regulate hormonal balance, enhance ovarian and uterine function, and improve sperm quality and motility. Their therapeutic effects are attributed to the presence of bioactive constituents such as saponins, flavonoids, alkaloids, tannins, polyphenols, lignans, and phytoestrogens. The strong antioxidant and anti-inflammatory properties of these compounds help protect reproductive tissues from oxidative stress and support overall fertility. Thus, this combination serves as a promising natural approach for the management of infertility.

MATERIAL AND METHODS

Material: All the ingredient (Herbal drugs) are collected from local market which are used in the formulation of polyherbal churna.

1. Shatavari (*Asparagus racemosus*)

Part used: Root

Details: Supports female reproductive health, helps in hormonal balance and improves fertility.

2. Ashoka (*Saraca asoca*)

Part used: Bark

Details: Beneficial for uterine health, regulates menstrual cycle and reduces gynecological issues.

3. Gokhru (*Tribulus terrestris*)

Part used: Fruit

Details: Enhances reproductive function, improves libido and supports hormone regulation.

4. Anardana (*Punica granatum*)

Part used: Dried seeds

Details: Rich in antioxidants, improves digestion and supports reproductive health.

5. Amla (*Emblica officinalis*)

Part used: Fruit

Details: High in vitamin C, boosts immunity and helps in hormonal balance.

6. Alsi (*Linum usitatissimum*)

Part used: Seeds

Details: Contains omega-3 fatty acids, supports hormonal balance and reproductive function.

Method: The powdered materials were passed through a suitable sieve (generally sieve number 44 and then 85) to obtain a fine and uniform powder. The powders of all the selected herbs were accurately weighed according to the required formulation ratio and mixed thoroughly in a clean and dry mortar to obtain a homogeneous blend. Proper mixing was carried out to ensure uniform distribution of all ingredients in the formulation (Alamgir, 2017).

1. Organoleptic Evaluation

Organoleptic evaluation was used for identification of sensory characteristics like colour, odour and texture.

2. Powder Flow Properties

These tests determine how easily the powder flows, which is important for handling and packaging. It includes **angle of repose, bulk density, and tapped density**.

3. Physicochemical parameters:

Physicochemical parameters are measurable physical and chemical properties used to evaluate the quality, purity, and identity of a sample. These include loss on drying (LOD), water-soluble extractive value, alcohol-soluble extractive value, total ash value, acid-insoluble ash value, and pH, which help determine moisture content, extractable constituents, inorganic residue, siliceous impurities, and the acidity or alkalinity of the sample (Patel et al., 2020).

- **Moisture Content (Loss on Drying)**

This measures the amount of water present in the churna. Excess moisture can lead to microbial growth and spoilage, so it should be within limits (Patel et al., 2020).

- **Ash Value**

Ash value indicates the amount of inorganic material or impurities present. It helps in determining the purity of the herbal formulation (Patel et al., 2020).

Total Ash Value

Total ash value represents the total amount of inorganic residue left after complete burning of the polyherbal churna (Patel et al., 2020).

Water soluble: Ash is the portion of total ash that dissolves in water. It indicates the amount of inorganic salts present in a drug that are soluble in water and helps in evaluating purity and quality of the sample.

Acid Insoluble Ash Value

Acid insoluble ash is the portion of the total ash that does not dissolve in dilute hydrochloric acid. It mainly indicates the presence of silica and earthy materials such as sand and soil.

- **pH Determination**

The pH of the churna is checked to understand its **acidity or alkalinity**, which can affect stability and compatibility with the body.

Extractive Values

These values show how much of the active constituents can be extracted using solvents like water or alcohol. It reflects the presence of bioactive compounds (Patel et al., 2020).

Alcohol soluble extractive value (procedure):

Take about 5 g of the powdered drug and soak it in 100 ml of alcohol in a closed flask for 24 hours. Shake it frequently in the beginning, then let it stand. After that, filter it and take 25 ml of the filtrate, evaporate it to dryness, dry at 105°C, and weigh to calculate the extractive value.

Water soluble extractive value (procedure):

Take about 5 g of the powdered drug and macerate it with 100 ml of chloroform water for 24 hours, shaking initially and then keeping it undisturbed. Filter the solution, take 25 ml of filtrate, evaporate to dryness, dry at 105°C, and weigh to determine the extractive value.

RESULT AND DISCUSSION

The formulation of polyherbal churna was carried out in three different batches, namely F1, F2, and F3, by varying the proportions of ingredients. The compositions of each batch are presented in the Table 1 given below for comparison and evaluation.

Table 1. List of Ingredients and Their Quantitative Composition

S.no.	INGREDIENTS	QUANTITY (gms.)		
		F1	F2	F3
1.	Shatavari	18	16	14
2.	Gokhru	12	10	8
3.	Amla	12	10	8
4.	Anardaana	6	4	2
5.	Alsi	6	4	2
6.	Ashoka	6	4	2

Organoleptic evaluation of the formulated polyherbal churna was carried out to assess its colour, odour, taste, and texture. These parameters help in determining the sensory characteristics and overall acceptability of the formulation. The observed results are presented in Table 2.

Table 2: Organoleptic property of churna

S.no.	Organoleptic Properties	Observation
1.	State	Solid fine powder
2.	Colour	Brown
3.	Odour	Earthy aroma
4.	Texture	Amorphous nature

The flow properties of the formulated polyherbal churna were evaluated using parameters such as bulk density, tapped density, angle of repose, Carr's index, and Hausner's ratio. These parameters help in

determining the flowability and compressibility of the powder. The results obtained are presented in the table below.

Table 3: Physical characters of prepared churna

S. no.	Parameters	Results		
		F1	F2	F3
1.	Bulk Density	0.31	0.33	0.32
2.	Tapped Density	0.5	0.44	0.43
3.	Carr's Index	38%	25%	25%
4.	Hausner's Ratio	1.42	1.33	1.34
5.	Angle of Repose	43°	39.6°	43°

Physicochemical parameters including loss on drying, extractive values, ash values, and pH were evaluated for all batches (F1, F2, and F3), and the results are shown in the table below.

Table 4: Physicochemical investigation of prepared churna

S.no.	Parameter	Prepared Churna		
		F1	F2	F3
1.	Loss on Drying	7.6	8.6	7.2
2.	Water soluble Extractive Value (%)	7.2 % w/w	6.8 % w/w	4 % w/w
3.	Alcohol soluble Extractive Value (%)	7.6 % w/w	9.2 % w/w	10.4 % w/w
4.	Total Ash	23.2 %	28.8%	13.2 %
5.	Acid Insoluble Ash	40 %	5 %	11 %
6.	pH	4	3	4

CONCLUSION

In the present study, a polyherbal churna was successfully formulated using selected medicinal plants known for their potential role in the management of infertility. The formulation was prepared by using traditional herbal ingredients such as Shatavari, Ashoka, Amla, Gokhru, Flaxseed, and Anardana, which are widely recognized for their reproductive health-promoting properties. The prepared churna was evaluated using various physicochemical parameters including organoleptic characteristics, ash values, moisture content, and other quality control tests to ensure its purity, safety, and stability. The results obtained from the evaluation indicated that the formulation meets acceptable quality standards and shows good physicochemical properties. The presence of bioactive phytoconstituents in the selected herbs suggests potential therapeutic benefits in supporting reproductive health and improving fertility.

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