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Research Article

Formulation and Evaluation of Herbal Tablets for the Treatment of PCOD using Kanchnar and Shatavari

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ABSTRACT

Herbal tablets have been crucial in managing and preventing illnesses for centuries. Across cultures, herbs have advanced healthcare, leading to detailed herbal pharmacopeias. Integrating into mainstream healthcare, herbal tablets, especially Ayurvedic ones, are made from natural ingredients like Kanchanara and Shatavari, which are effective against Polycystic Ovary Disease (PCOD) by regulating cyst size and balancing hormones. Excipients in tablet formulations ensure correct dosage, integrity, and effective drug release. This underscores the growing importance of herbal medicine in modern healthcare. The meticulous selection of excipients, such as diluents, binders, disintegrants, and lubricants, is critical in the production of herbal tablets. Diluents add bulk to the tablet, binders ensure the tablet remains intact post-compression, disintegrants aid in the tablet's dissolution for effective drug release, and lubricants prevent sticking during manufacturing. Every excipient is selected based on its suitability and capacity to improve the tablet's characteristics, guaranteeing that the finished product is safe to eat and efficient. Moreover, the acceptability and widespread usage of herbal tablets demonstrate their potential to treat a variety of medical ailments. The ability of Shatavari and Kanchanara to treat PCOD, a condition marked by ovarian cysts and hormonal abnormalities, is evidence of the medicinal value of herbal medicine. Herbal pills are expected to become even more important in modern healthcare as research on the health benefits of various herbs continues, providing natural and holistic alternatives to traditional treatments.

Keywords:- PCOD, Kanchnar, Shatavari, Herbal Tablets, Evaluation

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INTRODUCTION:

Herbal tablets are a type of natural remedy that has been utilized for centuries to manage and prevent illnesses. Across various cultures, herbs have played a crucial role in the advancement of healthcare practices. As civilizations evolved, each community incorporated the healing properties of local herbs into their medicinal knowledge. This led to the systematic collection of information about herbs and the creation of detailed herbal pharmacopeia.⁽¹⁾ Many traditional herbal medicinal practices have been embraced for diagnosing, preventing, and treating a variety of diseases.⁽²⁾

Herbal medicine is at the core of complementary and alternative medicine, a field that is gaining popularity

worldwide and moving toward integration into mainstream healthcare systems. The use of herbal tablets is prevalent across genders, social classes, and racial groups in both developing and developed countries.⁽³⁾ Ayurvedic tablets, also known as herbal tablets, are made from natural ingredients that are believed to have no harmful side effects on the human body. Many herbal supplements are formulated with a blend of botanical ingredients that have long been used in traditional or folk medicine.⁽⁴⁾ A tablet formulation typically consists of one or more active substances and other excipients that are necessary for the desired pharmacokinetic and mechanical properties of the final dosage form. These excipients mainly include diluents (or fillers), binders, disintegrants, and lubricants.⁽⁵⁾

Excipients play crucial roles in tablet formulations. Diluents or fillers add bulk to ensure the correct dosage of the active ingredient. Binders help maintain the tablet's integrity post-compression. Disintegrants promote tablet breakup for effective drug release. Lubricants prevent sticking during manufacturing. Each excipient is carefully selected based on its compatibility and ability to contribute to the tablet's properties.⁽⁶⁾

Kanchanara (*Bauhinia purpurea*), Shatavari (*Asparagus racemosus*) tree has attracted worldwide prominence owing to its wide range of medicinal properties, Kanchanara leaves and its constituents help regulate the size of cysts in the ovaries, which are common symptoms of PCOD, its anti-inflammatory properties also help to reduce inflammation associated with the condition. Shatavari is known for its hormone-balancing properties, which can be beneficial for women with PCOD who often experience hormonal imbalances, it is also believed to support ovarian function and promote overall reproductive health. Herbal tablet ingredients were used kanchanara, shatavari,, in which both kanchnar and shatavari leaves were found effective against PCOD.^(7,8)

PCOD (Polycystic Ovary Disease) is a health condition characterized by an imbalance of reproductive hormones, which can lead to problems in ovaries, this imbalance can

cause irregular menstrual periods, excess hair growth, acne and obesity. In PCOD, the ovaries may develop small collections of fluid (follicles) and fail to regularly release eggs. The mainstay of treatment is regular use of medicaments suppressing PCOD.⁽⁹⁾

Polycystic Ovary Disease (PCOD)

PCOD stands for Polycystic Ovary Disease, it also known as PCOS (Polycystic Ovary Disease) which is a common hormonal disorder in women of reproductive age. It is characterized by the presence of multiple cysts on the ovaries, irregular or absent menstrual periods, and high levels of androgens (male hormones) in the body.⁹ Polycystic ovarian disease (PCOD) was first described in 1935 by Irving F. Stein and Michael Leventhal.⁽¹⁰⁾

PCOD is characterized by hormonal imbalances, ovulatory dysfunction, and the presence of multiple cysts on the ovaries. Common symptoms include irregular menstrual cycles, hirsutism, acne, and infertility, all of which can significantly impact the physical, psychological, and reproductive health of affected individuals. Beginning during pregnancy, these factors have an impact on future generations through epigenetic factors that affect the developing brain and germ cells.⁽¹¹⁾

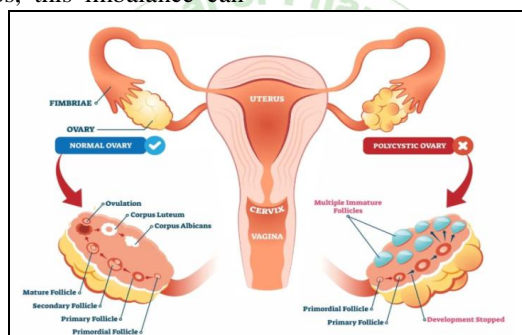


Figure 1: Difference between Normal Ovary and PCOD

What causes a PCOD ?

The cause of PCOD (Polycystic Ovary Syndrome) is not yet fully understood, but several factors are believed to play a role in its development. These include:

1. **Hormonal Imbalance:** Women with PCOD often have an imbalance in their reproductive hormones, specifically an excess of androgens (male hormones) such as testosterone. This hormonal imbalance can disrupt the normal function of the ovaries and lead to the development of cysts.
2. **Insulin Resistance:** Insulin is a hormone that helps regulate blood sugar levels. Some women with PCOD have insulin resistance, where their cells do not respond properly to insulin. This can lead to high levels of insulin in the blood, which in turn can increase androgen production and disrupt the menstrual cycle.⁽¹²⁾
3. **Genetics:** There appears to be a genetic component to PCOD, as it tends to run in families. Women with a family history of PCOD are more likely to develop the condition themselves.
4. **Inflammation:** Chronic low-grade inflammation in the body may contribute to the development of PCOD and its associated symptoms.

5. **Lifestyle Factors:** Factors such as obesity, lack of physical activity, and poor diet may contribute to the development and worsening of PCOD symptoms.⁽¹³⁾

Types of PCOD:

1. **Classic PCOD:** Characterized by irregular menstrual cycles, hyperandrogenism (elevated levels of male hormones), and polycystic ovaries on ultrasound.
2. **Non-Hyperandrogenic PCOD:** Some women with PCOD may not exhibit signs of hyperandrogenism but still have irregular menstrual cycles and polycystic ovaries.
3. **Metabolic PCOD:** In this type, women may have metabolic abnormalities such as insulin resistance, obesity, and dyslipidaemia, with or without the classic features of PCOD.
4. **Ovulatory PCOD:** Women with this type have normal ovulatory function but may still have polycystic ovaries and other features of PCOD.
5. **Idiopathic Hirsutism:** Some women may present with hirsutism (excess hair growth) but without other features of PCOD. This is known as idiopathic hirsutism and may be considered a separate condition.

6. Normo-Androgenic PCOD: Similar to non-hyperandrogenic PCOD, but without the signs of hyperandrogenism.⁽¹⁴⁾

Symptoms of PCOD:

1. Irregular menstrual cycles or no periods at all.
2. Heavy or prolonged menstrual bleeding.
3. Excess hair growth on the face, chest, or back (hirsutism).
4. Acne, oily skin, or dandruff.
5. Weight gain or difficulty losing weight.
6. Male-pattern baldness or thinning hair.
7. Darkening of the skin, particularly along the neck creases, in the groin, and underneath the breasts.
8. Skin tags, which are small excess flaps of skin in the armpits or neck area.⁽¹⁵⁾

Drug use in treatment of Disease

1. KANCHNAR



Synonyms:- Bauhinia purpurea, Rakta Kanchan, Purple bauhinia, Orchid tree, Camel's foot.

Biological source:- The biological source of Kanchnar includes both the dried bark and leaves of the Bauhinia purpurea Linn.

Family:- Fabaceae (Caesalpinaceae).

Geographical source:- It is native to Indian subcontinent and Myanmar and widely introduced elsewhere in tropical and subtropical areas of the world.

Chemical Constituents:- The chemical constituents of Kanchnar are hentriacontane, octacosanol, sitosterol, lupeol, galactopyranoside, lignins, saponins, tannins, apigenin, reducing sugars, steroids, cardiac glycosides.

Uses:- Kanchnar is used as Anti-inflammatory, Anti-bacterial, Anti-cancer. Kanchnar is used in traditional medicine to support Thyroid health, reduce inflammation, cleanse the lymphatic system and treat skin disorders. It is also beneficial for menstrual irregularities and may possess anti-cancer properties.

2. SHATAVARI



Synonyms:- Asparagus racemosus, Wild asparagus, Satavar, Satmuli.

Biological source:- It is dried spinous shrub with tuberous roots of the plant Asparagus racemosus.

Family:- Asparagaceae

Geographical source:- Asparagus racemosus is native to India, particularly found in regions such as Himalayas, as well as Sri Lanka. It is also cultivated in other parts of India for its medicinal properties.

Chemical Constituents:- Shatavari contains saponins(2-5%), Steroidal glycosides (0.1-0.2%), Flavonoids(0.1-0.3%) and Polysaccharides(20-30%).

Uses:- Shatavari is used as Anti-inflammatory, Anti-oxidant, Immunomodulatory, hormone balancer. Shatavari is utilized for reproductive health, aiding in menstrual regulation, fertility and balancing hormones and easing symptoms of imbalances. Additionally, it promotes digestive wellness, boosts the immune system and acts as an anti-inflammatory agent, particularly beneficial for joint health.

TYPES OF HERBAL TABLETS:

Based on Method of Preparation:

Powdered Herbal Tablets: These tablets are made by directly compressing powdered herbs and may contain other excipients.

- **Standardized Herbal Tablets:** These tablets contain a specific, standardized amount of active ingredients extracted from herbs, ensuring consistency in dosage and potency.

Based on Therapeutic Action:

- **Adaptogenic Tablets:** Contain herbs known for their adaptogenic properties, helping the body adapt to stress and normalize bodily functions.
- **Digestive Tablets:** Contain herbs that support digestion and gastrointestinal health.
- **Immune Support Tablets:** Contain herbs known for their immune-boosting properties.
- **Sleep Support Tablets:** Contain herbs that promote relaxation and improve sleep quality.

Based on Dosage Form:

- **Conventional Tablets:** These are the standard compressed tablets.
- **Chewable Tablets:** Designed to be chewed before swallowing, often more palatable.
- **Effervescent Tablets:** Dissolve quickly in water to form a bubbly solution, often used for easier ingestion or faster absorption.
- **Orally Disintegrating Tablets (ODTs):** Dissolve rapidly in the mouth without the need for water, ideal for people with swallowing difficulties.

Based on Herbal Combination:

- **Single Herb Tablets:** Contain only one herb.

- Compound Herbal Tablets: Contain a combination of multiple herbs, often formulated for specific health benefits or traditional remedies.

Based on Traditional System of Medicine:

- Ayurvedic Herbal Tablets: Follow principles of Ayurveda, an ancient Indian system of medicine.
- Traditional Chinese Medicine (TCM) Tablets: Formulated according to TCM principles, using herbs and herbal combinations from Chinese medicine. (16)

MATERIALS AND METHODS:

Material

The crude medicines used are Kanchnar, Shatavari leaves were dried, collected and the powdered form of these medicines was prepared. Lactose, HPMC, Sodium alginate, Talc, Acacia, Methyl cellulose, bounce and Magnesium stearate was used as excipients.

Method

Preparation of dry powder of Kanchnar leaves and Shatavari leaves

Collection of fresh leaves of Kanchnar from the original area. Clean the leaves by using distilled water. Leaves are dried at room temperature for a many days. The hot air roaster is used for the complete drying of leaves. The dried leaves are collected and grind in a mixer to make a fine greaspaint. also these leaves greaspaint of Kanchnar was settled by sieveno. 100 to get invariant flyspeck size. analogous procedure is done for Shatavari leaves and greaspaint of Shatavari leaves are set and transfer by Sieveno. 100 to get invariant flyspeck size.

Preparation of 1% acacia solution

Take 1 gm of acacia greaspaint and blend in 100 ml distilled water. Stir continuously until all greaspaint was blend duly.

Preparation of 1% HPMC solution

Take 100 ml distilled water in a teacup. Take 1 gm of HPMC greaspaint and blend in 100 ml distilled water. Stir continuously to form a jelly- suchlike appearance.

Preparation of 1% Sodium alginate solution

Take 100 ml ethanol in a teacup. Add 1 gm of Sodium alginate greaspaint in 100 ml alcohol. Stir duly to blend well.

Preparation of Starch paste

Take 10 ml of distilled water in a teacup. Take 1 gm of bounce greaspaint in 10 ml of distilled water containing teacup and bring to boil on a hot plate till smooth bounce paste formed.

Formulation of herbal tablets

In this expression, the dried leaves of kanchnar and shatavari were grinded independently in grinder and greaspaint was prepared. also these leaves greaspaint of Kanchnar and Shatavari were settled by sieveno. 100 to get invariant flyspeck size this was done independently for both maquillages. also this greaspaint of Kanchnar and Shatavari were used to form a tablet lozenge form. The expression was

done by following the wet granulation process and farther contraction by tablet punching machine.

Wet granulation method

Weigh all ingredients accurately, mix well and triturate by using mortar and pestle. The prepared 1% binding agent was added slowly to form a damp mass. Damp mass was transfer through sieve no. 22. Prepared granules are dried at room temperature. The well dried granules are ready for compression.

PREFORMLUATION STUDIES

STUDIES In the progress of new lozenge form, thepre-formulation study is the former step in the implicit medicine development. It's the introductory disquisition in the medicine development to gain information on the known parcels of the emulsion to be used and the proposed development program. So, it may simply confirm that there are no major walls for the emulsion development. piecemeal from helping expression development, Preformulation studies can also help in leading identification in medicine discovery phase. Following precompressional parameters were studied like the bulk viscosity, hausner's rate, angle of repose, tapped viscosity, frangibility testing, hardness testing, compressibility indicators andetc.

Table 1: Composition of Nutraceutical tablet

Sr. No.	Ingredients used	Quantity taken
1	Kanchnar	3.12 gm
2	Shatavari	3.12 gm
3	Methyl Cellulose	4.5 gm
4	Magnesium Stearate	0.5 gm
5	Talc	0.25 gm
6	Lactose	1.25 gm
7	Starch	1 gm
8	HPMC	1 gm
9	Sodium alginate	1 gm
10	Acacia	1 gm

Evaluation of pre-compressional blend

Angle of Repose

Angle of repose was measured by fixed funnel method. The fixed funnel method uses a funnel,being secured with its tip at a given height h'', above the graph paper which was placed on a flat horizontal surface. Granules were carefully transferred through the funnel until the apex of the conical pile touching the tip of the funnel.

$$\tan \theta = h / r$$

Where, r is considered as the radius of the base of the conical pile and θ is the angle of repose.

Bulk density

The bulk density is defined as the ratio of bulk mass of the granule to the bulk volume. And it is denoted by ρ_b .

The Bulk density is used to find out homogeneity of the given sample to be found.

Bulk density (ρ_b) = M/V_b Where, M is given as the mass of the sample, V_b as the bulk volume.

Tapped density

The tapped density is defined as the ratio of the weight of granules to the minimum volume occupied into the measuring cylinder, it is determined by placing a graduated cylinder containing a known mass of drug or the formulation on a mechanical tapper apparatus which is being operated at fixed no. of taps (100) until the powder bed reached to a minimum volume.

Tapped density (ρ_t) = weight of powder blend/Minimum volume of the cylinder.

Carr's index

The handed formula was used to calculate the greasepaint admixture's compressibility grounded on its apparent bulk viscosity and tapped viscosity. i.e., Carr's indicator is equal to Tapped viscosity \times 100/ Tapped viscosity- Bulk viscosity.

Hausner's ratio

A lower Hausner's rate (1.25). Hausner's rate is defined as an circular index of the ease of measuring greasepaint inflow. 10 It's handed by the equation. Tapped viscosity/ Bulk viscosity equals Hausner's rate.

Evaluation parameters of tablets:

Weight Variation

Weight Variation Twenty tablets were named aimlessly from the expression. Tablets were counted one by one and also the average weight was calculated. divagation of each tablet from average weight was calculated and also the per cent divagation was reckoned

Tablet Hardness

A Monsanto hardness tester was used to assess the hardness.

Friability test

Friability test is carried out, using Friability apparatus. The weighted tablets are being placed in the apparatus and which is been rotated at 25 rpm for 5 minutes. After an interval tablets are taken out from apparatus and once again they are weight. The friability is calculated by given formula.

Disintegration test

To estimate the disintegration time, three pills were taken. After the pills were put in the disintegration device, the amount of time that passed until the tablets completely disintegrated was recorded. The device was kept at a constant 37° C temperature.

RESULTS :

Formulation of tablets with crude drugs were prepared containing the crude drugs like

Kanchnar, Shatavari, etc. These are the main ingredients that are used for the manufacturing are showed in the Table No.2

Table 2: Herbal Tablet Formula

Sr. No.	Ingredients used	Quantity taken
1	Kanchnar	3.12 gm
2	Shatavari	3.12 gm
3	Methyl Cellulose	4.5 gm
4	Magnesium Stearate	0.5 gm
5	Talc	0.25 gm

6	Lactose	1.25 gm
7	Starch	1 gm
8	HPMC	1 gm
9	Sodium alginate	1 gm
10	Acacia	1 gm

Evaluation of Granules:

Table 3: Evaluation Granules

Sr.No	Evaluation parameters	Observed Values
1	Angle of repose (θ)	38.65°
2	Bulk density (g/cc)	0.349 g/cc
3	Tapped density (g/cc)	1.30 g/cc
4	Carr's index	73%
5	Hausner's ratio	3.82

Evaluation of tablets:

The evaluation parameters like Physical appearance, weight variation, friability, hardness, thicknes and disintegration test were carried for the batches and some of them are shown in Table no.4

Table 4: Evaluation parameters of Tablet

Sr.No.	Evaluation Parameters	Observations
1.	Physical Appearance	
	a) Colour	a) Brown
	b) Odour	b) Herbal Odour
	c) Taste	c) Bitter
	d) Appearance	d) Round
	e) Texture	e) Slightly Smooth
2.	Evaluation parameters of Tablets	
	a) Weight Variation	
	b) Tablet Hardness	3.2 kp
	c) Friability Test	1.45%
	d) Disintegration Test	

DISCUSSION:

An ancient time peoples uses various plants, roots, and leaves for treatment of various disease. Herbal tablet including natural herbs, like Kanchnar, Shatavari which have various action and effect on PCOD. This project is, about herbal tablet that, herbal tablet is a safest herbal medicine which is used for treatment of PCOD. The physicochemical properties of the tablets, including weight variation, hardness, friability, and disintegration time, were within acceptable limits, indicating good tablet quality and integrity. This study successfully formulated and evaluated herbal tablets containing Kanchnar (*Bauhinia variegata*) and Shatavari (*Asparagus racemosus*) for the treatment of Polycystic Ovary Disease (PCOD). These herbs were selected for their anti-inflammatory, hormoneregulating, adaptogenic, and estrogenic properties, which are beneficial for managing PCOD symptoms. The pre-compressional blend was optimized for good flow and

compressibility, ensuring suitable tablet compression. Kanchnar's anti-inflammatory and hormone-regulating effects, combined with Shatavari's adaptogenic and estrogenic properties, suggest a synergistic effect in managing PCOD. This natural combination offers a holistic approach to treatment, potentially reducing reliance on conventional medications and their side effects.

CONCLUSION:

The Study formulated herbal tablets with Kanchnar and Shatavari for PCOD. They showed good flow, compressibility, weight uniformity, hardness, low friability, and rapid disintegration. These properties support their efficacy for PCOD, attributed to their anti-inflammatory, antioxidant, and hormones-regulating effects. Further studies are needed for validation. The research highlights the potential of integrating Ayurvedic knowledge into modern medicine for women's health. The therapeutic potential of Kanchnar and Shatavari in managing PCOD was supported by their known pharmacological activities, including anti-inflammatory, antioxidant, and hormone-regulating effects. These properties are particularly beneficial in addressing the underlying pathophysiology of PCOD, which includes hormonal imbalance, oxidative stress, and chronic inflammation. In conclusion, the formulated herbal tablets containing Kanchnar and Shatavari show promise as a complementary treatment for PCOD. They offer a natural and holistic approach to managing this condition, potentially reducing the dependence on conventional pharmacological therapies and their associated side effects. Further clinical studies are recommended to validate the efficacy and safety of these herbal tablets in a larger population of PCOD patients.

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