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**Review Article**

## EXPLORING HERBAL REMEDIES: MANAGING POLYCYSTIC OVARY SYNDROME (PCOS) AND ITS COMPLICATIONS

Shrutika Sarode<sup>a\*</sup> | Mrunali Bhosale<sup>a</sup> | Preet Bang<sup>a</sup>

### AFFILIATIONS:

<sup>a</sup>Research Associate, ICRO

### CORRESPONDENCE:

Shrutika Sarode, Research Associate,  
ICRO, Pune

### EMAIL ID:

[shrutikasarode2018@gmail.com](mailto:shrutikasarode2018@gmail.com)

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### ABSTRACT:

Chronic oligo-anovulation is linked to the hyperandrogenic condition known as polycystic ovarian syndrome (PCOS). Asians are less likely to develop hirsutism as a result of PCOS. About 5–10% of this age group was impacted by those between the ages of 18 and 44. Infertility, defined as the failure to conceive after a year of continuous exposure to regular, unprotected coitus during the appropriate point of the menstrual cycle, is the most common problem in the world. Thirty to sixty women account for % of all human cases of infertility. Thus, research and awareness on PCOS are more important than ever. Based on the aforementioned considerations, a polyhedral formulation must be created in order to minimize the expense, time, and adverse effects of the current treatment.

**KEYWORDS:**Hyperandrogenic, Infertility, Polycystic ovary syndrome, Polyhedral formulation.

**INTRODUCTION:****1. Polycystic Ovarian Syndrome (PCOS):**

Originally recognized by Stein and Leventhal in 1935, polycystic ovarian syndrome is associated with changes in androgen production and metabolism at reproductive age may be explained by prolonged oligo-anovulation, polycystic ovarian morphology, psychological issues, and metabolic abnormalities, particularly insulin resistance and compensatory hyperinsulinemia. Many clinicians find it difficult to identify this widespread condition because there aren't any precise diagnostic standards. Reproductive abnormalities are a greater risk for women with PCOS. There are expanding ideas explaining about hormone imbalance, but no one knows the exact cause. Hyperandrogenism, polycystic ovaries, and several metabolic abnormalities (including insulin resistance and hyperinsulinemia) are its defining characteristics<sup>[1]</sup>. For women with PCOS, typical management currently includes both pharmaceutical therapies and lifestyle change. Diet, exercise, and weight loss are all linked to lifestyle changes. Pharmaceutical treatments include antiandrogens (flutamide, spiro lactone), hypoglycemia medications (metformin, thiazolidinediones), and combination estrogen-progestin (oral contraceptives). Despite being beneficial, this type of treatment is extremely costly and may result in weight gain, gastrointestinal issues, irregular menstruation, and increased insulin resistance, among other unfavorable effects.

Historically, therapeutic plants have received particular focus. As the result of multiple experiments, valuable and helpful medicinal plants have been found today. Because the discovery of these medications' side effects is crucial, numerous studies-involving animal experiments, case studies, and randomized controlled trials-have been conducted on the subject are looked at for herbal medications. In addition to having around twice the testosterone levels of normal women, PCOS-afflicted women frequently have insulin resistance. More recent rat PCOS models have now been created and verified. These investigations offer novel insights into the physiology of polycystic ovary and prolonged anovulation. Understanding the reality of a human disease requires moving from scientific concepts to animal models. Preclinical studies, medicinal screens, and fundamental reproductive biology research can all be conducted using validated animal models. Animal models of PCOS and persistent anovulation, however, might not accurately replicate the reproductive processes observed in the human condition.

**2. Symptoms:**

Symptoms that appear later in your twenties or thirties, such as the onset of your first period or health problems. Although each woman experiences these symptoms differently, for a patient to be diagnosed with polycystic ovarian syndrome, they need to have at least two of the following conditions:

- Acne not associated with puberty
- Absent periods
- Excessive hair growth
- Fluid retention
- Fatigue

- Irregular periods
- Heavy or prolonged periods
- Menstrual pain
- Infertility
- Ovarian cysts
- Weight gain
- Mood swings

Thirty to forty percent of cases of infertility are female. One of the most prevalent endocrine disorders in women, PCOS affects around 5–10% of women who are fertile, and it is believed to be a major contributor to female subfertility<sup>[2-3]</sup>.

**3. Causes of PCOS:**

PCOS causes include genetic predisposition, Strong adrenal stimulation during childhood, elevated insulin levels, contraceptive pill use, hormonal imbalance, and stress are some of the causes<sup>[4]</sup>.

**4. Organs afflicted with PCOS:**

1. ADRENAL GLAND- the gland situated just above each kidney
2. OVARY- the female gonad organ located on either side of the uterus is called an ovary.
3. PITUITARY GLAND- the pituitary gland; located directly beneath the brain; is in charge of all hormone regulation.
4. PANCREAS- the pancreas is the gland in our body that makes insulin.

The ovaries produce more ANDROGEN than usual, which inhibits the development of ovarian follicles. Thus, ovum misforms and is not released, which results in anovulation. During sex, sperm and ovum come into contact and result in conception. Therefore, if a woman has PCOS, her inability to conceive is caused by the lack of ovum. PCOS is linked to a number of anatomical abnormalities. Ovarian cysts in PCOS cause the ovaries to grow two to five times their normal size. There is more Stroma. The capsule is bright white in color and has thickened. The typical oval-shaped ovary will have several cysts inside of it<sup>[5]</sup>. According to a poll, eating poorly is the main lifestyle factor that causes PCOS. Young, anxious women with PCOS frequently consume excessive amounts of fat, sugar, carbonated beverages, and highly processed carbs, which raises insulin levels in an unhealthy way. Insulin causes the characteristic symptoms of PCOS by stimulating androgen receptors outside of the ovary, which also prevents the release of ovum from the follicle. This kind of diet will result in obesity, which will exacerbate PCOS and also cause PCOS that is linked to obesity to develop. Stressful modern lives and eating habits are related to numerous disorders, including PCOS, and can cause or worsen them.

**5. Necessity to Study PCOS:**

PCOS affects two out of every ten Indian women, according to a PCOS Society study. Six of the ten women with PCOS diagnoses are teenagers. According to a study conducted by the 40–45% of women who are of reproductive age have PCOS, according to the AIIMS Department of Endocrinology and Metabolism.

Although 35–50% of women with PCOS have fatty livers, 60% of them are obese. Roughly 70% of people are insulin resistant, 60–70% have elevated testosterone levels, and 40–

60% are glucose intolerant. Despite the lack of a definite etiology, some PCOS-Insulin levels are greater in afflicted women than normal. Excessive insulin production can lead to increased androgen production in the ovaries, including testosterone. Because insulin resistance can make weight loss more difficult, obesity is a common problem among women with PCOS<sup>[6]</sup>. It is risky because, among other long-term health issues, undetected or poorly treated conditions might result in infertility. A variety of symptoms, including weight gain, exhaustion, unwelcome hair growth, hair thinning, infertility, acne, pelvic pain, migraines, sleep issues, and mood swings, are present in girls and women with PCOS. On the other hand, it results in diabetes mellitus, hypertension, and aberrant blood lipid levels in elderly people. Comparisons between homeopathy, ayurveda, and allopathy show that while homeopathy and ayurveda are considered the most promising and side-effect-free treatments, allopathy does not cure PCOS; instead, it helps manage and control symptoms and demands more time and money. Thus, research and awareness on PCOS are more important than ever. The development of a polyherbal formulation is necessary in light of the aforementioned criteria in order to minimize the expense, duration, and unfavorable outcomes of the present course of treatment.

When used for flavor, fragrance, or medicinal purposes, a plant, plant component, or extract is sometimes referred to as a herb in trade. Herbal remedies from conventional medicine are organic compounds that have been utilized to treat a variety of conditions with little to no industrial processing. Preventive, curative, and rehabilitative roles have been established by traditional medicine. Because herbal remedies typically have less adverse effects than pharmaceuticals and are generally relatively soft on the body, they can be an extremely effective therapy option for PCOS<sup>[14]</sup>. The use of herbal therapy has peaked. It is competing to be acknowledged as a science, a distinct field of study with its own character. It is now necessary to show that herbal rehabilitation can hold its own against other medical specializations in terms of the scope of its practical application and scientific investigation. Compared to conventional therapy, herbal therapy has a number of benefits, including safety and fewer side effects. Additionally, the presence of several active ingredients in therapeutic plants results in a potentiating effect. Herbs have less adverse effects and can be used for extended periods of time, which is important as, PCOS requires long duration of care. They have demonstrated effectiveness in managing the underlying reasons of PCOS, improvising physical recovery and relieving symptoms through increased immunity. To increase the efficacy of the selected botanical treatment, we can combine the herbal treatments with a PCOS-friendly diet and exercise regimen<sup>[7]</sup>.

#### **6. Ayurvedic herbal remedy for PCOS:**

An Ayurvedic treatment involves using a multifaceted strategy to address: Restoring hormonal balance, managing obesity and preventing hypercholesterolemia, and addressing insulin resistance.

#### **6.1. Liquorice:**

Botanical name: Leguminosae family; *Glycyrrhiza glabra*. During the ten healthy women in their luteal phase of the menstrual cycle, ages 25 to 28, had their androgen metabolism examined in relation to liquorice. For two cycles, they occupied 5.5 g of a commercial licorice extract (consisting of 8.6% W/W glycyrrhizic acid) per day. They didn't received any other medical treatment. Radioimmunoassay was used to evaluate blood levels of gonadal and adrenal androgens, cortisol, aldosterone, and plasma renin activity. The total serum testosterone level gradually decreased over the course of four months. It returned to its pretreatment levels once the treatment was stopped. One possible way that licorice can reduce serum testosterone levels is by blocking the enzymes 17-hydroxysteroid dehydrogenase and 18-19 lyase. An adjuvant treatment for hirsutism and polycystic ovarian syndrome may involve the use of licorice<sup>[8]</sup>.

#### **6.2. Aloe-vera:**

The family is Liliaceae, and the botanical name is *Aloe barbadensis*. An investigation was conducted utilizing a rat model of PCOS to assess the efficacy of an Aloe vera gel formulation. To produce PCOS, five-month-old female Charles Foster rats were given oral doses of the non-steroidal aromatase inhibitor letrozole. After that, the rats received an oral dosage of 2 milliliter of the Aloe vera gel formulation per day for 55 days. As a result, their glucose sensitivity and steroidogenic activity were all restored. By co-treating the PCOS, the phenotypic's development was prevented. Aloe vera gel and the inductive substance (letrozole). Because aloe vera gel formulation restores ovarian steroid status and modifies important steroidogenic action, it protects against the PCOS characteristic. The phyto-components in the extract provide an explanation for this<sup>[9]</sup>.

#### **6.3. Flax Seed:**

The botanical name is *Linum usitatissimum*, Family: Linaceae. In a research, the results of a 40-gram daily flaxseed supplement on a 41-year-old PCOS woman's hormone levels were noted. Over a span of four months, the patient finished 83% of the recommended dosage of flaxseed. Significant changes were observed in body mass index (BMI), free serum testosterone levels, total serum testosterone, and insulin decreased, based on weight-height ratios and fasting blood samples collected at baseline and the 6-month mark. At the conclusion of the study, the patient also mentioned that her hirsutism had decreased. The case study reports a concurrent decrease in hirsutism and a clinically significant decrease in testosterone levels<sup>[10]</sup>.

#### **6.4. Fennel Seeds:**

It is thought that fennel seeds can help cure PCOS because of its anti-hirsutism properties and capacity to reduce androgen (male hormone) levels. Improving the effects of insulin therefore occurs in the insulin signaling pathway. Fifteen PCOS-affected women were randomized to either a placebo or daily oral cinnamon for ten weeks. When post-treatment insulin sensitivity indices were compared to baseline insulin sensitivity indices using fasting and 4-hour oral glucose

tolerance tests, significant reductions in insulin resistance were seen in the cinnamon group but not in the placebo group<sup>[11]</sup>.

#### 6.5. Red Clover (*Trifolium pretense*):

This herb has isoflavones, which the body absorbs and converts to phytoestrogens. Therefore, red clover works similarly to estrogen. Red clover is used to filter the blood and treat acne caused by conditions like polycystic ovarian syndrome. Red clover adverse effects include headaches, bleeding in the vagina, and dermatitis.

This herb should not be taken if you are pregnant or nursing, have endometriosis, breast cancer, ovarian cancer, or any other ailment that is made worse by estrogen exposure. If you have a bleeding issue of any kind, stay away from red clover as it may also make bleeding more likely<sup>[12]</sup>.

#### 6.6. Green Tea:

The potent antioxidants in green tea, known as catechins, which decrease the hormone levels that are responsible for occurrence ovarian cysts and the symptoms linked with them. The antioxidants in green tea can maintain insulin levels. Daily consumption of green tea also helps you lose this extra weight and reduces the weight gain that is linked to PCOS.

#### 6.7. Pumpkin Seeds:

Omega-3 fatty acids in pumpkin seeds aid in controlling the increased insulin and associated with PCOS. They also contain beta-sitosterol, that can treat PCOS symptoms like acne, hirsutism and weight gain<sup>[13]</sup>.

#### 6.8. Tulsi:

Because ovulation does not occur, the androgens are not used. Furthermore, the liver produces relatively little SHBG protein. This explains why women have problems becoming pregnant, acne as well as excessive facial hair growth. It has the ability to lower insulin levels and control androgens. It's also an excellent antioxidant. On an empty stomach, chew at least ten leaves first thing in the morning. Take one cup of boiled tulsi water every day.

#### CONCLUSION:

These days, ovarian cysts are a pretty frequent medical problem. Together with the other medications you are taking, nature has provided us with a plethora of herbal remedies for ovarian cysts that may be utilized in cases that are both benign and malignant. In many situations, these herbs are so powerful on their own that they can effectively treat ovarian cysts naturally. They also improve the results of conventional treatments.

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