Volume 4, Issue 1
January I 2026

Agri Roots
e- Magazine

www.agrirootsmagazine.in

ISSN: 2583-9071

The Potential Role of Herbal Medicines in the Treatment and Management of Polycystic Ovary Syndrome (PCOD/PCOS)

ARTICLE ID: 0329

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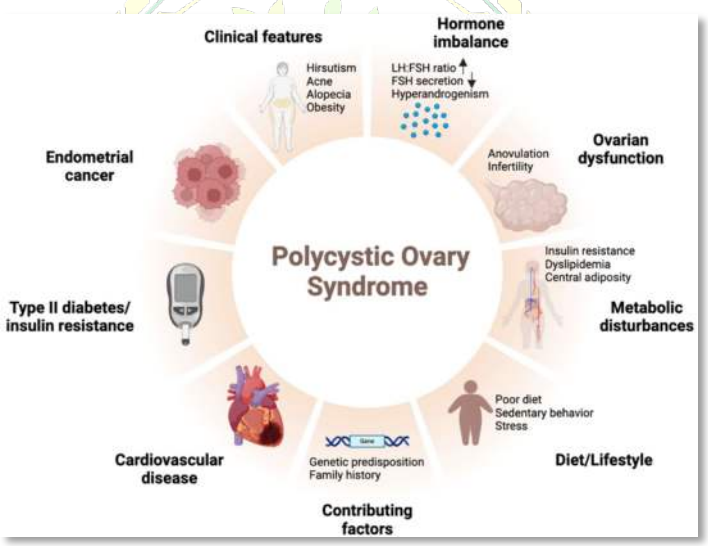
Polycystic ovary syndrome (PCOS/PCOD) is a common endocrine disorder characterized by hormonal imbalance in women of reproductive age. It is often associated with irregular menstrual cycles, anovulation, infertility, and hyperandrogenism. If left untreated, PCOS may lead to serious long-term health complications such as type 2 diabetes mellitus, cardiovascular diseases, and metabolic syndrome (Kapoor & Hasan, 2025).



Most women with PCOS exhibit multiple small cysts in the ovaries, giving rise to the term *polycystic ovary syndrome*. These cysts represent immature antral follicles that fail to develop properly, resulting in anovulation. In a normal menstrual cycle, a dominant follicle matures and releases an ovum, whereas in polycystic ovaries, follicular arrest prevents ovulation. Elevated levels of androgens such as testosterone and androstenedione contribute to clinical symptoms including hirsutism, acne, and menstrual irregularities.

The exact prevalence of PCOS remains uncertain due to variations in diagnostic criteria. According to the World Health Organization, over 116 million women worldwide were affected by PCOS in 2012 (Yadav et al., 2020). In India, PCOS affects approximately one in five women. Ultrasonographic studies indicate that 8–25% of asymptomatic women may have polycystic ovaries, while nearly 14% of women using oral contraceptives show similar features. Menstrual irregularities such as amenorrhea and menorrhagia are reported in 14.6–22.8% of Indian women with PCOS. Insulin resistance, a key etiological factor of PCOS, is particularly prevalent among the Indian population, thereby increasing disease susceptibility.

Herbal Medicines for the Treatment of PCOD/PCOS

Herbal medicines have shown promising potential in the management of PCOS by improving insulin resistance, regulating hormonal imbalance, restoring ovulation, and alleviating metabolic disturbances (Figure 1).

1. Ginger (*Zingiber officinale*)

Zingiber officinale belongs to the family Zingiberaceae. Its rhizome contains bioactive compounds such as 6-gingerol, shogaol, zingiberene, zingiberone, and gingerenone. Ginger has demonstrated significant anti-inflammatory and antioxidant properties. Studies indicate that ginger improves insulin sensitivity, reduces body weight, and enhances lipid profiles. Experimental studies on PCOD-induced Wistar rats revealed that 6-gingerol lowers sex hormone levels and improves ovulation, suggesting its role as an adjunct therapy in PCOD management.

2. Coconut Palm (*Cocos nucifera*)

Cocos nucifera (family Arecaceae), commonly known as coconut, exhibits strong antioxidant and estrogenic properties. Flower extracts of *C. nucifera* have been shown to reduce letrozole-induced PCOD in rats by restoring FSH and LH levels, increasing ovarian weight, improving lipid profiles, and normalizing blood glucose levels. These effects are attributed to its flavonoid content and hypoglycemic activity.

3. Turmeric (*Curcuma longa*)

Curcuma longa, a member of the Zingiberaceae family, is widely used in traditional Indian medicine. Curcumin, the principal bioactive compound, possesses antioxidant, anti-inflammatory, antihyperlipidemic, and hypoglycemic properties. Curcumin has been reported to lower blood glucose, regulate elevated hormone levels, improve lipid metabolism, and promote ovulation, making it beneficial in PCOD management.

4. Liquorice (*Glycyrrhiza glabra*)

Glycyrrhiza glabra (family Leguminosae) contains glycyrrhizic acid, liquiritin, isoliquiritin, and glabridin. These compounds exhibit estrogen-like activity and lipid-lowering effects. Licorice has been shown to enhance oocyte fertilization and embryonic development. Combined therapy with spironolactone has demonstrated improved outcomes in women with PCOS.

5. Cinnamon (*Cinnamomum zeylanicum*)

Cinnamomum zeylanicum belongs to the Lauraceae family and contains cinnamaldehyde, polyphenols, and procyanidins. Cinnamon exhibits antioxidant, anti-inflammatory, and hypoglycemic activities. Clinical studies suggest that cinnamon improves insulin sensitivity, reduces low-density lipoprotein levels, and helps regulate menstrual cycles in women with PCOD.

6. Peppermint (*Mentha piperita*)

Mentha piperita (family Lamiaceae) contains essential oils such as menthol, limonene, and flavonoids. Peppermint has been shown to reduce testosterone levels and body weight in PCOS models. Its antioxidant properties aid in restoring ovarian morphology, improving ovulation, and normalizing endocrine hormone secretion.

7. Pomegranate (*Punica granatum* L.)

Pomegranate is rich in vitamins, minerals, ellagitannins, ellagic acid, and flavonoids. Obesity being a major risk factor for PCOD, pomegranate leaf extract has demonstrated significant reductions in body weight, triglycerides, blood glucose, and free testosterone levels in PCOD-induced animal models.

8. Aloe vera (*Aloe barbadensis* Mill.)

Aloe vera contains phytosterols, anthraquinones, chromones, polysaccharides, and enzymes with antioxidant and hypoglycemic properties. Studies show that aloe vera improves insulin sensitivity, restores estrous cyclicity, enhances steroidogenesis, and improves lipid profiles in PCOD-induced rats.

9. Bamboo (*Bambusa bambos*)

Bambusa bambos (family Poaceae) exhibits strong antioxidant activity. Bamboo seed consumption has been shown to lower blood glucose, triglycerides, and LDL cholesterol while restoring estrous cyclicity, thereby aiding in PCOS management.

10. Fenugreek (*Trigonella foenum-graecum*)

Fenugreek, a member of the Fabaceae family, possesses hypolipidemic, antioxidant, anti-inflammatory, and hypoglycemic properties. Clinical studies suggest that fenugreek, when combined with metformin, improves menstrual regularity and ovarian morphology in PCOS patients.

11. *Gymnema sylvestre*

Gymnema sylvestre is widely used in Ayurveda for diabetes management. It also exhibits antiandrogenic activity. Ethanolic leaf extracts have been shown to reduce elevated androgen levels and correct menstrual irregularities in PCOS animal models.

Figure 1. *Medicinal plants used in PCOS management: (a) Gymnema sylvestre, (b) Fenugreek (Trigonella foenum-graecum), (c) Coconut palm (Cocos nucifera), (d) Aloe vera, (e) Cinnamon (Cinnamomum zeylanicum), (f) Liquorice (Glycyrrhiza glabra), (g) Turmeric (Curcuma longa), (h) Peppermint (Mentha piperita), (i) Pomegranate (Punica granatum L.), (j) Bamboo (Bambusa bambos), (k) Ginger (Zingiber officinale).*

Conclusion

PCOS is one of the most prevalent hormonal disorders affecting women from adolescence to pre-menopause. It is associated with infertility, metabolic dysfunction, cardiovascular risks, and long-term health complications. Although conventional

pharmacological therapies are effective, their adverse effects limit long-term use. Herbal medicines offer a safer, cost-effective, and holistic alternative for managing PCOS by addressing both metabolic and reproductive abnormalities, thereby improving patient compliance and quality of life.

References

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