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Review of Ayurvedic Herbs Used in Hormonal Regulation of Polycystic Ovarian Disorder (PCOD)

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Abstract

Polycystic Ovarian Disorder (PCOD) is a prevalent endocrine and metabolic disorder characterized by hyperandrogenism, insulin resistance, chronic anovulation, and menstrual irregularities, leading to significant reproductive and metabolic complications. Conventional therapeutic approaches primarily target symptom control; however, long-term use is often associated with adverse effects and limited efficacy. This review critically evaluates the role of Ayurvedic herbs in the hormonal regulation of PCOD, emphasizing their pharmacological mechanisms, clinical efficacy, safety profiles, and potential integration with conventional therapies.

Findings indicate that Ayurvedic herbs such as *Shatavari*, *Ashwagandha*, *Gokshura*, *Turmeric*, *Fenugreek*, *Neem*, and *Guduchi* exert multi-targeted actions on endocrine pathways central to PCOD pathophysiology. While existing evidence supports their therapeutic potential, further large-scale randomized clinical trials are required to establish standardized protocols and validate long-term safety and efficacy.

Keywords: PCOD, Ayurveda, Herbal Medicine, Hormonal Regulation, Insulin Resistance, Endocrine Modulation.

1. Introduction

Polycystic Ovarian Disorder (PCOD) is one of the most common endocrine disorders affecting women of reproductive age, with a prevalence ranging from 6% to 20% depending on the diagnostic criteria applied. The disorder is characterized by complex hormonal dysregulation involving hyperandrogenism, altered gonadotropin secretion, insulin resistance, and chronic low-grade inflammation, resulting in impaired folliculogenesis and ovulatory dysfunction. Clinically, PCOD manifests as menstrual irregularities, infertility, hirsutism, acne, obesity, and an increased risk of metabolic syndrome and long-term cardiovascular complications.

Hormonal regulation remains central to PCOD management, as excessive androgen production and insulin resistance exacerbate ovarian dysfunction and associated metabolic abnormalities. Although conventional therapeutic strategies such as oral contraceptives, insulin sensitizers, and ovulation-inducing agents are widely employed, they often provide symptomatic relief without addressing the underlying endocrine and metabolic disturbances. Recent studies have highlighted the need for integrative and long-term management approaches that target both reproductive and metabolic components of PCOD (Ankita et al., 2023; Balkrishna et al., 2023).

Ayurveda conceptualizes PCOD as a disorder arising from an imbalance of Kapha and Pitta doshas, impaired Agni (digestive and metabolic fire), and obstruction of reproductive channels (Srotorodha), leading to disturbed Artava dhatu and abnormal follicular development. Contemporary clinical and observational studies have reported favorable outcomes with Ayurvedic interventions, including improved menstrual regularity, hormonal balance, and metabolic parameters, supporting their relevance in modern PCOD management (Singh et al., 2024; Sahu & Mishra, 2024). Accordingly, Ayurvedic management emphasizes a holistic approach integrating herbal therapy, dietary regulation, lifestyle modification, and metabolic correction. This review aims to elucidate the pharmacological basis and clinical relevance of Ayurvedic herbs in regulating endocrine pathways implicated in PCOD.

2. Methodology

This narrative review synthesizes data from peer-reviewed clinical trials, observational studies, experimental pharmacological research, and classical Ayurvedic texts focusing on herbs traditionally used for hormonal regulation in PCOD. Electronic databases including PubMed, Scopus, Google Scholar, and ScienceDirect were searched, with emphasis on studies reporting outcomes related to androgen levels, insulin sensitivity, ovarian morphology, inflammation, and oxidative stress (Panda et al., 2020).

Experimental studies using PCOD-induced animal models, particularly mice, were briefly analyzed to understand mechanistic insights. These studies commonly involved induction of PCOD using agents such as letrozole or estradiol valerate, followed by treatment with herbal extracts and assessment of hormonal profiles, follicular development, ovarian histology, and insulin resistance markers. Safety profiles, herb–drug interactions, and compatibility with conventional therapies were also evaluated.

3. Review of Ayurvedic Herbs

Shatavari (*Asparagus racemosus*)

Shatavari exhibits phytoestrogenic and adaptogenic properties, supporting estrogen balance, regulation of menstrual cycles, and enhancement of follicular development. Experimental and clinical studies suggest its role in improving ovarian responsiveness and fertility outcomes (Sharma, 2005). Recent systematic and observational reviews have further highlighted the role of *Asparagus racemosus* in hormonal modulation and reproductive health among women with PCOD, supporting its relevance in integrative management approaches (Ankita et al., 2023; Singh et al., 2024).

Ashwagandha (*Withania somnifera*)

Ashwagandha functions as an adaptogen, reducing stress-induced endocrine disruption through regulation of cortisol levels. It also improves insulin sensitivity and metabolic parameters, indirectly supporting ovarian function in PCOD (Mishra et al., 2000). Recent clinical and lifestyle-intervention studies have emphasized its role in improving hormonal balance, stress-related metabolic dysfunction, and insulin resistance in PCOD patients (Balkrishna et al., 2023; Singh et al., 2024).

Gokshura (*Tribulus terrestris*)

Gokshura has been reported to modulate androgen synthesis and improve ovulatory function. Its application in endocrine disorders supports reproductive health by balancing gonadotropin and androgen levels (Patel & Shah, 2018). Contemporary reviews on polyherbal and Ayurvedic formulations have identified *Tribulus terrestris* as a key component in androgen regulation and ovulatory improvement in PCOD management (Priya & Rana, 2023; Sahu & Mishra, 2024).

Turmeric (*Curcuma longa*)

Curcumin, the active constituent of turmeric, exhibits potent anti-inflammatory and antioxidant properties. It reduces ovarian inflammation, oxidative stress, and insulin resistance, which are central contributors to PCOD pathogenesis (Aggarwal & Harikumar, 2009). Recent studies and integrative medicine reviews continue to support curcumin's role in metabolic regulation, insulin sensitivity, and reduction of chronic inflammation associated with PCOD (Ankita et al., 2023; Singh et al., 2024).

Fenugreek (*Trigonella foenum-graecum*)

Fenugreek enhances insulin sensitivity and improves glycemic control. Clinical studies have demonstrated reductions in ovarian cyst volume and improvements in menstrual regularity among women with PCOD (Bashtian et al., 2013). Recent reviews have reinforced fenugreek's role as an insulin-sensitizing agent in PCOD, particularly when used as part of polyherbal or lifestyle-based interventions (Priya & Rana, 2023; Balkrishna et al., 2023).

Neem (*Azadirachta indica*)

Neem demonstrates hypoglycemic, anti-androgenic, and anti-inflammatory effects, contributing to improved metabolic and endocrine balance in PCOD (Kumar & Rungta, 2016). Recent observational and Ayurvedic management studies have highlighted neem's supportive role in regulating blood glucose levels and reducing hyperandrogenic manifestations in PCOD patients (Singh et al., 2024; Sahu & Mishra, 2024).

Guduchi (*Tinospora cordifolia*)

Guduchi exhibits immunomodulatory, antioxidant, and metabolic regulatory properties. Experimental animal studies indicate its role in improving insulin resistance and supporting ovarian function (Zade & Dabhadkar, 2015). Recent literature has emphasized its relevance in managing metabolic inflammation and endocrine imbalance associated with PCOD when used as a component of holistic Ayurvedic regimens (Ankita et al., 2023; Singh et al., 2024).

Overall Mechanistic Perspective

Collectively, these herbs influence key endocrine pathways, including the hypothalamic–pituitary–ovarian axis, insulin signaling, androgen biosynthesis, inflammatory cascades, and oxidative stress mechanisms implicated in PCOD pathophysiology. Recent evidence supports their role as complementary and integrative therapeutic agents in long-term PCOD management (Panda et al., 2020; Balkrishna et al., 2023; Singh et al., 2024).

4.Results

Ayurvedic Herbs Used in Hormonal Regulation of PCOD

Herb	Botanical name	Key action	Effect on PCOD
Shatavari	*Asparagus racemosus*	Phytoestrogenic, adaptogenic	Regulates menstrual cycle, supports folliculogenesis
Ashwagandha	*Withania somnifera*	Adaptogenic, anti-stress, insulin-sensitizing	Reduces cortisol, improves insulin resistance
Gokshura	*Tribulus terrestris*	Androgen-modulating	Improves ovulation and reproductive function

Turmeric	*Curcuma longa*	Anti-inflammatory, antioxidant	Reduces ovarian inflammation and metabolic stress
Fenugreek	*Trigonella foenum-graecum*	Hypoglycemic, insulin-sensitizing	Improves insulin sensitivity and menstrual regularity
Neem	*Azadirachta indica*	Anti-androgenic, hypoglycemic	
Guduchi	*Tinospora cordifolia*	Immunomodulatory, antioxidant	Improves metabolic regulation and endocrine homeostasis

5. Conclusion

Ayurvedic herbs demonstrate significant potential in the hormonal management of PCOD through multi-targeted mechanisms addressing endocrine imbalance, metabolic dysfunction, inflammation, and oxidative stress. Evidence from clinical studies and experimental animal models supports their role in improving ovarian function, insulin sensitivity, and hormonal profiles. However, despite encouraging preliminary findings, there remains a critical need for well-designed, large-scale randomized controlled trials to establish standardized formulations, dosage regimens, and long-term safety. Integrating Ayurvedic herbal therapies with conventional treatment modalities may provide a holistic, patient-centered, and sustainable.

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