

# Phytochemical Interventions for Polycystic Ovary Syndrome : (PCOS) Systematic Review

Vruttika Katore<sup>1</sup>; Amruta Bhingare<sup>2</sup>

<sup>1</sup> Under Graduate Scholar, Jagadmba Education Society's S.N.D.College of Pharmacy Babhulgaon, Yeola .

<sup>2</sup> Assistant Pofessor, Jagadmba Education Society's, S.N.D.College of Pharmacy Babhulgaon, Yeola.

**Abstract:-** Worldwide, 2.2-26% Many women who are fertile experience PCOS, a complicated the Endocrine, metabolic, and genetic condition. Pale menstruation, infertility, hirsutism, acne, and insulin resistance are some of the symptoms of PCOS, which is typified by polycystic ovaries, persistent anovulation, and hyperandrogenism. While they come with risks and adverse effects, conventional treatments frequently target specific ailments. Herbal remedies, on the other hand, present a viable, low-risk substitute. The effectiveness of several botanicals, such as Ashoka, Shatavari, Lodhra, Guduchi and Haritki in reducing PCOS symptoms is highlighted in this review. These herbs improve ovarian morphology and lower hyperandrogenism; they also have hypoglycemic, anti-obesity, and hormone-regulating qualities. Other herbs that are useful for hormone imbalance, reproductive dysfunction, depression, menstruation include The plants *Phyllanthus emblica* and *Bauhinia variegata*. *Bellirica terminalia*. *Hypericum perforatum* with *Tribulus terrestris*. anomalies. Notably, there have been no documented adverse effects and these phytotherapeutic approaches are well tolerated. The goal of this review is to compile the body of research regarding the use of natural plants to treat PCOS, with a focus on the possibility of herbal formulations as a safe, effective, supplemental management strategy for condition.

**Keywords:-** PCOS or Polycystic Ovarian Syndrome , Ovarian Morphology , Hypoglycemic Consequences , Hormone Regulation Alternative and Complementary Therapies, Ashoka, Shatavari, Lodhra, Guduchi ,Tulsi and Haritaki.

## I. INTRODUCTION

Millions of women worldwide who are of reproductive age suffer from PCOS, an endocrine illness that is complex and varied. In addition to its characteristic polycystic ovarian shape and prolonged oligoanovulation, PCOS is frequently accompanied by a variety of metabolic disorders and psychosocial problems. A crucial metabolic dysfunction Compiling the body of knowledge on the usage of natural plants is the aim of this review. These insulin-related problems have far-reaching effects, since they interfere with the metabolism and synthesis of androgens, resulting in a variety of symptoms such as obesity, infertility, monthly abnormalities, and hyperandrogenism. Because of this, The core causes of PCOS are compensatory hyperinsulinemia and insulin resistance. long-term wellbeing is afflicted women.

This emphasizes the necessity of thorough knowledge, prompt diagnosis and efficient management techniques.[1] PCOS is still a complicated and mysterious disorder that does not respond well to a single therapeutic intervention because its mechanism is unknown. The basic processes causing this illness remain unclear despite a great deal of investigation. With genetic and environmental variables interacting to affect gene expression and contribute to the development of PCOS, there is emerging evidence that the condition may have epigenetic roots. Understanding PCOS is complicated by this epigenetic component, which makes it difficult to find a treatment that works for everyone. This underscores the necessity for ongoing study into the basic biology of PCOS, as present therapeutic approaches frequently concentrate on treating symptoms rather than the underlying reasons.[2] The pathogenesis of PCOS is uncertain, however it is certainly influenced by epigenetic factors. Its development is influenced Life quality is significantly impacted negatively by PCOS, effective treatment challenging. Current management options Despite growing research, the underlying mechanisms are still not well understood, and most treatments focus more on symptom relief than the underlying causes [3, 4] Because of its efficacy and safety record, herbal formulations have grown in popularity in recent years. Unlike conventional medicines, herbal remedies have a much wider range of active components and fewer side effects. Specifically, herbs like Ashoka, Shatavari, Lodhra, Guduchi, Tulsi, and Haritki have a history of being effective in treating a variety of conditions. That's why everyone searching for natural medicines should consider them. [5]

### ➤ Limitations of Conventional Treatments

Traditional Western medicine, surgery and treatments often focus on alleviating specific symptoms, sbut may be accompanied by risks, side effects, and interactions. These conventional methods can be inadequate, ineffective, or even harmful in some cases.

### ➤ Emerging Role of Herbal Formulations

Fortunately, complementary and alternative medicine offers promising solutions. Herbal formulations containing extracts of Ashoka , Lodhra, Shatavari, Tulsi , Guduchi , Haritaki have garnered attention for their natural, due to the interplay between environmental and genetic variables, creating the. These plants' complex chemical constituents exhibit significant effects on PCOS, despite their mechanisms of action being partially understood. Marketed formulations combining these herbs have received positive feedback from PCOS patients.[1,2]

➤ *Objective:*

This article aims to summarize the most effective herbs and formulations playing a critical role in PCOS treatment, highlighting their potential to modulate serum hormone levels and ovarian morphology. By exploring these plant-based herbal formulations, we may uncover new bioactive products and advance our understanding of PCOS management. [1]

A number of conditions include compensatory hyperinsulinemia, which may be the cause of altered androgen production and metabolism in reproductive age, chronic oligoanovulation, polycystic ovarian morphology, psychological problems, and metabolic abnormalities, primarily insulin resistance.[2]

➤ *Types of PCOS:*

PCOS is Classified into various types,

- Post-Pill PCOS,
- Adrenal PCOS,
- Inflammatory PCOS,
- Insulin Resistance PCOS,

➤ *Causes of PCOS:*

- PCOS is caused by genetic susceptibility.
- The relationship between fat and insulin resistance Adrenal gland activation is high in children.
- imbalance in hormones. Buildup of toxicity Ovarian and uterine inflammation under stress

➤ *Additional Factors Contributing to PCOS*

- Environmental factors (e.g., exposure to endocrine disruptors)
- Lifestyle factors (e.g., poor diet, sedentary lifestyle) ,
- Family history ,
- Ethnicity (e.g., higher prevalence in South Asian women)
- Early menarche ,
- Childhood obesity

➤ *Pathophysiology of PCOS*

- Hormonal imbalance (e.g., hyperandrogenism, insulin resistance
- Insulin resistance and metabolic disorders ,
- Inflammation and oxidative stress [6,9]

➤ *Menstrual Cycle Problem:*

- The most typical signs of PCOS Either amenorrhea or oligomenorrhea are the most common symptoms of PCOS. But it might also result in other issues related to menstruation. [10]
- It is said that hormones influence the menstrual cycle in females.
- The ovaries, the pituitary gland, and the hypothalamus regulate when it starts.
- Through the pituitary gland, luteinizing hormone (LH) and follicle-stimulating hormone (FSH) are released.

LHRH, or luteinizing hormone releasing hormones, are produced by the hypothalamus then stimulate this pituitary gland.

- Women's ovarian follicle stimulation is regulated by both the hormones FSH and LH.
- Progesterone and estrogen are hormones that are produced by the ovaries. Maintaining the balance of these hormones controls the menstrual cycle.
- There are three stages to the menstrual cycle stages include the ovulatory, luteal / secretory, and follicular proliferative stages.
- Hormonal tablets which are also used for birth control are used to treat irregular menstrual periods.[11]

## II. TREATMENT OF PCOS WITH HERBAL INGREDIENT

➤ *Ashoka:*

The plant is known as *Saraca asoca*. The Leguminosae family Tree parts that are named after the word "nag suffering." Ashoka has a number of therapeutic uses. For its many health advantages, the Ashoka tree is well known. Ashoka leaves and bark are sometimes used to treat women with menstrual disorders, including as dysmenorrhea stomachaches, and uterine spasms. Numerous tannins, flavonoids, and glycosides found in Ashoka tree bark constitute uterine tonic beverages. Ashoka tree roots and seeds are used to treat skin conditions such dermatitis, psoriasis, and acne in PCOS. Discomfort and stomach spasms caused by Ashoka tree tea that affect the uterine muscles and endometrium Additional disorders related to irregular menstrual periods, leucorrhea, fibroids, cysts and amenorrhea [12] further connected issues, As such, ashoka is frequently used in the treatment of women's gynecological and menstrual diseases. [13]



Fig 1 Ashoka Bark

➤ *Lodhra :*

The plant is known as *Symplocos racemose* The Symplocaceae Family In Ayurveda medicine, lodhra is a highly prized plant that treats problems specific to women. Because it is a flexible plant, lodhra is used in the Indian



medical system, both independently and in combination heal and in combination with other herbs in different formulations. *S. racemosa* has been shown to be benefit in treating Polycystic Ovary Syndrome (PCOS) Sin studies using a letrozole-induced female rat model. Important changes in ovarian tissue health, estrogen, testosterone, and progesterone levels have been seen. *S. racemosa* is a prospective therapeutic agent for the management of postpartum depression (pcod) due to its ability to boost fertility and avoid ovarian cell failure. Fifth, a crucial plant in Ayurveda medicine used to treat feminine diseases is *Symplocos racemosa* (Lodhra) (Family: Symplocaceae). Studies indicate that it is effective in managing PCOS. Enhancing the amounts of hormones estrogen, testosterone, progesterone) and ovarian health, thereby promoting fertility and preventing ovarian cell failure.[14,15]



Fig 2 Lodhara

➤ *Shatavari:*

The plant is known as *Asparagus racemosus*. The *Asparagus* family. The medicinal plant known as *Asparagus racemosus* is known by its Sanskrit name, shatavari. The plant's dried roots are used as medicine because they contain phytoestrogen. stimulates the growth of ovarian follicles, regulates the menstrual cycle, and revitalizes the female reproductive system. [16] With several health advantages, shatavari is regarded as one of the most important Ayurvedic herbs. It is a main component in a lot of Ayurvedic recipes. Typically it is a spiny, branching, woody, climbing shrub that can reach heights or lengths of 1-2 feet. [17] The roots have a diuretic, tonic, and medicinal function that increases cytoprotection and mucosal resistance. It also helps to dissolve cysts and stop new cysts from growing, cure hyperinsulinemia. Shatavari treats neuropathy, inflammation, tumors, and dyspepsia. It functions to regulate the HPO axis and hormone levels. [18]



Fig 3 Shatavari

➤ *Tulsi :*

The plant is known as *Ocimum sanctum* linn. The *Lamiaceae* family. Hypoglycemia and obesity are the two main medical conditions for which the holy herbal plant tulsi is used [19]. It treats polycystic due to its anti-androgenic qualities, which can help prevent ovarian syndrome. It prevents the synthesis of testosterone and regulates fat. [20] Since there is no proper ovulation mechanism, there is no androgen usage by the body. Unused testosterone is the unused androgens are the root cause of acne and hirsutism. Maintaining and using androgen levels appropriately is Tulsi's role. Moreover, it possesses antioxidant qualities. [21]



Fig 4 Tulsi

➤ *Guduchi:*

The plant is known as *Tinospora cordifolia*. The *Menispermaceae* family. The Guduchi. Numerous therapeutic effects, such as The medicinal herb *Menispermaceae* is linked to ovarian balance, an anti-inflammatory, an anti-stress, and

hypoglycemia. It is the stem portion that the pants employ. Using guduchi mostly for PCOS treatment. Ovarian cysts and irregular insulin levels are the main causes of tissue inflammation. Anti-inflammatory qualities are proposed for guduchi.. It helps the body's defenses against disease. Insulin resistance is a condition developed by women with PCOS, and it helps to overcome. It is also a plant that controls menses. [22,23]



Fig 5 Guduchi

#### ➤ Haritaki

The plant is known as: Terminalia chebula The Combretaceae Family Three fruits Amla, Haritaki, and Baheda can be combined or mixed to form a "triphala". Triphala, a plant that is rich in natural vitamin C and antioxidants, It is used because of its anti-inflammatory properties to treat PCOS. Triphala not only has cleansing and purifying properties, but it also aids in PCOS treatment. Triphala scavenges two types of radicals: superoxide and

diphenylpicrylhydrazyl. Consequently, it has anti-inflammatory properties. qualities. Phenolic chemicals, which are present in triphala extracts, have the property of scavenging free radicals. These substances mainly help to relieve the problem of irregular menstruation by altering hormone control.[24] "Tridoshic Rasayana" is described in Ayurveda as a medicinal substance that influences the vata, pitta, and kapha energies, which are the three constitutional energies. Its effects on these energies are balanced and revitalizing. Ayurveda believes that triphala is a blend of Pitta, Kapha, and Vatta, which makes it cleansing and well-balanced. Tridoshic [Rasayana] is a therapeutic substance that has the ability to balance and rejuvenate the three humors. (Vata, Pitta, and Kapha), is how triphala is referred to in an ancient Ayurvedic source a has a cold temperament, Harad, Baheda, and Amala have warm energies. Triphala as a medicine for internal cleaning and detoxification, is balance and effective because its including all [25]



Fig 6 Haritaki

Table 1 Hrebal Ingredient with Chemical Constituent

Herbal Ingredient	Alkaloids	Chemical Glycoside	Constituent Flavonoids	Tannins	Saponine
1.Ashoka	Ashokaline, Ashokine.	Ashokaside, Saracoside.	Quercetine, Kaempferol.	Catechine, Gallicacid	Ashokasaponins
2.Lodhra	Lodhrie, Symplocine, Symplocoside	Lodhroside, Symploside	Quercetin, Kaempferol	Catechine, Gallicacid	Lodhrasaponine
3.Shatavari	Asparagamine, Racemosine	Shatavaroside, Asparagoside	Quercetine	Catechine, Gallicacid Isorhapointigenin	Shatavarins , Asparaoside, Racemoide
4.Tulsi	Ocimine, Sanctamine	Tulsin, Ocimuoside	Quercetine, Kaempferol.	Catechine, Epicatechins, Proanthocynaides	Ocimumoside, Ursolicacid saponin
5.Guduchi	Tinosporine, Cordifoline, Palmatine	Tinoside, Cordifoside, Guduchioside	Quercetine, Kaempferol. Naringenin, Apigenin	Gallicacid, Ellagic acid, Chebulogic acid, Corilagin	Tinosporol
6.Haritaki	Chebuline, Chebulin, Terminaline	Chebulooside, Arjunolic acid, Terminolic acid	Quercetine, Kaempferol.	Gallicacid, Ellagic acid, Chebulogic acid, Corilagin	Tinosporol, Cordilfol, Guduchisaponin, Berberine



### III. CONCLUSION

Herbal medicines offer a safe and effective approach to managing Polycystic Ovary Syndrome (PCOS) and other reproductive disorders in women. Utilizing single herbs or combinations, such as Ashoka, Lodhra, Shatavari, Tulsi, Guduchi, and Haritaki, can provide therapeutic benefits without adverse side effects. The synergistic effect of combining herbs amplifies their pharmacological effects, making selection of appropriate herbs and combinations crucial.

### REFERENCES

- [1]. Ande SN, Pavitrakar KN, Bakal RL, Kochar NI. A comprehensive review on promisable herbal drugs for mitigation of polycystic ovarian syndrome. *Innov Pharm Pharmacother* 2022;10(2):35-40
- [2]. Purohit A, Jain S, Nema P, Jain DK, Vishwakarma H, Jain PK. A Comprehensive Review on Tailoring an Herbal Approach for Treatment of Polycystic Ovarian Syndrome. *Asian Journal of Dental and Health Sciences*. 2022; 2(1):27-32
- [3]. Norman RJ, Dewailly D, Legro RS, Hickey TE. Polycystic ovary syndrome. *Lancet*. 2007; 370(9588):685-97. [https://doi.org/10.1016/S0140-6736\(07\)61345-2](https://doi.org/10.1016/S0140-6736(07)61345-2)
- [4]. Celik O, Acbay O. Effects of metformin plus rosuvastatin on hyperandrogenism in polycystic ovary syndrome patients with hyperlipidemia and impaired glucose tolerance. *J Endocrinol Investig.* 2012; 35(10):905-10.
- [5]. Witchel SF, Oberfield SE, Peña AS. Polycystic ovary syndrome: Pathophysiology, presentation, and treatment with emphasis on adolescent girls. *J Endocr Soc* 2019;3:1545-73
- [6]. Balen A. The pathophysiology of polycystic ovary syndrome: Trying to understand PCOS and its endocrinology. *Best Pract Res Clin Obstet Gynaecol* 2004;18:685-706.
- [7]. Witchel SF, Oberfield SE, Peña AS. Polycystic ovary syndrome: Pathophysiology, presentation, and treatment with emphasis on adolescent girls. *J Endocr Soc* 2019;3:1545-73.
- [8]. Stener-Victorin E, Padmanabhan V, Walters KA, Campbell RE, Benrick A, Giacobini P, et al. Animal Models to Understand the Etiology and Pathophysiology of Polycystic Ovary Syndrome. *Endocr Rev* 2020;41:bnaa010.
- [9]. Diamanti-Kandarakis E. Polycystic ovarian syndrome: Pathophysiology, molecular aspects and clinical implications. *Expert Rev Mol Med* 2008;10:e3
- [10]. Tsilchorozidou T, Overton C, Conway GS. The pathophysiology of polycystic ovary syndrome. *Clin Endocrinol (Oxf)* 2004;60:1-17
- [11]. Sushma, L.P. Yadava. Potential Use of Saraca Asoca in the Management of Artavadoshti w.s.r. to Menstrual Disorders in Modern Era *International Journal of Ayurveda and Pharma Research*. 2021;9 (9):69-73
- [12]. Lai L, Flower A, Moore M, Prescott P, Lewith G. Polycystic ovary syndrome: A randomised feasibility and pilot study using Chinese Herbal medicine to explore Impact on Dysfunction (ORCHID) – study protocol. *Eur J Integr Med* 2014;6:392-9
- [13]. Pachiappan S, Ramalingam K, Balasubramanian A. A review on phytomedicine and their mechanism of action on PCOS. *Int J Curr Res Rev* 2020;12:81.
- [14]. Abirami S, Pushpalatha A, Vijaymurugan V, Jansirani D, Selvi ST, Anjugam T, et al. efficacy of madhurigai sombu chooranam in the treatment of Sinai Pai neerkatti. *Asian J Pharm Res Dev* 2020;8:83-7
- [15]. Moini Jazani A, Nasimi Doost Azgomi H, Nasimi Doost Azgomi A, Nasimi Doost Azgomi R. A comprehensive review of clinical studies with herbal medicine on polycystic ovary syndrome (PCOS). *Daru* 2019;27:863-77.
- [16]. Kashani L, Akhondzadeh S. Herbal medicine in the treatment of polycystic ovary syndrome. *J Med Plants* 2016;15:1-5
- [17]. Pandey AK, Gupta A, Tiwari M, Prasad S, Pandey AN, Yadav PK, et al. Impact of stress on female reproductive health disorders: Possible beneficial effects of shatavari (*Asparagus racemosus*). *Biomed Pharmacother* 2018;103:46-9
- [18]. Yadav Chandra Kishor, Mishra Indra Bir, Jha Khushboo. Critical review of Ayurvedic herbs in treatment of Gynecological problems. *International Journal of Research in AYUSH and Pharmaceutical Sciences*, 2024;8(3):1-4.
- [19]. Kumarapeli M, Karunagoda KP, Perera PK. A randomized clinical trial to evaluate the efficacy of Satapushpashatavari powered drug with Satapushpashatavari grita for the management of polycystic ovary syndrome (PCOS).
- [20]. Satapathy S, Das N, Bandyopadhyay D, Mahapatra SC, Sahu DS, Meda M. Effect of tulsi (*ocimum sanctum* linn.) supplementation on metabolic parameters and liver enzymes in young overweight and obese subjects. *Indian J Clin Biochem.* 2017; 32(3):357-363. <https://doi.org/10.1007/s12291-016-0615-4>