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REVIEW ARTICLE

Herbal Remedies for treatment of Polycystic Ovary Syndrome

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ABSTRACT:
Polycystic ovary syndrome (PCOS) is the one of major cause of infertility in women's. Various women's of reproductive age are prone for PCOS. It is observed that this endocrine disorder is characterized by chronic oligo- or anovulation, polycystic ovarian morphology and hyperandrogenism. It is found that the disease is caused due to obesity, insulin resistance, stress, lack of exercise, diet or abnormal genetic makeup. Researchers found that various plants can be used for therapy of PCOS which includes *Ecklonia cava*, *Allium fistulosum*, *Origanum majorana etc.* The current review focuses on the promising herbal treatments available for PCOS.

KEYWORDS: PCOS, herbal treatment, ginger, mentha, hyperandrogenism.

INTRODUCTION:
Polycystic ovarian syndrome (PCOS) is the commonly occuring endocrine disorder in women. The womens with PCOS have problems like obesity, hyperandrogenemia or insulin resistance. The PCOS may lead to the infertility in womens[1]. PCOS is associated with an increased rate of miscarriage, gestational diabetes, hypertensive disorder and premature delivery, ovulatory dysfunction, oligomenorrhea or amenorrhea, increased risk of endometrial cancer, infertility, androgen excess leading to hirsutism and insulin resistance with or without obesity. These obstetric complications are due to abnormal of placental function, systemic inflammation and metabolic disorder[2-4]. The treatment of PCOS is based on the lifestyle modification, weight loss, dietary modification or pharmacotherapy. The drug treatment for PCOS includes oral contraceptives, antiandrogens or metformin etc[5].

The pharmacotherapy is usually associated with adverse effects like flutamide with liver toxicity, oral contraceptives with venous thromboembolism, weight gain and cardiovascular problems while metformin with fatal and nonfatal lactic acidosis[6,7]. The pharmacological treatment is available for treatment of PCOS but with is always associated with some adverse effects or side effects. Hence currently researchers are focusing on the herbal drugs as alternatives for the treatment of PCOS. As the herbal medicines are have very less or no adverse effects these can be used for the treatment of PCOS. Hence in the current review we focused on some medicinal plants which can be used for the therapy of PCOS.

Herbal remedies for PCOS:

1. *Ecklonia cava:*
The PCOS is induced in rats by letrozle and the study showed that the E. cava extract restored the regular estrus cycle, normal hormone level like testosterone, estrogen, luteinizing hormone (LH), follicle stimulating hormone (FSH), and anti-Mullerian hormone (AMH)[8].

2. *Allium fistulosum*:
The *Allium fistulosum* (AF) root extract is administered to the letrozole-induced PCOS rats and results showed

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that the AF extract influenced aromatase production, increased the estrogen production, and also bring back estrogen feedback mechanism[9].

3. Licorice (*Glycyrrhizae radix* et rhizome, GRR):
The Licorice plant also showed the significant results in leterozole - induced PCOS rats. The result indicated that the GRR extract inhibits the PCOS symptoms by controlling FSH and LH hormonal levels[10].

4. Ginger:
The ginger extract also showed the promising treatment for the PCOS. The estradiol valerate induced PCOS female rats also showed that ginger extract increase the LH and estrogen concentration while the progesterone and FSH concentration are decreased. This showed that the ginger extract is useful in balancing sexual hormones in PCOS[11].

5. *Origanum majorana:*
The study conducted in the menstruating women having PCOS by double blind manner controlled placebo trial. The marjoram tea improved the hormonal profiles in the PCOS women which might be due to increase in insulin sensitivity and decrease in androgenic hormones[12].

6. *Foeniculum vulgare:*
The aqueous extract of fennel seed is also useful in treating renal failure in PCOS rats[13].

7. *Nervilia fordii:*
The effects of total flavanoids extracted from the *Nervilia fordii* were studied and the results reveled that the *N. fordii* increased the serum levels of follicle-stimulating hormone (FSH), and decreased luteinizing hormone (LH), testosterone and insulin in the PCOS rats. It is proved that this regulation of the hormones is due to partial inhibition of activation of JAK2/STAT3 pathway, partially up-regulating the IL-6 expression and partially down-regulating the suppressor of cytokine signaling 3 (SOCS3) expression in ovaries of PCOS rats[14].

8. *Citrullus colocynthis* (CCT):
The CCT hydro-alcoholic extract effects on estradiol valerate-induced PCOs rats' model were assessed. The results confirmed that the CCT extract is promising treatment for the PCOS which is due to reduction in luteinizing hormone and testosterone whereas follicle stimulating hormone level is normal. The histopathological study also showed that there is significant increase in number of preantral and antral follicles and corpus luteum in PCOS rats[15].

9. *Pterocarpus marsupium* [PM]:
The effect of *Pterocarpus marsupium* methanolic extract on testosterone propionate induced Polycystic Ovarian Syndrome (PCOS) in female albino rats is also studied. The results indicated that the PM inserts protective effect by restoring all the parameters to normal and destroying the cysts[16].

10. *Mentha Spicata*:
Mentha spicata can also be used as treatment remedy for the PCOS. The study on PCOS induced rats reveled that spearmint oil from the Mentha spicata reduced body weight, testosterone level, ovarian cysts and atretic follicles while graffian follicles are increased[17].

11. Grape seed:
Salmabadi et al studied the effect of grape seed extract in estradiol valerate induced PCOS in rats. The results of the study showed that grape seed extract reduced the serum triglycerides, IL-6, low-density lipoprotein-cholestrol and inflammation in PCOS rats[18].

12. Green Tea Extract (GTE):
It is also observed in estradiol valerate induced PCOS rats that the green tea extract causes significant reduction in LH serum level, body and ovarian weight. Moreover it is also showed that GTE also reduces the insulin resistance[19]. Furthermore it is also reveled through clinical trials that green tea consumption by overweight and obese women suffering from PCOS leads to weight loss, a decrease in fasting insulin, and a decrease in the level of free testosterone[20].

13. *Trigonella foenum-graecum*:
The post-marketing surveillance study in 50 premenopausal women also showed that the *Trigonella foenum-graecum* seed extract reduces the cyst size in 46% of study population, while 36% of subjects showed complete dissolution of cyst. Further more it is also reported that the 71% of subjects reported the return of regular menstrual cycle at the end treatment and 12% of subjects later became pregnant. Also it is showed that there is significant increases in luteinizing hormone (LH) and follicular stimulating hormone (FSH) levels in patients[21].

14. Korean red ginseng (KRG):
The study on estradiol valerate (EV)-induced PCOS rat showed that the KRG extract decreased the high numbers of antral follicles and increased number of corpora lutea in the PCOS[22].

15. *Grifola frondosa* (Maitake mushroom):
It is also observed that the Maitake mushroom extract induce ovulation in patients with PCOS in comparison with and in combination with clomiphene citrate treated patients[23].

16. *Matricaria chamomilla:*

The Estradiol Valerate induced PCOS model in rat showed that Chamomile can decrease the signs of PCOS in the ovarian tissue and help in LH secretion. The study indicated that the chamomile flower extract may be useful in PCOS[24].

17. Cinnamon extract:

The study on fifteen women with polycystic ovary syndrome (PCOS) was randomized to daily oral cinnamon for 8 weeks. The baseline insulin sensitivity indices using fasting and 2-hour oral glucose tolerance tests (OGTT) showed significant reductions in insulin resistance in the cinnamon treated women's[25].

CONCLUSION:

The PCOS is commonest endocrine disorder in the women's at young age. The PCOS is characterized by various symptoms like insulin resistance, hormonal disturbances or hirsutism, hyperandrogenism, oligo/amenorrhea. The pharmacotherapy of PCOS is usually accompanied by low to high adverse drug effects. Researchers have revealed that herbal drugs are having low adverse effects and can be useful in improving insulin resistance, modulating FSH and LH hormones levels as well as beneficial for reducing size or dissolution of complete cyst along with the follicular development, ovulation and later probably getting pregnant. Hence herbal medicines or their supplements may act as alternative medicines for the PCOS. But, further study, on herbal drugs is required to explore their efficacy in treatment of PCOS. Current review is useful in exploring the herbal remedies available for PCOS.

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