Role of Shatavari (Asparagus racemosus) in Polycystic Ovary Syndrome (PCOS)

Srishty Tyagi[1] and *Rachna Gupta [2]

[1]Department of Clinical Nutrition and Dietetics, School of Biosciences and Technology, Galgotias University, Greater Noida, Uttar Pradesh, India – 203201

[2]Department of Food and Technology, School of Biosciences and Technology, Galgotias University, Greater Noida, Uttar Pradesh, India – 203201

[1]Srishtytyagi21@gmail.com

Corresponding Author: [2]*Rachna Gupta,

Orcid Id: - https://orcid.org/0000-0003-1670-6545

[2]rachna.gupta@galgotiasuniversity.edu.in

Abstract

Polycystic ovary syndrome (PCOS) is considered to be one of the most common endocrine and metabolic diseases in women of reproductive age on the planet. It is a condition that is hyperandrogenic, has irregular ovulation, ovarian cyst development, insulin resistance and is chronically inflamed. The traditional methods used in treating these conditions like hormonal therapy and insulin-sensitizing medications usually pose a challenge such as side effects and addiction. Therefore, the focus has shifted towards the use of herbal and nutraceutical interventions in the management of PCOS. Shatavari (Asparagus racemosus) is a famous Ayurvedic medicine herb traditionally known to be a rejuvenating and female reproductive health promotional herb. The herb has biologically active compounds such as steroidal saponins (shatavarins), flavonoids, alkaloids, and phytoestrogenic compounds which have added endocrine-modulating, antioxidant, and adaptogenic action. Some of the experimental and clinical studies indicate that Shatavari could be beneficial in terms of hormonal balance, ovarian functioning, oxidative stress, and reproductive health of women. Shatavari in herbal formulations has also shown positive effects in the treatment of PCOS-related symptoms of menstrual irregularities and infertility. Besides, a new area of research suggests the possibility of Shatavari to become an ingredient of functional foods and nutraceutical products that target the health needs of women. This review is a synthesis

of existing scientific data on the pharmacological and mechanism of action of Shatavari, and its therapeutic potential in the treatment of PCOS. The review also addresses the gaps in research and areas of future clinical use and development of nutraceuticals.

1. Introduction

Polycystic ovary syndrome (PCOS) is among the most common endocrine and metabolic diseases in women of childbearing age. It is approximated to have a prevalence of about 8-13 percent among women all over the world, but it is not always the same as it can be affected by the diagnosis and the features of the population. The Rotterdam criteria define PCOS as being clinically characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology. Besides reproductive abnormalities, PCOS is commonly linked to many metabolic complications such as insulin resistance, obesity, dyslipidemia, and predisposition to type 2 diabetes mellitus (Jain et al.; Oyovwi et al., 2025).

The PCOS women are known to have irregular menstrual cycles, anovulation, infertility, acne, hirsutism, and weight gain that have a significant effect on their reproductive health and quality of life. PCOS has a multifactorial pathophysiology, and a complex interaction between genetic, endocrine, metabolic, and environmental factors. One of the major processes that contribute to the development of the disorder is the insulin resistance that results in compensatory hyperinsulinemia and enhances ovarian androgen production. An increase in the level of androgens impairs the growth of follicles, which results in anovulation and the emergence of numerous underdeveloped follicles in the ovaries (Pandey et al., 2018; Bansal et al., 2026).

Along with endocrine abnormalities, chronic low-grade inflammation and oxidative stress have also been reported in the development of PCOS. These also lead to metabolic and reproductive imbalances. Another important aspect that can contribute to the development of hormonal disequilibrium and reproductive disorders in women with PCOS is psychological stress (Pandey et al., 2018).

The traditional PCOS management usually involves lifestyle changes, hormonal treatments, insulin sensitizing medications like metformin, and oral contraceptives to control menstrual cycles and lower the levels of androgens. Although the pharmacological interventions are capable of controlling the symptoms, they might result in side effects including gastrointestinal disturbances, weight changes, and

cardiovascular risks, and they are usually focused on the symptoms, but not the pathophysiology of the disorder (Jain et al.). This has led to growing interest in complementary and alternative forms of therapy, especially herbal medicines and nutraceuticals which could have multi-targeted effects with fewer side effects.

Shatavari (Asparagus racemosus) is one of the numerous medicinal plants studied in the field of women health because of its traditional and scientifically proven therapeutic value. Shatavari is a famous Ayurvedic medicine herb that has a positive effect on the female reproductive system and is generally well-known (Singh et al., 2018). Shatavari is a Rasayana, which means a rejuvenating herb, in Ayurvedic texts, meaning a substance that enhances vitality, longevity, and reproductive health (Bharati and Kumar, 2019).

Historically, Shatavari was employed to promote hormone equilibrium, fertility, menstruation, lactation, and menstrual control in women. The plant has many bioactive compounds in the roots, where Shatavarin I-IV steroidal saponins, flavonoids, alkaloids, polysaccharides play a role in the pharmacological effects (Singh et al., 2018). Shatavarin IV is one of these constituents, and it was determined as a phytoestrogenic compound that can potentially replicate the estrogenic effect and promote reproductive health by regulating hormonal pathways (Banerjee et al.).

Modern science research has started to confirm the ancient application of Shatavari and may have therapeutic effects in the reproductive system like PCOS. The experimental and clinical studies indicate that Shatavari might have adaptogenic, antioxidant, anti-inflammatory, and hormone-modulating effects, which might assist in improving the ovarian activity and recovering the hormonal equilibrium (Bansal et al., 2026; Sarkhel). Moreover, Shatavari has been shown to have positive effects when used as herbal formulations in symptom management of PCOS. As an example, a research by Kalam et al. (2024) indicated that herbal preparations of Shatavari and Kanchnar in the form of tablets were potentially beneficial in terms of hormonal control and alleviating PCOS-related symptoms. Equally, a clinical study by Kumarapeli et al. (2018) showed that a Satapushpa-Shatavari herbal preparation is effective in enhancing the regularity of menstruation and decreasing the clinical signs of PCOS.

Besides the therapeutic uses, Shatavari has also been investigated as a functional food component. Recent research has explored its use in nutraceutical products and functional foods to improve their health-promoting effect. Indicatively, Srivastava et al. (2025) designed extruded functional foodstuffs with Shatavari and reported good

nutritional and sensory properties, which shows that this herb can be a functional nutritional ingredient in managing the health of women.

On the whole, there is emerging evidence that Shatavari can be used to a great extent in terms of female reproductive health, endocrine regulation, and symptom relief in the case of PCOS. Nevertheless, even with encouraging results, more effective clinical research is needed to gain a complete insight into its mechanisms of action and to develop uniform doses of therapeutic agents to be used in clinical practice.

2. Botanical Description and Traditional Uses of Shatavari

Shatavari (Asparagus racemosus) is a climbing plant which is a member of family Asperagaceae and is commonly found in India, Sri Lanka and the Southeast part of Asia. The most popular part of the plant used as a medicine is the roots.

Shatavari is an Ayurvedic medicine that is said to be a rejuvenating herb that is cooling, nourishing and restorative. It is conventionally applied in the treatment of infertility, menstrual, menopausal symptoms, and lactation insufficiency (Joshi & Chakraborty, 2026).

Shatavari is literally translated as she who has a hundred husbands and it signifies the links of fertility and reproductive strength in females.

3. Phytochemical Composition

Shatavari has a high phytochemical composition which gives it its therapeutic effects. Its roots have been found to possess several bioactive compounds such as:

steroidal saponin (Shatavarin I–IV)
flavonoids
alkaloids
polysaccharides
tannins
antioxidant compounds

Among them, steroidal saponins called shatavarins are regarded as the key bioactive ingredients that make saponin have phytoestrogenic properties and reproductive health effects (Banerjee et al.).
One of them, Shatavarin IV specifically, was reported to have an estrogen-like activity that could help in hormonal balance and reproductive well-being (Banerjee et al.).

4. Pathophysiology of PCOS

Polycystic ovary syndrome (PCOS) is a multifactorial endocrine and metabolic disease that is a result of intricate development of hormonal imbalance, metabolic disorders, genetic predisposition, and environmental factors. These interrelated processes impair the normal performance of the ovary and cause the broad range of clinical symptoms that are presented in women with PCOS (Jain et al.; Oyovwi et al., 2025).
The development and progression of PCOS is associated with several important biological processes:
Hyperandrogenism
Insulin resistance
Chronic low-grade inflammation
Oxidative stress
Dysregulation of the hypothalamic–pituitary–ovarian (HPO) axis

Hyperandrogenism
Hyperandrogenism is regarded as one of the characteristic features of PCOS and is characterized by the excessive secretion of androgens, i.e. testosterone and androstenedione. High levels of androgen interfere with the follicular development leading to the ovulation and the development of many premature ovarian follicles. The clinical manifestation of hyperandrogenism includes the hirsutism, acne, alopecia, and menstrual abnormalities (Bansal et al., 2026).

Insulin Resistance

The other hallmark of PCOS is insulin resistance, which is found in a considerable percentage of suffering women, even those who are not obese. In insulin-resistant patients, adipose cell and muscle cells are insulin-resistant, and they are compensated

by hyperinsulinemia. Increased insulin concentrations promote the overproduction of excess androgens by the ovarian theca cells, and inhibit the production of sex hormone-binding globulin (SHBG) in the liver, thus raising the bioavailability of the available androgens (Oyovwi et al., 2025).

Chronic Inflammation

There is growing evidence that PCOS is linked to chronic inflammation of low grade, whereby there is high presence of inflammatory cytokines and other markers like C-reactive protein. This inflammatory condition adds to insulin resistance, ovarian dysfunction and metabolic abnormalities. Endocrine disruptions and the inability to mature follicles may also be aggravated by chronic inflammation (Jain et al.).

Oxidative Stress

Oxidative stress is significant in the pathogenesis of PCOS. It arises when the rate of reactive oxygen species (ROS) generation is higher than the antioxidant defense system of the body. Increased ROS may cause injuries to cellular components such as lipids, proteins and DNA which may lead to impairment of normal ovarian functioning.

Oxidative stress in women with PCOS has been reported to lead to dysfunction of the follicles, poor oocyte quality, and tissue destruction of the ovary. Hormonal imbalance can also be further caused by increased oxidative stress disrupting steroidogenesis. Research has also noted that high ROS might disrupt the ovarian follicle maturation and ovulation thus leading to infertility related to PCOS (Pandey et al., 2018).

Disruption of the Hypothalamic–Pituitary–Ovarian Axis

Hypothalamic pituitary ovary (HPO) axis is essential in the control of female reproductive hormones. In PCOS the axis is dysregulated by causing the luteinizing hormone (LH) to be secreted more in comparison to follicle-stimulating hormone (FSH). This hormonal imbalance supports androgen synthesis by ovarian theca cells and disrupts normal follicular growth leading to anovulation and menstrual disorders (Bansal et al., 2026).

Implications for Therapeutic Management

Since PCOS is a multifactorial condition, treatment methods focused on one pathway might not be effective in managing the complexity of the condition. Thus, interventions with antioxidant, anti-inflammatory, insulin-sensitizing, and endocrine-modulating effects can be more effective in the management of PCOS.

In this respect, medicinal plants and herbal nutraceuticals have attracted a lot of attention, as they can have multi-targeted biological effects. Antioxidant and hormonal control herbs can be used to alleviate oxidative stress, enhance metabolic activity, and normalize hormones in PCOS women (Sarkhel; Singh et al., 2018).

An example of such medicinal plants is Shatavari (Asparagus racemosus) that has historically been used in Ayurvedic medicine to maintain female reproductive health. Its bioactive components, such as steroidal saponins and phytoestrogenic compounds can be part of its possible role in the regulation of endocrine functions and enhancement of the reproductive outcome in PCOS women (Banerjee et al.; Bharati & Kumar, 2019).

4. Pharmacological Properties of Shatavari Relevant to PCOS

Pharmacological Properties of Shatavari Relevant to PCOS

Shatavari (Asparagus racemosus) is a common herb used in the Ayurvedic system of medicine that has a therapeutic effect on the female reproductive system. According to modern pharmacological research, Shatavari roots contain a number of bioactive compounds that provide it with various biological effects: steroidal saponins (shatavarins), flavonoids, alkaloids, polysaccharides, and glycosides (Singh et al., 2018). The effects of these compounds include phytoestrogenic, antioxidant, anti-inflammatory, adaptogenic as well as endocrine-modulating, and thus Shatavari could be a promising herbal candidate in the management of hormonal and metabolic disorders including polycystic ovary syndrome (PCOS).

Phytoestrogenic Activity

Among the pharmacological effects of Shatavari most significant in the case of PCOS is the effect of the phytoestrogenic activity. The plant has steroidal saponins including Shatavarin I-IV that are structurally similar to the steroid endogenous estrogen and are able to interact with estrogen receptors in the body. One of them, Shatavarin IV, has

been reported to be a strong phytoestrogen that can be used to control hormonal balance in women (Banerjee et al.).

Phytoestrogens can also be used to normalize hormonal changes by regulating estrogenic levels of the reproductive tissues. Phytoestrogenic compounds can assist in restoring the endocrine balance and normal follicular development in PCOS, in which hormonal imbalance and high androgen levels interfere with ovarian functioning. Shatavari can also help to enhance ovulatory and menstrual control by modulating estrogen receptors and endocrine signaling (Bansal et al., 2026; Bharati and Kumar, 2019).

Antioxidant Activity

Oxidative stress is also a significant factor in the etiology of PCOS because it affects ovarian activity and harms reproductive tissues. Increased reactive oxygen species (ROS) have been implicated in inappropriate follicular maturation and low quality of oocytes. Shatavari has important antioxidant effects, and they counteract the effects of free radicals and prevent oxidative damages in cells (Pandey et al., 2018).

The presence of flavonoids, saponins, and phenolic compounds in Shatavari is also credited with the antioxidant effects of the plant that improves the endogenous antioxidant defense system of the body. Shatavari can help reduce oxidative stress and, therefore, improve ovarian health and normal reproductive functioning in PCOS women (Singh et al., 2018).

Anti-Inflammatory Properties

Low-grade chronic inflammation is also being identified as a major contributor to the pathogenesis and pathophysiology of PCOS. Insulin resistance, hormonal imbalance, and ovarian dysfunction may be caused by inflammatory mediators and cytokines. The anti-inflammatory effect of Shatavari has been proven in a number of experimental studies and could be used to alleviate inflammatory response in endocrine disorders (Sarkhel).

The anti-inflammatory properties of Shatavari are considered to work because of its capability to regulate inflammatory processes and prevent the generation of pro-inflammatory cytokines. Shatavari can reduce inflammation, thereby contributing to the

mitigation of the metabolic imbalance and enhancing the reproductive performance of women with PCOS (Bansal et al., 2026).

Adaptogenic and Stress-Modulating Effects

Psychological and physiological stress has the ability to decrease reproductive hormones and lead to endocrine disorders. Shatavari is an Ayurvedic Rasayana herb and is regarded as an adaptogen that aids the body to deal with physical and emotional stress. Adaptogenic herbs enhance stress-resilience by balancing hormones by balancing the hypothalamic-pituitary-adrenal (HPA) axis (Bharati and Kumar, 2019).
As stress is known to cause hormonal imbalances in PCOS, the adaptogenic effect of Shatavari could indirectly benefit reproductive health through the maintenance of endocrine stability and general physiological balance.

Insulin-Modulating and Metabolic Effects

Among the most critical metabolic abnormalities, which PCOS is related to, is insulin resistance. High insulin level stimulates ovarian androgen and aggravates hyperandrogenism. Certain experimental trials indicate that Shatavari can have positive metabolic in its action by enhancing glucose metabolism and insulin sensitivity (Singh et al., 2018).
Shatavari can potentially help to alleviate the metabolic complications of PCOS such as obesity, dyslipidemia, and impaired glucose tolerance by modulating metabolic pathways and enhancing insulin regulation.

Fertility-Enhancing Effects

Shatavari has been a female reproductive tonic that has been traditionally used to increase fertility and reproductive health. Its bioactive constituents could assist in the maintenance of ovarian activity, enhancement of follicular maturation, and hormonal balance. The recent research has brought its possible use in enhancing the reproductive parameters and fertility among women (Oyovwi et al., 2025).

Also, the reproductive issues, such as menstrual irregularities and infertility, which are typical symptoms of PCOS, have been treated effectively with herbal preparations containing Shatavari (Kalam et al., 2024; Kumarapeli et al., 2018).

Nutraceutical and Functional Food Potential

Shatavari is also a health-promoting nutraceutical ingredient that has attracted attention as a nutraceutical ingredient in recent years. The studies of the functional food products supplemented with Shatavari indicate that it could be integrated into the food regimen to enhance the well-being and hormonal balance of women. Indicatively, Shatavari-based extruded functional food products have demonstrated a good nutritional content and acceptability among consumers (Srivastava et al., 2025).

Incorporation of Shatavari into nutraceutical and functional foods systems can offer a new dietary technology to aid reproductive health and to treat metabolic diseases like PCOS.

6.Evidence from Clinical and Experimental Studies

The role of Shatavari in reproductive health and in the management of PCOS has been studied in several studies.

A randomized clinical trial comparing a Satapushpa-Shatavari preparation showed that the preparation elevated menstrual regularity and hormonal balance in women with PCOS (Kumarapeli et al., 2018).

In another research on herbal formulations containing Kanchnar and Shatavari, it was found that the therapeutic effect of the formulations was significant in the treatment of PCOD, which also suggests that Shatavari-based formulations could be used to treat reproductive disorders (Kalam et al., 2024).

It is also indicated that some studies show that Shatavari can be used to improve fertility by increasing ovarian functionality and reproductive tissue conditions (Oyovwi et al., 2025).

Moreover, randomized clinical trials have demonstrated that Shatavari supplementation is able to reduce the symptoms of menopause and improve vascular activity, which further confirms its endocrine-modulating effect (Mahajan et al., 2025; Pingali et al., 2025).

7. Shatavari as a Nutraceutical for Women's Health

The interest in functional foods and nutraceuticals in the world has stimulated interest in medicinal plants as dietary interventions to enhance health and prevent chronic diseases. Shatavari (Asparagus racemosus) is one of them and received great attention because of the long history of its traditional application and its scientifically proved health-promotion effects. Medicinal plants are used as nutraceuticals and they are sources of bioactive compounds that can have therapeutic action in addition to nutritional benefit.

The research has been characterized as offering promise in the field of nutraceutical ingredients that treat women in general due to its hormone-regulating, antioxidant, anti-inflammatory, and adaptogenic effects (Sarkhel). The plant plant contains a number of bioactive components in its roots including steroidal saponins (shatavarins), flavonoids, and polysaccharides, which are thought to play a role in its therapeutic action on reproductive health. They can be used to balance the hormones, assist with ovarian activity, and enhance the reproductive performance of women.

Shatavari is a traditional Ayurvedic herb known as a rejuvenator Rasayana that is said to stimulate fertility, menstrual cycles, lactation, and the overall female reproductive system (Bharati and Kumar, 2019). The science of nutrition in modern times is also becoming aware of the potential of such herbs as functional food ingredients that can be integrated into food systems to offer nutritional benefits in addition to therapeutic ones.

Recent research has investigated the use of Shatavari in the formulation of functional food to help promote the health of women. An example is Srivastava et al. (2025) who came up with extruded functional food products with Shatavari and confirmed the enhanced nutritional content and palatable sensory properties. Such studies show the fact that the Shatavari can be introduced in the modern foodstuffs like the health food like health snacks, fortified cereals, and nutraceutical supplements.

The development of Shatavari-enriched foods can be utilized as a preventive age to the nutritional defence to diseases of the reproductive system mainly, hormonal imbalance, infertility and polycystic ovary syndrome (PCOS). Nutraceutical preparations could provide a safe and convenient means of promoting hormonal health and overall well-being in women by providing bioactive phytochemicals through dietary means.

Moreover, the fact that Shatavari is integrated into functional foods and dietary supplements is related to the increased demand in natural and plant-based health products. With the ongoing research on the pharmacological and nutrition qualities of Shatavari, the use of the compound in nutraceutical products has potential to grow tremendously in future.

All in all, Shatavari-based nutraceutical and functional foods are a promising field of research and development to provide better reproductive health to women and treatment of endocrine-related disorders. Nevertheless, additional clinical trials are required to determine standard doses, safety in the long-term and effectiveness in other populations.

8. Additional Health Benefits Supporting PCOS Management

Besides reproductive health benefits, Shatavari was also reported to enhance digestive health and metabolic activity (Singh et al.).

These other benefits can indirectly facilitate the management of the disorder since metabolic disturbances and insulin resistance are paramount in the progression of PCOS..

9. Research Gaps and Future Directions

Although Shatavari (Asparagus racemosus) has high therapeutic potential in helping women to maintain their reproductive health, there are still a number of gaps in the existing scientific literature on the use of Shatavari as a therapeutic agent in the treatment of polycystic ovary syndrome (PCOS). Even though there are experimental studies and the preliminary clinical studies show positive effects, the evidence at hand is never enough to determine final therapeutic guidelines.

The small sample size and few well-designed clinical trials comparing the direct effects of Shatavari in women with PCOS is one of the greatest constraints of the current research. Most of the studies are based on the general reproductive health or menopausal symptoms instead of the pathophysiology of the complications of PCOS. Also, the differences in preparation of herbs and extraction formulations and dosing make results unequal and hard to compare between different studies.

The other difficulty in this case is the unavailable standardized formulations of Shatavari extracts. Bioactive compounds of which the steroidal saponins are part of can

be concentrated with reference to the considerations made in terms of the plants employed, and the processes of extraction and the processes of processing. The latter may have an impact on validity and efficacy of treatment findings of studies.

Besides, although anti-inflammatory, antioxidant and phytoestrogenic and adaptogenic effects of Shatavari have been reported, the underlying pathways of action to evaluate the multitude of pharmacological effects of the respective pathways, i.e. the insulin resistance, androgen production and ovarian follicular development, have not been explored.

The future research must be based on the current study, and the research will be carried out on several critical areas, which will facilitate the scientific knowledge of Shatavari in the treatment of PCOS:

Huge randomized controlled clinical trials that need to be carried out to ascertain the safety and efficacy of Shatavari in PCOS females.

Producing homogenized herbs extract and prepare with the same effect.

Developing the most optimal dosages, the duration of time that should be utilised to provide treatment to the clinics and the means of its administration.

Addressing the pharmacokinetic as well as the molecular processes of Shatavari bioactive compounds.

Development of products based on Shatavari as nutraceuticals and functional foods that will increase hormonal optic and metabolism.

The research on the use of Shatavari as Herbal dietary supplement in functional food systems to control reproductive heath cases that are chronic.

Further research in this area will lead to reduction in the gap between the traditional Ayurvedic information and the present evidence-based medicine. This can ultimately result in curing PCOS and endocrine related diseases that bedevil the women and a simple, easy and cost effective treatment is yet to be found.

10. Conclusion

Asparagus racemosus (shatavari) is a possible medicinological plant and has a high potential in managing polycystic ovary syndrome (PCOS). It has numerous

pharmacological effects like the ability to act as a phytoestrogenic, antioxidant, anti-inflammatory and adaptogenic agent but of significant importance is that it is an ingredient in hormonal maintenance and procreation in women. The bioactive functions can be applied in combating many pathophysiological processes of PCOS that involve but are not limited to oxidative stress, endocrine disproportion, and, malfunction of metabolic processes.

This was a fact due to the probability of experimental studies, clinical studies and traditional herbal preparations proving the probability of the likelihood of Shatavari to potentially improve the parameter of the reproductive health in addition to ameliorating the symptoms of PCOS, including menstrual abnormality, hormonal disorder and infertility. In addition, the fact that it is capable of controlling the endocrine functioning and passes as antioxidants is a good sign that can be incorporated as an additional medicine to prevent female reproductive and hormonal diseases.

Such good results have been limited by the lack of large clinical trials and standard preparations of herbs, although they are not yet present in the existing literature on scientific evidence. Further clinical trials that are properly done must be carried to return the effectiveness of Shatavari in the management of the PCOS patient and the most pertinent dosage, safety profile, and generic treatment regimen.

And in addition to that, Shatavari as one of the components of nutraceutural preparations and functional foods systems is a new innovative prevention care solution. These food plans would be capable of providing a safer and more comfortable habit towards supporting hormone underlyingness and femaleness among women.

Overall, it is possible to state that Ayurvedic ancient discoveries could be integrated with the modern one to establish new plant-to-treatment dimensions in terms of the PCOS and other reproductive issues management.

Acknowledgement

The authors gratefully acknowledge Galgotias University for providing GU Fellowship , academic support and access to resources that facilitated the completion of this review.

We also extend our appreciation to the faculty and peers who provided constructive insights throughout the research process.

REFERENCES

Ademola, J., Ajgaonkar, A., Debnath, T., Debnath, K., & Langade, J. (2025). Efficacy and safety of Shatavari root extract (Asparagus racemosus) for menopausal symptoms: A randomized, double-blind, three-arm, placebo-controlled study. Frontiers in Reproductive Health, 7, 1654503.

Banerjee, P., Adhikary, K., Kumar, P., Saha, S., Goel, A., & Chakraborty, S. (2026). Shatavarin IV: A phytoestrogen from Shatavari that enhances women's reproductive health and promotes the holistic well-being of humankind. In A. Das (Ed.), Health benefits of Asparagus racemosus (Shatavari) (pp. 104–111). CRC Press.

Bansal, D., Singh, S., Bisht, M., & Pal, G. (2026). Role of Shatavari (Asparagus racemosus) in female reproductive health. Journal of Dravyaguna Vigyan, Rasashastra & Bhaishajya Kalpana, 3(2).

Bharati, J., & Kumar, S. (2019). Shatavari (Asparagus racemosus). In P. K. Singh (Ed.), Phytobiotics and animal production (pp. 567–590). International Books & Periodical Supply Service.

Das, A. (2026). Shatavari in improving women's health. In A. Das (Ed.), Health benefits of Asparagus racemosus (Shatavari) (pp. 93–103). CRC Press.

Jain, H., Pandey, D., Nama, N., Kaushik, P., & Chaturvedi, S. (Year). A review on herbal management of PCOS (polycystic ovarian syndrome)

Kalam, S., Chaure, R., Dapke, P., Gorade, S., Kale, S., Khore, T., & Sanap, G. (2024). Formulation and evaluation of herbal tablets for the treatment of PCOD using Kanchnar and Shatavari. Asian Journal of Pharmaceutical Research and Development, 12(4), 37–42.

Kumarapeli, M., Karunagoda, K. P. K. R., & Perera, P. K. (2018). A randomized clinical trial to evaluate the efficacy of Satapushpa-Shatavari powdered drug with Satapushpa-Shatavari ghrita for the management of polycystic ovary syndrome (PCOS). International Journal of Pharmaceutical Sciences and Research, 9(6), 2494–2499.

Mahajan, S., Avad, P., & Langade, J. (2025). Efficacy and safety of Shatavari (Asparagus racemosus) root extract for perimenopause: A randomized, double-blind, placebo-controlled study. International Journal of Women's Health, 17, 4057–4073.

Oyovwi, M. O., Chijiokwu, E. A., Ben-Azu, B., Ugwuishi, E. W., & Jeroh, E. (2025). Shatavari (Asparagus racemosus): A promising ally for fertility. Current Nutrition Reports, 14(1), 108–118.

Pandey, A. K., Gupta, A., Tiwari, M., Prasad, S., Pandey, A. N., Yadav, P. K., & Chaube, S. K. (2018). Impact of stress on female reproductive health disorders: Possible

beneficial effects of Shatavari (Asparagus racemosus). Biomedicine & Pharmacotherapy, 103, 46–49.

Pingali, U., Nutalapati, C., & Wang, Y. (2025). Ashwagandha and Shatavari extracts dose-dependently reduce menopause symptoms, vascular dysfunction, and bone resorption in postmenopausal women: A randomized, double-blind, placebo-controlled study. Journal of Menopausal Medicine, 31(1), 21–30.

Sarkhel, D. (Year). Therapeutic potential of Shatavari: A nutraceutical for women's health.

Singh, A. K., Srivastava, A., Kumar, V., & Singh, K. (2018). Phytochemicals, medicinal and food applications of Shatavari (Asparagus racemosus): An updated review. The Natural Products Journal, 8(1), 32–44.

Singh, N. B., Singh, C. S., Baishya, J., Borah, A. K., Singha, U., Sikdar, N., & Das, A. (2026). Asparagus racemosus(Shatavari) as an effective therapeutic remedy for improving digestive health. In A. Das (Ed.), Health benefits of Asparagus racemosus (Shatavari) (pp. 239–249). CRC Press.

Srivastava, A., Ahmad, R., & Srivastava, A. K. (2025). Preparation, sensory, and nutritional evaluation of extruded functional food products using Asparagus racemosus (Shatavari). Cureus, 17(2).