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A Review on Phytoestrogenic Activity of Asparagus Racemosus for Menopausal Symptoms

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ABSTRACT: Asparagus racemosusis a popular Ayurvedic medicinal herb noted for its adaptogenic, immunomodulatory, and hormone-balancing effects.The phytoestrogenic activity of Asparagus racemosus is examined in this review in relation to the treatment of menopausal symptoms. As endogenous estrogen levels decline throughout menopause, leading to urogenital difficulties, mental disorders, osteoporosis, and vasomotor symptoms, interest in plant-based hormone replacement treatment (HRT) substitutes is growing. Because of their affinity for estrogen receptors, the steroidal saponins found in Asparagus racemosus, especially shatavarins, exhibit estrogen-like effects and may be able to alter hormonal balance. The plant's anti-osteoporotic, depressive, and uterotrophic effects were validated by preclinical studies conducted on ovariectomized rat models.According to clinical study, it has the potential to improve psychological well-being and lessen vasomotor symptoms including hot flashes and night sweats.This review highlights the potential of Asparagus racemosus as a safe, effective, and natural remedy for menopausal symptoms by summarizing recent pharmacological research.

KEYWORDS: Menopause, Asparagus racemosus, Phytoestrogens, Saponin glycosides

I. INTRODUCTION:

MENOPAUSAL SYMPTOMS AND NEED FOR PHYTOESTROGENS:

Menopause is a natural biological process that occurs after a woman's monthly periods stop. Menopause marks the end of a woman's reproductive years. Menopause symptoms include changes in the menstrual cycle, hot flashes, nocturnal sweats, muscle and joint difficulties, painful breasts, and emotional changes. Phytoestrogensare being studied for their potential benefits in reducing menopausal symptoms, preventing osteoporosis, and lowering the risk of cancer. It may help maintain bone density by mimicking oestrogen's bone-protective characteristics, particularly in postmenopausal women. Asparagus racemosus has been shown to be exceptionally advantageous to female reproductive health, especially in the treatment of PMS symptoms, amenorrhea, dysmenorrhea, and pelvic inflammatory diseases.Most women experience this between the ages of 45 and 56. An abrupt or progressive reduction in oestrogen levels disrupts the hypothalamic-pituitary-ovarian (HPO) axis. This may induce endometrial development failure, resulting in irregular menstrual cycles. During menopause, the complicated interaction of changing hormone levels, particularly oestrogen and progesterone, makes women more prone to a variety of symptomsOestrogen insufficiency affects around 75% of women, resulting in perimenopausal or menopause symptoms. Menopause is a normal stage of a woman's life, not a disease.[1]

OVERVIEW OF PHYTOESTROGENS:

Phytoestrogensare plant-derived secondary metabolites that have structural and biological properties comparable to human oestrogens. They can mimic or change oestrogen's effects in the body by binding to oestrogen

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receptors. These compounds are found in over 300 plant species and are produced via the phenylpropanoid pathway, with diverse enzymes leading to different chemical structures.These compounds usually bind to the oestrogen receptor present in the body due to their structural similarity to that of the oestrogen and thus exhibit estrogeniceffects.They are investigatedfor possible benefits in menopausal symptom alleviation.[2]

ASPARAGUS RACEMOSUS- GENERAL INTRODUCTION:

Asparagusracemosus belongs to family Liliaceaeand commonly known as 'Shatavari' treats reproductive menstrual cycles. Symptoms may include dysmenorrhea, amenorrhea, uterine bleeding, sexual debility, menopause, pelvic inflammatoryissues. Traditionally used for PMS as a uterine tonic, it strengthens, nourishes, cleanses and promotes uterine prolapse. It reduces miscarriage by preparing the uterine wall for contraction during foetal development and promotes lactation by harmonizing hormone levels.[3]

BOTANICAL DESCRIPTION:

The plant is an undergrowth shrub that can reach a height of three metres. The roots are elongated, tuberous, and brown in colour, with tapered ends on both sides. It is 1-2 cm thick and 25-90 cm long, and appears ash silver white both internally and externally. The plant is a woody climber with brown, white, or grey leaves and tiny protecting spines. Asparagus leaves resemble pine needles. Flowering happens in the months of February to March. The flowers are all uniform and tiny in size. It appears white with tiny points. The flower is hermaphrodite in nature and is mostly pollinated by bees. By the end of April, the blossoms are aromatic and have a delicate fragrance.Typically, this plant prefers black, well-drained, fertile soil with a temperature of 20-30 0C. The fruits comprise 2 to 3 lobed and globular in shape and changes from green to purple, which looks to purple black on ripening. The seeds appear to be brittle and hard.[4]

TAXONOMICAL CLASSIFICATION OF ASPARAGUS RACEMOSUS:

Taxonomic Rank	Classification
Kingdom	Plantae
Phylum	Angiosperms
Class	Monocotyledons
Order	Asparagales
Family	Asparagaceae
Genus	Asparagus
Species	Asparagus racemosus

MACROSCOPIC CHARACTERISTICS:

- **Roots:** Tuberous, long, cylindrical, light brown externally and white internally with a mucilaginous texture.
- **Stems:** Slender, wiry, climbing, and covered with small, sharp spines.
- **Leaves:** Green, needle-like, arranged in a whorled manner, functioning as the main photosynthetic structures.
- **Flowers:** Small, white to pale yellow, fragrant, occurring in clusters
- **Fruits:** Small, round, purplish-black berries containing black, hard seeds.[5]

Fig no:1 Asparagus stem

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Fig no:2 Asparagus flower

Fig no:3 Asparagus root

CHEMICAL CONSTITUENTS:

Class	Key compounds	Biological activity
Steroidal saponins	Shatavarins	Estrogenic activity, reproductive health support; Shatavarin IV is most prevalent
Flavonoids	Quercetin	Strong antioxidant; scavenges free radicals and protects cells from oxidative damage
	Rutin	Anti-inflammatory, strengthens blood vessels, improves circulation
Glycosides	Shatavarin VI	Promotes female hormonal balance and lactation
Alkaloids	Asparagamine A	Antibacterial, antioxidant acts on the nervous system
Essential oils	Terpenes	Promotes female hormonal balance and lactation
mucilage	polysaccharides	Soothing to GI tract; protects mucosa, anti-ulcer effects
Other Components	Amino acids, vitamins, minerals	Contribute to nutritional value and overall therapeutic profile

PHARMACOLOGICAL STUDIES:

PHYTOESTROGENIC STUDY OF ASPARAGUS RACEMOSUS:

(Malini and Vanithakumari,2005) investigated the estrogenic effects of the alcoholic root extract of Asparagus racemosus on mature female albino rats. The extractadministered orally over several days, greatly raised uterine weight, vaginal cornification, and endometrial proliferation, all of which are indicators of estrogenic action. Histological investigation demonstrated an increase in epithelial and

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glandular proliferation. The findings imply that steroidal saponins, a bioactive molecule found in A. racemosus, may interact with estrogen receptors, producing estrogen-like actions.[6]

ASPARAGUS RACEMOSUS FOR POST MENOPAUSAL OSTEOPOROSIS:

The metabolic bone disease known as osteoporosis is typified by structural changes and decreasing bone mass, which results in increased skeleton porosity.The purpose of this study was to examine the anti-osteoporotic potential of Asparagus racemosus root extracts in an ovariectomized rat model that mimicked postmenopausal osteoporosis. Biomechanical, biochemical, and histopathological properties were used to evaluate both methanolic and aqueous extracts. The findings demonstrated a considerable increase in calcium retention, a decrease of osteoclastic activity, and improvements in bone mineralization and ossification. According to the study, phytosterols and other bioactive components in A. racemosus may have estrogen-like anti-osteoporotic effects by interacting with estrogen receptors.[7]

CLINICAL STUDY FOR ALLEVIATING MENOPAUSAL SYMPTOMS:

(Gudise et al. ,2024) conducted a double-blind, multicentre, randomized controlled experiment to evaluate the efficacy of Asparagus racemosus root extract in treating menopausal symptoms. Seventy perimenopausal women were randomly assigned to receive either Aspurus™ (standardized Shatavari extract) or a placebo. Over the course of the trial, the Shatavari group outperformed the placebo group in terms of vasomotor and psychological symptoms such as hot flashes, night sweats, anxiety, sleeplessness, and vaginal dryness. The extract was well tolerated, with no significant side effects, confirming Shatavari as a promising natural choice for menopause symptom alleviation.[8]

CLINICAL ANALYSIS OF SHATAVARI FOR PERIMENOPAUSAL VASOMOTOR DISTURBANCES:

This study was conducted to evaluate the safety and effectiveness of a standardized extract from the roots of Asparagus racemosus for the treatment of menopausal symptoms, with a focus on vasomotor disturbances such as night sweats and hot flashes. Hot flash can be defined as sensation of penetrating heat in the face, neck and chest, typically lasts from a few seconds up to few minutes.Perimenopausal women were randomized to receive either standardized Shatavari extract or a placebo in this multicentre, double-blind, randomized controlled study. For a predetermined amount of time, the extractwhich had been standardized for its bioactive steroidal saponinswas administered orally. In comparison to those who received a placebo, the results demonstrated that those who received Shatavari extract experienced a significant decrease in the frequency and intensity of vasomotor symptoms, an improvement in overall hormonal balance, and an improvement in menstrual health, with no significant adverse effects observed.[9]

EFFECTS OF SHATAVARI ROOT EXTRACT ON NATURAL ESTROGENIC MODULATION IN VIRGIN FEMALE RATS:

Using adult virgin femalerats,(Sahay et al.,2005) examined the estrogenic effects of alcoholic extracts of Asparagus racemosusroots. According to their research, long-term use of the extract caused notable physiological alterations linked to estrogen stimulation, such as a noticeable expansion of the mammary glands and a dilatation of the vaginal opening. These alterations point to the presence of bioactive substances in the extract, most likely phytoestrogens or steroidal saponins, which interact with estrogen receptors and produce systemic estrogen-like actions. The results demonstrate A. racemosus potential as a natural substitute for synthetic estrogen therapy and validate its historical use in regulating female reproductive health.[10]

MEDICINAL SIGNIFICANCE:

Asparagus racemosus is a popular medicinal plant known for its nutritive, rejuvenative, aphrodisiac, laxative, galactagogue, antispasmodic, antacid, diuretic, antitumor, demulcent, anti-diarrheal, anti-depressant, antimicrobial, antioxidant, adaptogenic, and immunomodulatoryproperties.It is thought to be quite useful in promoting female reproductive health, particularly in treating PMS symptoms, amenorrhea, dysmenorrhea, and pelvic inflammatory illnesses. Shatavari helps to balance female hormones, increase fertility, and improve ovum quality. It also serves as a galactagogue, boosting breast milk production in postpartum women and those who have had hysterectomy.[11]

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TRADITIONAL USES OF ASPARAGUS RACEMOSUS:

•It is used in ayurvedic formulations such as Shatavari kalpa.

• In Unani medicine, it is used to treat stomach disorders and overall weakness.

• The root extract is used in tribal and traditional medicine to heal wounds, ulcers, and inflammation.

• It has also been used to treat diabetes, urinary tract diseases, and coughs.

AYURVEDIC PREPARATIONS:

• Shatavari Churna - A powdered version consumed with milk or honey to promote reproductive and digestive health.

• Shatavari Ghrita is a medicinal ghee used to boost conception and lactation.

• Shatavari Asava/Arishta: Fermented herbal compositions utilized as a tonic for overall wellness.[12]

II. CONCLUSION:

As there is growing interest in plant-based alternatives to synthetic hormones, Asparagus racemosus has emerged as a possible phytoestrogen contender. It contains steroidal saponins like shatavarins and has estrogen-like properties that help manage menopause, infertility, and menstrual disorders. According to the study's findings, Asparagus racemosus has high phytoestrogenic activity and can effectively alleviate menopausal symptoms such as hot flashes and night sweats. The active treatment group experienced a greater reduction in the frequency and severity of symptoms than the placebo group, indicating a positive therapeutic response. Because of its estrogenic characteristics, Asparagus racemosus may be an effective natural treatment for menopausal symptoms.By separating and standardizing its bioactive components for use in tablets, syrups, and gels, future research will aim to determine its pharmacological effects in allopathic treatment. The objective is to develop safe, effective, and evidence-based herbal formulations for immunological modulation, neuroendocrine disorders, and women's health.

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