

A Comprehensive Review of the Nutritional, Therapeutic and Prophylactic Properties of *Asparagus Racemosus* in Geriatrics Care

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ABSTRACT

Asparagus racemosus (AR), commonly known as Shatavari, is an herbaceous plant that has been used for centuries in traditional medicine systems like Ayurveda and Unani for its medicinal properties. AR is often used to support the overall health and wellbeing of older adults. This comprehensive review examines the nutritional, therapeutic, and prophylactic properties of AR in geriatrics care. The research was conducted as a systematic review by following the PRISMA model and data was collected from scientific articles and research published in Google scholar, Science Direct and PubMed from 2010 to 2021. AR is rich in vitamins, minerals, and other nutrients that are essential for maintaining good health. It contains vitamins C, E, and K, potassium, calcium, phosphorus, and iron, all of which are vital for maintaining healthy bones, reducing inflammation, supporting the immune system, and preventing chronic diseases. The therapeutic properties of AR include its antioxidant, anti-inflammatory, immune-boosting, hormone-balancing, and cognitive support effects. The herb's antioxidant properties help reduce oxidative stress and prevent cellular damage caused by free radicals and herbs have anti-aging properties that slow down the aging process and promote healthy aging. The anti-inflammatory properties reduce inflammation in the body and prevent chronic diseases like arthritis. The immune-boosting properties support the immune system. The hormone-balancing properties help alleviate symptoms of menopause and improve reproductive health in women. The cognitive support properties help to improve memory overall brain function. Furthermore, AR improves bone density and prevents osteoporosis, which is a common issue among older adults. In conclusion, AR, is a valuable herb in geriatric care due to its numerous nutritional, therapeutic, and prophylactic properties.

Keywords: Geriatric care, prophylactic, *Asparagus racemosus*, nutrients, therapeutic

INTRODUCTION

The United Nations' 2019 World Population Prospects report projects that by 2050, there will be about 2.1 billion individuals worldwide who are 60 years of age or older, more than double the current figure. As the world's population continues

to age, geriatric care has become a crucial area of focus in healthcare. With advancing age, individuals often face various health challenges, including decreased immunity, impaired digestion, chronic stress, and a higher susceptibility to chronic diseases. In light of these

concerns, exploring natural remedies with therapeutic and prophylactic properties has gained significant attention. A comprehensive evaluation of the person's physical health, cognitive capacities, functional status, and social situations is the first step in providing geriatric care.. In recent years, there has been growing interest in exploring the potential benefits of natural remedies and traditional medicine in promoting health and well-being, particularly among the elderly population. Ayurveda offers specific therapies called *rasayanas*, which are rejuvenation treatments aimed at promoting healthy aging. Ayurveda employs various herbs and herbal preparations to support healthy aging. One such natural resource that has shown promising potential is *Asparagus racemosus*, commonly known as *Shatavari*. *Asparagus racemosus* is a perennial herb. It belongs to the Liliaceae family and is native to India, Sri Lanka, and other parts of Asia. *Shatavari* has long been recognized for its rejuvenating and toning effects on the female reproductive system. However, recent research has shed light on its broader nutritional and medicinal properties, particularly in the context of geriatric care. This comprehensive review aims to explore the nutritional, therapeutic, and prophylactic aspects of *Asparagus racemosus*, focusing specifically on its relevance in geriatric care. By examining the available scientific literature, we seek to provide an in-depth analysis of *Shatavari's* potential benefits for the elderly population. This review will encompass various facets, including its chemical composition, bioactive components, mechanisms of action, and the effects of *Asparagus* on age-related ailments commonly encountered in geriatric patients. This study will delve into the rich nutritional profile of *Asparagus*, highlighting its essential vitamins, minerals, dietary fibers, and antioxidants that contribute to overall

health and well-being. Moreover, we will explore its therapeutic potential in alleviating age-associated conditions such as cognitive decline, cardiovascular disorders, osteoporosis, and immune dysfunction. Additionally, this review will investigate *Shatavari's* prophylactic effects, including its potential for preventing age-related diseases and promoting healthy aging. The therapeutic and prophylactic properties of *Asparagus racemosus* are of paramount importance in geriatric care, as they can provide alternative or complementary approaches to conventional treatments.[1-3]

AIM AND OBJECTIVES

The study aims to introduce *Asparagus racemosus* Linn as an effective plant in Geriatrics Care. The general objective is to find out the nutritional, therapeutic, and prophylactic properties of *Asparagus racemosus* in geriatric care. The specific objective is to identify the phytochemicals in *Asparagus racemosus*. [4]

Classification (Singh, *et al*, 2018).

- **Kingdom** – Plantae
- **Oder** – Asparagales
- **Family** – Liliaceae/ asparagaceae
- **Genus** – *Asparagus*
- **Species** – *A. racemosus*

Botanical Name - *Asparagus racemosus* willd

Vernacular names (Sharma, *et al*, 2021).

- Sanskrit name – *Shatavari*, *Satamuli*, *Satmul*, *Bhiru*
- English - *Asparagus*
- Hindi – *Satavari*
- Bengali – *Shatamuli*
- Gujarati - *Satawari*
- Marathi – *shatavari*

Parts used – The roots(rhizomes) and leaves

MORPHOLOGY**Stem**

Asparagus plants have tall, erect stems called spears. These spears are the edible part of the plant that is commonly consumed. The stems are long, slender, and usually green in color.[5]

Branches and Cladodes

Asparagus has feathery branches or cladodes that emerge from the main stem. These branches are small, needle-like structures that are covered with tiny scale-like leaves. The branches or cladodes are not usually consumed.[6]

Roots

Asparagus plants have a well-developed root system. The roots are 30- 100cm, (Hasan, N. *et al*, 2016). fibrous and spread

horizontally in the soil. They help anchor the plant and absorb water and nutrients from the soil.[7]

Leaves

Asparagus has small, needle -like leaves that are present on the branches. (Joshi, R. K., 2016). These leaves are not the main photosynthetic organs of the plant, as most of the photosynthesis takes place in the spears.[8]

Flowers and Berries

If left to grow, asparagus plants produce small, white in color. The flowers are followed by red pulpy berries which are purplish black when they are ripening and that contain seeds. (Sharma, *et al*, 2021).[9]



plant



Flowers & fruits



Root

Fig. 1: *Asparagus racemosus* - plant, flowers, fruits and root

METHODOLOGY

The study was conducted as a systematic review using the PRISMA model. Data was collected from scientific articles and

research published in Google Scholar, PubMed, and Science Direct. 20 published articles from the years 2010 to 2021 were included in this study.[10]

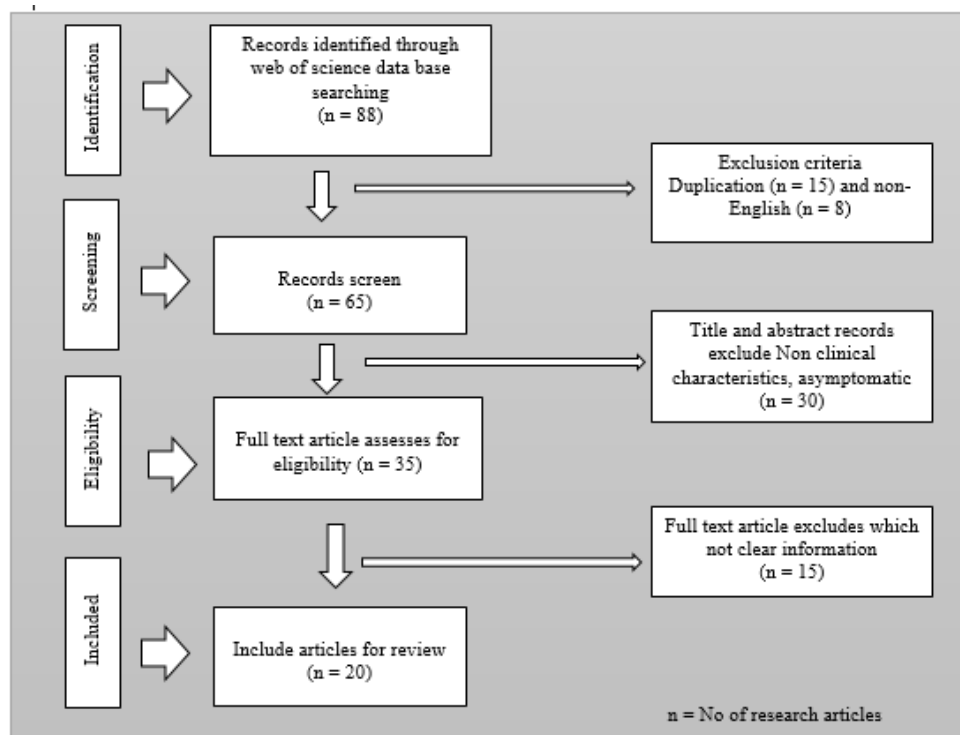


Fig. 2: PRISMA flow diagram.

RESULTS

Chemical Constituents of *Asparagus Racemosus*

Shatavari contains various phytochemicals that contribute to its medicinal properties. Some of the key phytochemicals found in *shatavari* include:

1. **Saponins:** Shatavari is rich in saponins, such as, Shatavarins, 3-O-[α -L-rhamnopyranosyl-(1 $\rightarrow$ 2)- α -L-rhamnopyranosyl], (1 $\rightarrow$ 4)-O- β -D-glucopyranosyl]-25(S)-spirosta-3 β -ol, Asparanin A, Immunoside, which are natural compounds with a wide range of biological activities. (Singla, *et al*, 2014).
2. **Steroidal saponins:** Shatavari contains steroidal saponins, including shatavarins. Shatavarin I and VI, sarsasapogenin, asparanin (A, B, C) and adcendin (A, B). (Singla, *et al*, 2014).
3. **Flavonoids:** Shatavari contains various flavonoids, including rutin, quercetin, and kaempferol, 8-Methoxy-5,6,4-trihydroxyisoflavone-

7-O- β -Dglucopyranoside, Hyperoside. (Shaha, *et al*, 2017).

4. **Asparagositides:** Shatavari is a rich source of asparagositides, which are unique to the *Asparagus* genus.
5. **Shatavarosides:** Shatavarosides are another group of glycosides found in shatavari. These compounds have been investigated for their potential immunomodulatory, antioxidant, and neuroprotective activities.
6. **Carbohydrates:** polysaccharides and mucilage.
7. **Minerals:** Calcium, copper, Iron, manganese, Sodium, Potassium, Selenium, Magnesium and zinc in trace amounts. (Singla, *et al*, 2014).
8. **Others:** vitamin A, C, K, B complex and essential fatty acids. Glutathione (An antioxidant), Ferulic acid (A phenolic compound)[11,12]

Nutritional effect of *Asparagus* (Singla, *et al*, 2014).

Asparagus is a nutritious vegetable with several health benefits, its nutritional profile and various compounds found in

asparagus can contribute to overall health and well-being. Hence it is considered a nutritive tonic due to its high content of essential nutrients. It is known to provide nourishment to various bodily systems,

including the reproductive, digestive, and immune systems. Here are some nutrients associated with asparagus consumption.[13]

Table 1: Nutritional effect of Asparagus.

Nutrients	Nutrient value (per 100 g)
Calories	20 Kcal
Protein	2200 mg
Carbohydrates	3380 mg
Dietary fiber	2100 mg
Fat	0.2g
Vitamins	
Vitamin E	1.13 mg
Vitamin A	756 IU
Vitamin C	5.6 mg
folates	0.052 mg
Niacin	0.978 mg
Vitamin K	0.0416 mg
Thiamin	0.142 mg
Minerals	
Calcium	24 mg
Iron	1.14 mg
Zinc	0.54 mg
Manganese	0.158 mg
Potassium	202 mg
Phosphorus	52 mg
Magnesium	14 mg
Sodium	2 mg
Iron	1.1 mg

Therapeutic and Prophylactic Properties of *Asparagus racemosus*

Anti-inflammatory activity

200 mg/kg resulted in significant decreases in tissue weight, skin thickness, neutrophil-mediated myeloperoxidase activity, inflammatory cytokine production, and other histopathological markers. Additionally, Angiotensin converting enzyme have effectively reduced inflammatory damage induced by chronic TPA exposure and a significant inhibition of vascular permeability induced by acetic acid (Hasan *et al*, 2016). (Selvaraj *et al*, 2019). The methanolic extracts significantly inhibited production

of TNF- α and IL-1 β production in mouse macrophage cells, Elevated tumor necrosis factor- α (TNF- α) synthesis has been associated with the development of diabetes, septic shock, tumorigenesis, rheumatoid arthritis, psoriatic arthritis and inflammatory bowel disease. (Chaudhary *et al*, 2012).[14]

Antioxidant properties

In contrast to the crude extract, the polysaccharide-containing purified aqueous fraction was discovered to be a strong antioxidant. (2014) Singha *et al*. In vitro, *A. racemosus* extracts demonstrated potent antioxidant properties against

gamma-radiated free radical-induced membrane damage in rat liver mitochondria. Lipid peroxidation and protein oxidation were inhibited by the crude extract and its aqueous fraction. This activity was contrasted with that of ascorbic acid and glutathione. Tuszyńska (2010). Chaudhary and associates (2012). In rat liver mitochondria, the potential antioxidant benefits of *A. racemosus* crude extract and purified aqueous fractions were investigated in relation to member damage brought on by free radicals produced by Gama radiation (Alok et al, 2013). Antioxidant qualities are imparted by the Shatavari methanolic extract. While lipid peroxidation declines, there is a notable rise in enzymes such as catalase, superoxidase demutase, and ascorbic acid.[15]

Anti-stress activity

A. racemosus is used in Indian traditional medicine to treat immunological diseases linked to stress and to overall health improvement. These plants are also useful for managing inflammatory and stressful conditions. The effects of the methanol and aqueous extracts from the tuberous roots were examined in an experimental mouse stress paradigm. The extracts have an inhibitory effect on interleukin 1 and tumor necrosis factor, two pro-inflammatory cytokines, as well as on the in vitro production of nitric oxide by mouse macrophage cell line RAW 264. (Hasan *et al*, 2016). Concanavalin A-induced EL4 lymphoma cell production of interleukin 2 was also observed to be reduced in a comparable way. Corticosterone levels in the serum and adrenal glands were assessed. The study suggests that these plants could be beneficial. (Alok, 2013).[16]

Aphrodisiac activity

The sexual behavior of male albino rats is influenced by lyophilized aqueous extracts of asparagus roots. Significant anabolic

effects were demonstrated by the animals treated with the aqueous extracts, as evidenced by the growth of their body weight and reproductive organ weight. A significant shift in animal sexual behavior was indicated by reductions in mount latency, ejaculation latency, post-ejaculatory latency, and intromission latency. Penile erections are also significantly enhanced. The extract-treated mice's better sexual behavior was also demonstrated by a decrease in hesitant time. The observed effects of the extracts appear to be comparable to those of testosterone. According to Hasan *et al*. (2016), the improved penile erection raises the possibility that a nitric oxide-based intervention is potentially at play.[17]

Antidepressant activity

Inhibiting MAO-A and MAO-B and interacting with the adrenergic, dopaminergic, serotonergic, and GABAergic systems, the methanolic extract of *Asparagus racemosus* has a potent antidepressant-like action. Several investigations were carried out to evaluate Shatavari's antidepressant properties both in vitro and in vivo. Stress exposure is a significant factor in depression. Physical stress is used to induce depression in animal models for research. According to reports, the root of *A. racemosus* possesses strong antidepressant properties. Numerous scientific investigations have been conducted to assess its application in psychiatric diseases such as depression. Therefore, it has been demonstrated that the methanolic extract of Shatavari exhibits encouraging antidepressant properties, likely mediated via the noradrenergic and serotonergic systems as well as the strengthening of antioxidant defenses. In 2019, Selvaraj *et al*. The strong antidepressant effects are directly linked to the methanolic extracts. (Takhur and others, 2021).[18]

Anti- bacterial activity

Escherichia coli, *Shigella flexneri*, *Shigella dysenteriae*, *Vibrio cholerae*, *Shigella sonnei*, *Salmonella typhi*, *Bacillus subtilis*, *Salmonella typhimurium*, *Staphylococcus aureus*, and *Pseudomonas putida* are all susceptible to the antibacterial effects of asparagus racemosus roots extracted in methanol. (Takhur *et al*, 2021).[19]

Immunomodulatory Effect

Numerous researchers have studied into how *Asparagus racemosus* root extract affects the immune system's humoral and cellular responses, improving its capacity to fight infections. In order to modulate the immune system, *A. racemosus* polysaccharide fraction is utilized. (Takhur *et al*, 2021). *Asparagus* has been proven to be beneficial in treating potentially lethal intra-abdominal infections that can result in trauma and bowel surgery. It has also been observed that taking *Asparagus* roots powder orally has immunomodulating effects. It has been discovered that the polymorphs and macrophages have better phagocytic activity. Consequently, *racemosus* provides protection against sepsis by changing macrophage. (Farhan *et al*, 2020).[20,21]

Anti diuretic property

Asparagus alcoholic extract has been proven to have diuretic properties. (Farhan *et al*, 2020).[21]

Gastrointestinal health

One study found that *Terminalia chebula* and *A. racemosus* significantly reduce the ulcer severity and ulcer index, shielding the stomach mucosa from ulcers brought on by pentagastrin and carbachol. (Shasa *et al*, 2017).[22]

Anti-cancer activity

Strong cytotoxicity was demonstrated by both isolated shatavarin IV and AR-2B, which included 5.05% shatavarin IV, as

reported by Shasa *et al*. A protective effect of the root extract was seen in the memory cell carcinoma. Researchers investigated the steroidal segments of *A. racemosus* for apoptotic activity and hypothesized that they might be able to cause tumor cell death. (Thakhur *et al*, 2021).[23]

Hepatoprotective activity

In mice with CC14-induced liver injury, alcoholic extracts from *Shatavri* roots have been demonstrated to provide protection against raised levels of alanine transaminase, aspartate transaminase, and soluble phosphatase. (Takhur *et al*, 2021). The *Shatavri* roots' alcoholic extracts have been shown to offer protection against elevated levels of alanine transaminase, aspartate transaminase, and soluble phosphatase in rodents with CC14-induced liver damage. When *Shatavari* (*Asparagus racemosus*), the best female reproductive tonic, is prescribed for paracetamol-induced liver injury in rodents, there is an increased level of SGOT, SGPT, serum bilirubin, and serum antacid phosphatase, indicating the hepatoprotective action (Thakur *et al*, 2021). By acting as a scavenger and lowering free radical formation by inhibiting hepatic CYP2E1 activity, free radical production was decreased, resulting in hepatoprotective action. (Sharma *et al*, 2018).[24]

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demonstrated by a decrease in hesitant time. The observed effects of the extracts appear to be comparable to those of testosterone. According to Hasan et al. (2016), the improved penile erection raises the possibility that a nitric oxide-based intervention is potentially at play.[25]

Cardioprotective activity

The growth of serum cholesterol, particularly LDL cholesterol, is the primary cause of atherosclerosis and cardiovascular disease. Free radical production has been discovered to be a major factor in the emergence of coronary artery disease. (Selvaraj *et al*, 2019). Studies show that *A. racemosus* extract supplementation of roots powder is effective in reducing total lipid concentration and peroxidation by lowering the (cholesterol) LDL and VLDL above 40. (Thakur *et al*, 2021).[26]

Effect of problem associated menopause

Hormone replacement therapy is a typical treatment for menopausal symptoms, although it might have negative side effects. In an effort to provide a trustworthy alternative to synthetic steroidal hormones, women are now turning to natural medicine. Due to its recognized supplies of phytoestrogen, asparagus racemosus may be useful in easing uncomfortable menopausal symptoms. Shatavari's Phyto estrogenic characteristics make it a useful remedy for hormonal imbalance (Pandey *et al*, 2018).[27]

DISCUSSION

Geriatric care refers to the specialized medical, nursing, and social support provided to elderly individuals, typically those aged 65 and older. Older adults often have chronic health conditions such as hypertension, diabetes, arthritis, heart disease, osteoporosis, and dementia. Cognitive decline is common in older adults, and conditions like Alzheimer's

disease and other forms of dementia can significantly impact a person's ability to function independently. Memory loss, confusion, disorientation, and difficulty with daily activities are some of the challenges associated with cognitive decline. Older adults may experience social isolation and loneliness due to factors such as the loss of loved ones, retirement, limited mobility, and restricted social interactions. This can impact mental health and overall well-being. Nutrition and weight management older adults may face challenges in maintaining a healthy diet due to factors such as reduced appetite, difficulty chewing or swallowing, and medication side effects. Proper nutrition is crucial for maintaining overall health, managing chronic conditions, and preventing malnutrition. Mental health conditions, such as depression and anxiety, can affect older adults. Loss of independence, bereavement, declining health, and social isolation are factors that contribute to mental health issues. Geriatric care is focused on addressing the unique healthcare needs and challenges faced by older adults, considering their age-related physiological changes, chronic conditions, and functional limitations. Older adults often have multiple chronic health conditions such as hypertension, diabetes, arthritis, heart disease, or dementia. Geriatric care focuses on managing these conditions effectively, including medication management, lifestyle modifications, and preventive care. *Shatavari* (*Asparagus racemosus*) is a medicinal herb that has been traditionally used in Ayurvedic medicine. While there is limited scientific research specifically focused on the effects of *Shatavari* in geriatric care, its potential benefits and properties make it worth considering as a supplement for older adults. Asparagus is low in calories and rich in essential vitamins and minerals, including vitamin K, vitamin C, vitamin E, vitamin A, folate, and potassium. These nutrients are

important for maintaining a healthy immune system, supporting cell function, and promoting overall vitality. Aging often leads to a decline in digestive function. Asparagus also contains a carbohydrate called inulin, which acts as a prebiotic, supporting the growth of beneficial bacteria in the gut. This, in turn, may contribute to improved digestive health and enhanced nutrient absorption. Asparagus is a good source of dietary fiber, which promotes regular bowel movements and supports a healthy digestive system. It supports the digestive system by soothing the gastrointestinal tract and improving nutrient absorption. This could potentially benefit older adults experiencing digestive issues or nutrient deficiencies. Adequate fiber intake can also help prevent constipation and maintain bowel regularity. Asparagus contains antioxidants such as vitamin C, beta-carotene, and glutathione. Antioxidants help protect cells from damage caused by harmful molecules called free radicals, which are associated with chronic diseases and aging. Chronic inflammation is linked to several health conditions, including heart disease, diabetes, and certain cancers. Asparagus contains compounds with anti-inflammatory properties, such as saponins and flavonoids. Their adaptogenic, immunomodulatory, anti-inflammatory, and antioxidant qualities are attributed to saponins. Shatavari has anti-inflammatory and antioxidant qualities that can help lower inflammation and oxidative stress, two factors that contribute to aging and age-related illnesses. These properties may contribute to overall health and well-being in geriatric care, which could facilitate a decrease in bodily inflammation. Asparagositides are glycosides that have a potential diuretic effect, which means they can increase urine production and help flush out toxins and excess fluids from the body. This property may be beneficial for individuals with edema (fluid retention) or

urinary tract infections. Asparagus has a low glycemic index, meaning it does not cause a significant spike in blood sugar levels. The fiber content in asparagus also aids in slowing down the absorption of glucose, which can contribute to better blood sugar control, especially for individuals with diabetes. Some studies have suggested that asparagus contains compounds with potential anticancer properties, such as saponins and phenolic compounds. These substances may help inhibit the growth of certain cancer cells, although more research is needed to confirm these effects. Asparagus is considered a powerful adaptogen, which means it helps the body adapt to stress and maintain balance. It is also believed to have a calming effect on the mind and can be used to support mental and emotional well-being, making it beneficial for managing stress and anxiety. It has a cooling effect on the body and is commonly used to support female reproductive health and hormonal balance. In geriatric care, hormonal imbalances can occur, especially in women during menopause. *Shatavari* may help alleviate symptoms such as hot flashes, mood swings, and vaginal dryness. As individuals age, their immune systems may weaken, making them more susceptible to infections and diseases. *Shatavari* is considered an immune modulator and may help strengthen the immune response.

CONCLUSION

In conclusion, the research on the nutritional, prophylactic, and therapeutic properties of asparagus have provided significant insights into its potential health benefits. Asparagus is a nutrient-dense vegetable that is rich in vitamins, minerals, and dietary fiber, making it an excellent addition to a balanced diet. It possesses various bioactive compounds, such as flavonoids, saponins, and phenolic acids, which contribute to its antioxidant and

anti-inflammatory properties. Studies have suggested that asparagus consumption may play a role in preventing chronic diseases, including cardiovascular diseases, diabetes, and certain types of cancer. Furthermore, asparagus exhibits diuretic properties, aiding in maintaining kidney health and promoting healthy urinary function. Its anti-inflammatory properties may offer benefits for conditions such as rheumatoid arthritis. Asparagus has been investigated for its potential to support liver function and aid in detoxification processes. It contains a specific antioxidant called glutathione, which plays a crucial role in liver health and detoxification pathways. These properties are more beneficial for geriatric issues. According to the evidence of research articles, *Asparagus racemosus* is a valuable herb in geriatric care due to its numerous nutritional, therapeutic, and prophylactic properties, along with its phytochemical constituents. In the modern era, *Asparagus racemosus* can be used for geriatric problems with greater efficacy and safety. This review of research will help to find out the pharmacological effect of *Asparagus racemosus* in geriatric care. It is suggested to do clinical research for further studies to determine the effect of *Asparagus racemosus* in geriatric care.

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REFERENCE

1. Choudhary, D., & Sharma, D. (2014). A phytopharmacological review on *Asparagus racemosus*. *International Journal of Science and Research*, 3(7), 742–746.
2. Anupam, K. S., et al. (2012). *Asparagus racemosus* (Shatavari): An overview. *Pharmaceutical and Chemical Sciences*, 1(3), 588–598.
3. Shaha, P., & Anurag, B. (2017). Pharmacological profile of *Asparagus racemosus*: A review. 6(11), 1215–1222.
4. Shashi, A., et al. (2013). Plant profile, phytochemistry, and pharmacology of *Asparagus racemosus* (Shatavari): A review. *Asian Pacific Journal of Tropical Disease*, 3(3), 242–251.
5. Singh, L., & Kumar, A. (2018). *Asparagus racemosus*: The plant with immense medicinal potential. *Pharmacognosy and Phytochemistry*, 7(3), 2199–2203.
6. Kumar, S., & Rajoria, K. (2020). Ayurvedic herbs in the management of geriatric problems: A review. *Herbal Science*, 3(2), 17–24.
7. Ganguly, S., & Khakhlar, K. (2017). Shatavari (*Asparagus racemosus* Willd.) – A boon to female health. *International Ayurvedic Medical Journal*, 5(11), 4188–4192.
8. Hasan, N., et al. (2016). *Asparagus racemosus*: For medicinal uses & pharmacological actions. *International Journal of Advanced Research*, 4(3), 259–267.
9. Kaarla, N. M., et al. (2019). Effect of *Asparagus racemosus* on selected female reproductive parameters using Wistar rat model. *Discovery Phytomedicine*, 6(4), 199–204.
10. Selvaraj, K., et al. (2019). *Asparagus racemosus* - A review. *Systematic Reviews in Pharmacy*, 10(1), 87–89.
11. Thakur, S., et al. (2021). Shatavari (*Asparagus racemosus*): The best female reproductive tonic. *International Journal of Research and Review*, 8(5), 73–84.
12. Hasan, N., et al. (2021). *Asparagus racemosus*: For medicinal uses & pharmacological actions. *International Journal of Research and Review*, 8(5), 259–267.
13. Dwivedi, K. K., et al. (1993). The concept of aging in Ayurveda.

- Ancient Science of Life*, 12(3), 377–387.
14. Polo, A., et al. (2019). Medicinal properties of selected *Asparagus* species: A review.
15. Sharma, K., & Bhatnagar, M. (2011). *Asparagus racemosus* (Shatavari): A versatile female tonic. *International Journal of Pharmaceutical & Biological Archives*, 2(3), 855–863.
16. Sharma, N., et al. (2021). Shatavari (*Asparagus racemosus* Wild): A review on its cultivation, morphology, biological activities & pharmacological importance. *World Journal of Pharmaceutical and Medical Research*, 7(9), 41–48.
17. Joshi, R. K., et al. (2016). *Asparagus racemosus* (Shatavari), phytoconstituents and medicinal importance, future source of economy by cultivation in Uttarakhand: A review. *International Journal of Herbal Medicine*, 4(4), 18–21.
18. Kumar, M., & Rani, S. (2017). *Asparagus racemosus*: A medicinal plant of immense potential. *International Journal of Cell Science and Biotechnology*, 6.
19. Alok, S., et al. (2013). Plant profile, phytochemistry, and pharmacology of *Asparagus racemosus* (Shatavari): A review. *Asian Pacific Journal of Tropical Disease*, 3(3), 242–251.
20. Shaha, P., & Bellankimath, A. (2017). Pharmacological profile of *Asparagus racemosus*: A review. *International Journal of Current Microbiology and Applied Sciences*, 6(11), 1215–1223.
21. Farhan, A., et al. (2020). *Asparagus racemosus*: A therapeutic herb. *Scholarly Journal of Food and Nutrition*, 3(3), 364–367.
22. Department of Ayurveda. (1961). *Ayurveda pharmacopoeia* (Vol. I).
23. Department of Ayurveda. (1961). *Ayurveda pharmacopoeia* (Vol. II).
24. Jayaweera, D. M. A. (2006). *Medicinal plants used in Ceylon* (Part II). Colombo: The National Science Foundation.
25. Jayaweera, D. M. A. (2006). *Medicinal plants used in Ceylon* (Part III). Colombo: The National Science Foundation.
26. Jayaweera, D. M. A. (2006). *Medicinal plants used in Ceylon* (Part IV). Colombo: The National Science Foundation.
27. Pandey, A. K., et al. (2018). Impact of stress on female reproductive health disorders: Possible beneficial effects of Shatavari (*Asparagus racemosus*). *Biomedicine & Pharmacotherapy*, 103, 46–49.