IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

REVIEW ON SHATAVARI

Uzma attar , Rupali banger, Pooja avhad

Bachelor of Pharmacy, Department of Quality assurance , Yadavrao Tasgaonkar Institute of Pharmacy , Bhivpuri Road , Karjat , India

ABSTRACT

Asparagus recemosus commonly used as Shatavari. Asparagus recemosus is an indigenous medical plant of the family Liliaceae.

In Ayurveda, this amazing herb is known as the “Queen of herbs”.

Shatavari has long been used as an Ayurvedic herb for women's health. It has identical use in the treatment of female reproductive system as well as the rejuvenatove theropy known as Rasayana by using the different dosage form of shatavari such as Swarasa, Kalka, Kwatha, Kshira, Ghrita and Taila and many more. Hence this review would provide

The present study was undertaken to assess recent reaserch on Neuro- nutraceutical potential of Asparagus racemosus along with their different therapeutic studies. And is primarily used in female aliments mainly as galactagonic and several menstrual problems.

And it also summaries the information concerning the cultivation, collection, morphology, flowering and fruiting time, pharmacological activity of Asparagus racemosus.

Keyword: Asparagus racemosus (Shatavari), recent reaserch on Shatavari

INTRODUCTION

Asparagus racemosus Wild. (family Asparagaceae; Liliaceae), is commonly called Satavari, Satawar . This species is found abundantly in subtropical and tropical zones such as India, Asia, Australia and Africa. The phytochemical constituents of the plant vary depending on its geographical zone of availability. During hot climatic conditions the plant shows the presence of rhizomes, aerial parts and tuberous roots.Asparagus racemosus is an important medicinal plant of tropical and subtropical India. Its medicinal use has been accounted in the Indian and British Pharmacopoei and in indigenous systems of medicine.

In Ayurveda, this amazing herb is known as the “Queen of herbs”, because it promotes love and devotion. Shatavari (Asparagus racemosus, Asparagaceae) is used in Ayurvedic medicine to treat aging, boost immunity, improve longevity, vigor, and mental function. It has also been known to assist in treating neurological disorders, hepatopathy, tumors, and dyspepsia. It has antioxidant, anti-inflammatory, antiseptic, and antimicrobial properties. Although the phytochemical constituents of the plant depend on its geographical zone of availability, the major phytochemical constituents present in the roots are steroidal saponins. The authors reviewed current literature to address the pharmacological benefits of shatavari.

Kingdom : Plantae
Order : Asparagales
Family : Asparagaceae

Sub family: Asparagoideae

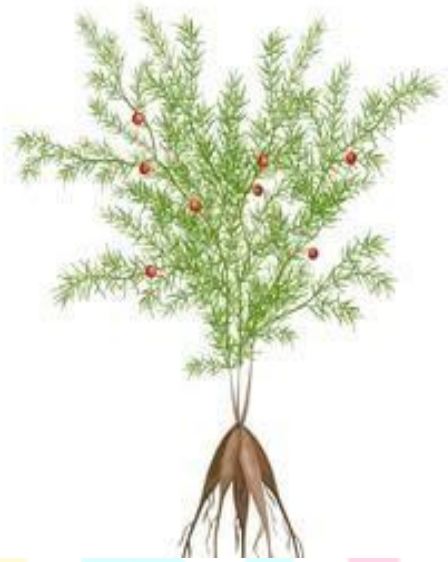
Genus :. Asparagus
Species : Asparagus racemosus L.

Shatavari means "who possesses a hundred husbands or acceptable to many". It is considered both a general tonic and a female reproductive tonic. Shatavari may be translated as "100 spouses", implying its ability to increase fertility and vitality. Shatavari (Asparagus racemosus) is a climbing plant which grows in low forest areas throughout India. The name "Shatavari" translates to "a woman who possesses 100 husbands", referring to the Shatavar rejuvenation effect in female reproductive organs.Shatavari is the main Ayurvedic rejuvenative tonic for the female, as is Withania for the male.
It was found that shatavari root extract contains alkaloids, flavonoids, tannins, phytosterols, glycosides, carbohydrates, proteins, and fats. Methanolic and ethanolic root extracts showed positive results against Escherichia coli, Shigella dysenteriae, Vibrio cholerae, Basillus subtilus, Staphylococcus aureus, Shigella sonnei, and Shigella flexneri bacteria. Bioactive principle of Asparagus racemosus

The major bioactive constituents of Asparagus are a group of steroidal saponins (Shatawari IIV). This plant also contains vitamins A, B1, B2, C, E, Mg, P, Ca, Fe, and folic acid. Other primary chemical constituents of Asparagus racemosus are essential oils, asparagine, arginine, tyrosine, flavonoids (kaempferol, quercetin, and rutin), resin, and tannin.

Morphology:

The medication contains dried tuberous succulent roots which emergeadventitiously from the root stock



The medication contains dried tuberous succulent roots which emergeadventitiously from the root stock. The tuberous dry barrel shaped in the center, decreased towards the closures and dark colored in shading. Surface of the new roots are effectively removable and sprea shimmering material inside. The medications are either whole roots or longitudinally broken pieces. The medication in measurements measure 10.0 - 24.0 cm. long and 0.5-2.5 cm. in distance across. Surface of the dried roots show profound sporadic longitudinal wrinkles and moment transverse wrinkles because of shrinkage during drying. The messed up bits of the medication have sporadic uneven transverse surface and empty depression in the inside part of the medication without decreasing end or center portion of the medication without decreasing closures. The medication is hard, be that as it may, it breaks with a short crack. The medication has no smell and has somewhat adhesive taste which leaves bitter mix in the wake of biting for couple of minutes.

Flowering and fruiting time:
Plant almost dies or dries up in summers and it grows with new tender branches from underground root. Flowers begin to appear in September-December and fruits appear afterwards

1. NEURO-NUTRACEUTICAL POTENTIAL OF ASPARAGUS RACEMOSUS:

Herbal supplements have surely been explored due to their multiple component nature to enhance the effect of western medications. One such well-documented nutraceutical in the ancient Greek, Chinese, and Ayurvedic medicine system known for its various medicinal benefits is Asparagus racemosus. Widely used for its lactogenic properties, A. racemosus is also cited in Ayurveda as a nervine tonic. A. racemosus based nutraceuticals have shown to possess adaptogenic, neuroprotective, antioxidant, anti-inflammatory, and nootropic activity under preclinical and clinical settings without posing significant adverse effects. A. racemosus extracts restore the perturbed neurotransmitters and prevent oxidative neuronal damage. From the available neuropharmacological researches, the physiological actions of A. racemosus can ultimately be directed for either augmentation of cognitive ability or in the management of neurological conditions such as stress, anxiety, depression, epilepsy, Parkinson's, and Alzheimer's disease.

2. SHATAVARI (ASPARAGUS RACEMOSUS WILLD) AND ITS FORMULATIONS - A CRITICAL REVIEW THROUGH BRIHATRAYI

Shatavari is the “Universal Rasayana”1. It is extensively used in female fertility, overall health and vitality, to promote lactation, and as an aphrodisiac. Various proven pharmacological activities of Shatavari . . It is used as a main ingredient in various formulations mentioned in Brihatrayi and other Ayurvedic texts. In Brihatrayi, various formulations like Swarasa, Kwatha, Churna, Ghrita, Taila etc of Shatavari are found. Out of all these formulations, in predominance the used part of Shatavari is root. During screening of Brihatrayi, the other parts such as Shaka, Ankura and whole plant are also used in the preparation of formulations.

Characteristics and Types:
Shatavari has a Swadu-Tikta Rasa, GuruSingdha Guna, Shita Virya and Madhura Vipaka. It has an effect of Rasayana, Vrushya, Medha-Agni-Bala Vardhana, Vata-Pittahara, Grahani, and Arsha7
Sushruta mentioned two types of Shatavarii.e. Shatavari and Brihat Shatavari

3. THERAPEUTIC STUDIES OF ASPARAGUS RACEMOSUS

Various studies have been conducted on this plant to know its pharmaceutical and therapeutic uses. Large-scale clinical studies are still needed to prove the clinical efficacy of this herb, especially in skin diseases, immunomodulatory disorders and cancers.

1. Reproductive Effect:

It is utilized to cure the reproductive problems in females like irregularities in menstrual cycle Dysmenorrhea, Uterine Bleeding, amenorrhea, sexual weakness,
Dysfunctional, menopause, pelvic inflammatory disease like sexual dysfunction and endometriosis. In ancient times it has been used for PMS as uterine tonic, thus it strengthens, nourishes, cleanses and causes uterus prolapse. It eliminates infertility and develop the uterine wall for contraction during foetus development hence prevents the miscarriage and also helps
to increase lactation by balancing the hormonal level. It increases the weight of ovaries and improves folliculogenes and root extract is helpful in serum FSH stimulation

2. Anti-carcinogen Activity:

Steroidal saponins extract from the plant shatavari used for apotosis inducing study .The root extract appeared to have a defensive impact in the memory cell carcinoma. Steroidal segments of the A. racemosuswere researched for the apoptotic action and surmised to have the ability to tumour cell death. Shatavarin IV possess’ significant anti-cancer properties

3. Anti-proliferative Activity:

From the various experiment Shatavarin IV shows the most extreme potential to diminish cell viability and mortality rate

4. Anti-ulcer Activity:

The plant shows the property of adaptogen (improve the capacity of body to changes as indicated by the climate) as referenced before, it is rasayana spice to improve the cell resistance The constituents of A. racemosus works against ulcer. The compatible perish in measure of gastric secretion, free causticity and number of ulcer patches and acidity was analysed

5. Cardio protective Activity:

Development of cardiovascular diseases and atherosclerosis is mainly due to the increase in the serum cholesterol especially LDL cholesterol. The release of free radicals has been found to play a key role in the development of coronary artery disease. Studies exhibit a significant hypocholesterolemic role of A. racemosus extract12,13. Methanolic root extract of Shatavari supplements are potential component in decreasing lipid peroxidation. Extracts also exhibits a decrease in low-density lipoproteins, very lowdensity lipoproteins and triacylglycerol levels in blood.

The supplementation of roots powder is utilized in bringing down the all-out lowering the (cholesterol) LDL and VLDL over
40%

6. Anti-bacterial Activity:

Antibacterial activity is the efficacy of the plant extract to inhibit the growth of bacterial pathogens. Plant extract with antibacterial property depends on its phytochemical constituents. Plant extracts with antibacterial property can be used as a medicinal plant and replace synthetic antibiotics.

The methanol extract originated from the roots of A. racemosus have demonstrated for antibacterial property against Vibrio cholerae, Shigella dysenteriae, Pseudomonas putida Staphylococcus aureus, Shigella flexneri, Escherichia coli, Salmonella typhi, Salmonella typhimurium, Shigella sonnei, and Bacillus subtilis

7. Anti- Fungal:

The root extract of Shatvari provide significant protection against fungal infections such as candida, Malassezia furfurand M.globosa

8. Anti-oxidant:

Antioxidants have a vital role in scavenging the free radicals produced in the body. Though our body has its own antioxidants to protect, it is always advisable that our diet is enriched with antioxidants to boost the immune system of our body. Various studies have proved the antioxidant potential of A. racemosus. Studies have proved the role of aqueous Shatavari root extract in protecting the gamma radiation induced damage in liver. The antioxidant potential was well characterized against lipid peroxidation

Antioxidants are intimately involved in the prevention of cellular damage – the common pathway for cancer, aging, and a variety of diseases

.Methanolic extract of the Shatavari imparts anti-oxidant properties. There is a significant increase in the enzymes like catalase, super-oxidase demutase and also in ascorbic acid whereas the lipid peroxidation decreases. The anti-oxidant activities are also due to the flavanols like racemofuran, asparagamine A, racemosol.

A study to investigate the potential of methanolic extract of Asparagus racemosus roots against kainic acid (KA) -induced hippocampal and striatal neuronal damage in mice. Excitotoxic lesions were produced in the brain by Intrahippocampal and intrastriatal injections of KA to anesthetized mice. Decreased glutathione peroxidase (GPx) activity and reduced glutathione (GSH) content was observed after KA injection, GSH acts as a nucleophilic scavenger of toxic compounds and also as a substrate in the GPx-mediated destruction of hydroperoxides to stop the accumulation of toxic levels in brain tissues so GSH is considered to have a good antioxidant property. The mice treated with Asparagus racemosus extract showed an enhancement in GPx activity and GSH content, and reduction in membranal lipid peroxidation and protein carbonyl. From the study it was concluded that the plant extract plays the role of an antioxidant by attenuating free radical induced oxidative damage.

9. Anti-depressant:

Depression is the most common disorder associated with psychology. The synthetic drugs used to treat depression usually ends up with various side effects. Moreover, most of the drugs are effective for a few of the patients. Plant extracts with antidepressant property can reduce the ill effects synthetic drugs and patients can rely on it. Right from ancient time different herbal preparations are used to treat psychiatric disorders. Numerous studies were conducted to assess the antidepressant activity of Shatavari invitro and invivo. Exposure to stress plays an important role in depression. Studies in animal models are done by inducing physical stress which leads to depression A. racemosus root has been reported to have a significant antidepressant activity. Various scientific studies have been done to evaluate its use in psychological disorders like depression. Thus, it is proved that the methanolic extract of Shatavari has promising antidepressant activity, which is probably mediated through the serotonergic, noradrenergic systems and augmentation of antioxidant defenses.
The methanolic extracts are directly associated with the significant anti-depressant properties

10. Hepatoprotective:

The alcoholic extracts of the Shatavri roots are known to provide protectivity against increased levels of alanine transaminase, aspartate transaminase and soluble phosphatase in CC14-instigated hepatic harm in rodents. In paracetamol actuated liver injury in rodents there is expanded degrees of SGOT, SGPT, serum bilirubin and serum antacid phosphatase, upon prescription with the ethanolic roots extricate and inversion in their levels showing the hepatoprotective action

11. Anti-diarrhoeal:

The ethanolic and aqueous concentrates have been appeared to have inhibitory action against gastrointestinal tract motility after intake of charcoal meal PGE2 incited enter pooling, taking loperamide as a kind of perspective medication

Very significant anti-diarrhoeal activity was found in A. recemosus were similar to loperamide an anti-diarrhoeal drug the action of this extract can be attributed to the inhibition of prostaglandin biosynthesis which in turn inhibits gastrointestinal motility and

12. Immunomodulant Activity:

A. racemosus polysaccharide fraction is used for the immune modulant activity]. It improves resistance through Tcells and brought about a huge expansion in immunizer titers demonstrating obvious humoral reaction. Steroidal sapogenins and steroidal saponins (shatavaroside an and shatavaroside B) are significant auxiliary metabolites present in Shatavri that may be described to show immunomodulatory impacts

13. Neural Disorders Activity:

A. racemosus extract's potential examined against Kainic Acid (KA)-striatal neuronal damage and induced hippocampal

14. Anti-plasmodial Activity:

The ethyl acetate extract of the roots of A. racemosus has been tested for antiplasmodia activity

15. Anti-inflammatory effects:

Inflammation is the body's defense against infection. Before starting treatment for any type of infection, inflammation need to be reduced in order to treat better and to reduce pain in patients. Although there are number of synthetic anti-inflammatory drugs which are available, it is always reliable to make use of herbal extracts, as it is safe for the individuals.

A racemosus root powder at the quantity of 200mg/kg can reduce the tissue weight, inflammatory cytokine production, neutrophil mediated myeloperoxidase action, so it is consisting anti-inflammatory property

significant inhibitory effects by the methanol and aqueous extracts of the three root extracts on NO production were observed. Macrophages play an important role in inflammation

16 : Hypoglycemic activity

Ethanolic root extracts of A. racemosus exhibited a significant hypoglycemic activity. Studies with animal models proves a significant increase in the levels of insulin release. The release of insulin further increased with a subsequent increase in the concentration of glucose in blood. When compared to methanol and aqueous extracts, ethanolic extracts showed a significant hypoglycemic activity. Invitro antidiabetic studies also proved the efficacy of asparagus in decreasing the serum

glucose levels1618. Further studies can help in the preparation of antidiabetic drug from Shatavari extract which can replace synthetic drugs available in market.

17 : Effect on uterus

Methanolic extracts of Shatavari can be used as uterin sedative. Many research studies, both in-vivo and in-vitro has proved that root extracts of A. racemosus have been responsible for the competitive block of contraction of rat, guinea pig and rabbits' uteri induced by oxytocin. Shatavari root extracts also possess active components that fight against female infertility, increases libido, decreases inflammation of sex organs, improves conception rate, reduces or prevents abortion, increases lactation and improves the hormonal balance after postportum

18 : Antitussive effect

A. racemosus has been commonly used in the treatment of cough and in minor upper respiratory tract infection, exhibiting the antitussive properties. In the experimental setup by Akansha Singh and Sinha (2014) the methanol extract of the roots showed activity against sulphur induced cough in mice which was likened to the codeine phosphate, a drug obtained from opium.

Hence this extract can be used against the opium based drugs, since there are no side effects like nausea, sweating, tiredness which can be observed by use of codeine phosphate associated drugs. 19 :Antiepileptic effect:

The anticonvulsant activity was evaluated using different extracts on seizures. the methanolic extract has shown significant anticonvulsant effect which was anticipated by the observation of a decrease in the duration of the hind limb extension, clones and also the duration of stupor phase. There was a prolonged onset of the tonic clonic seizure induced by pentylenetetrazol in the groups treated with methanolic and aqueous extracts and mechanism behind the activity was GABAergic.

20 : Antileshmanial activity:

Leishmaniasis can occur in diverse clinical forms such as cutaneous, mucosal, visceral leishmaniasis (VL, the most severe) and remain a major health problem in the tropical and subtropical areas, threatening almost 350 million people in 88 countries.The viability of promastigotes after treatment with Racemoside A

21. : Adaptogenic activity

'Rasayana' is a group of plant drugs which besides improving defence mechanisms of the body also promot physical and mental health as well as provide strengt and long life. The objectives of 'rasayanas' includ vayasthapana (retarding ageing), ayukaram (enhancin life span), medhabalakaram (promoting intellect and physical strength) and rogapaharanasamartha (increasing resistance to diseases).These are similar to 'adaptogens' which are the agents that increase the non- specific resistance of organisms against a variety of stresses. A. racemosus is studied against the side effects induced by cisplatin such as gastric emptying and normalise intestinal hypermotility. A. racemosus reversed the effects of cisplatin on gastric emptying, and also normalized cisplatin induced intestinal hypermotility.[58] 'Satavari mandur'(SM) is an ayurvedic herbo-mineral formulation main ingredient of Satavari mandur is the root extract of A. racemosus, having effective antiulcerogenic agent. 'Siotone' is herbal formulation which has significant adaptogenic activity and it reverse chronic stress-induced biochemical, physiological and behavioural perturbations.

4. SHATAVARI (ASPARAGUS RECEMOSUS): A VERSATILE FEMALE TONIC

Shatavari is beneficial in female infertility. It increases libido, cures inflammation of sexual organs, helps treat PCOD, prepares the uterus for conception, prevents miscarriages, good postpartum tonic, improves lactation, helps in menstrual disorders. Shatavari is a beautiful supplement used wholly or as an adjuvant for the complete health of women. Shatavari used daily will improve women's health and vitality Effect in young females:

In young females it may increase weight of ovaries and may enhance folliculogenesis, as evidenced by a histological study of ovaries of immature female rats. A significant rise is serum follicle stimulating hormones (FSH) is observed with a dose 100 mg/kg of A.R. root extract

Problems related with menstruation:

The constituents of A. racemosus make it useful in menstrual disorders such as dysmenorrhea, premenstrual syndrome, irregular bleeding during perimenopausal period and also in situations after menopause. A. racemosus contain saponins which hinder the oxytocic activity on uterine musculature, thereby maintain the spontaneous uterine motility, confirming its utility in dysmenorrhea which comprises of painful menstruation without significant pelvic pathology[15]. Ethyl acetate and acetone extracts of roots of

A. racemosus block spontaneous motility of the virgin rat's uterus. These can also inhibit the spasmogenic effect of Ach, barium chloride and serotonin on the uterus [45], further confirming its activity in relieving dysmenorrhea. An herbal formulation Evecare was found effective in all patients of dysmenorrhea and in 80% cases of premenstrual syndrome .

Problems related with menopause:

Menopause is a natural event of women's life's as they transit from reproductive to non reproductive stage few years before and after this transition a majority of women encounter problems like hot flushes, night sweats, palpitations, insomnia, anxiety, irritability, vaginal dryness, vaginal atrophy, atrophy of cervix and decreases in size of uterus Problems related with menopause .Women having undergone hysterectomy also experience such symptoms due to removal of functional organs of reproductive system. They have elevated levels of serum follicle stimulating and serum lutenising hormones. These hormones are important in female reproductive system as they help to regulate and stimulate ovarian cycles through feed back mechanism to ovaries and hypothalamus. A common practice to relievemenopausal symptoms is to administer hormone replacement therapy , which is not free from adverse effects. Therefore women are turning to natural medicine in an attempt to have a safe alternative to synthetic steroidal hormones. A. racemosus being known source of phytoestrogens can be effective in reducing adverse menopausal symptoms (The chemicals entities from plants which mimic hormones are called phytoestrogens). These are weaker than natural estrogens in action]. However they compete with estrogen for estrogen receptors. In the presence of excess of estrogens in the body phytoestrogens may have antiestrogenic effect by occupying some estrogen receptor. The symptoms of a menopause are due to the body A. racemosus have shown their effectiveness in alleviating the symptoms in and postmenopausal period and in hysterectomised patients.

The potential for estrogen-like effects of shatavari supplementation has implications for both muscle and bone health after the menopause post-menopausal estrogenic deficits may promote the ageassociated decline in muscle strength and function (sarcopenia); men experience a more gradual decline in handgrip strength (HGS) across the lifespan, whereas women display a sharp decline in such strength in the middle of the sixth decade .A large metaanalysis of studies that examined muscle strength and hormone replacement therapy (HRT) demonstrated that HRT increases muscle strength . E2 withdrawal has a detrimental effect on myosin binding function and, therefore, muscle force production; conversely, E2improves muscle force production, and may promote muscle protein synthesis . One study showed that shatavari (500 mg·d−1 root extract; fresh weight equivalent not stated) enhanced strength gains in young men following eight weeks of bench press training this was an observational study with no indication of possible mechanisms of action. However, it does suggest that shatavari may be a beneficial ergogenic aid in supporting resistance training-induced increases in muscle size and strength; no assessment of these ergogenic effects has been made in older adults.

CULTIVATION AND COLLECTION:

.1 Climate and Soil: Shatavari is native to the Indian subcontinent and can be found growing in surprisingly diverse environments from the humid tropical jungles of Sri Lanka to the foothills of the Himalayas. The plant is a climber; its thin branches and feathery leaves can often be found bursting out of shrubs and trees that it uses to support its growth and search for light. Although it is happy growing in humid jungles, shatavari can also thrive in extremely arid conditions. Asparagus can be grown successfully in black cotton soil mixed with river stand . It propogated from adventitious roots which are dipped in liquid cow dung for 24 hrs before being planted in raised soil beds.Its capacity to capture and store moisture in dry soils is reflected in its potential for replenishing fluids in the human body and

bringing balance to a stressed system. In Uttrakhand climate wise divided in tropical, subtropical and hot climate, and it was find suitable by scientist's to grow in all. Usually this plant prefers to grow in light, medium and heavy soils. But black well drained and fertile soil is good for cultivation and temperature required 25-40 0C.

2 HARVEST:

Month of May and June is suitable for plantations. Generally Shatavari crop does not affect with pest and diseases. Once harvesting 1.5-2 years after transplanting, this continues for 10-15 years .

Usually it is collected from wild plants. It is cultivated in garden as a potted plants for its graceful feathery leaves and flowers . Shatavari bears white , fragrant flowers in the form of

CONCLUSION:

Shatavari is a very important medicinal plant, which is used in Ayurveda and also in Himalayan traditional medicine system.

Different parts of A. racemosus has been extensively studied for its medicinal properties. A. racemosus extracts has proved to possess various pharmacological properties and a potent therapeutic agents.

The plant utilised generally as tonic for variety of diseases . It is also considered as a Female reproductive tonic. The phytochemical of the plant are widely distributed with many therapeutical properties. The main therapeutic use of the plant shatavari is on the reproductive system of women and promote tearing and memory. The potential benefits of shatavari supplementation for the musculoskeletal system after the menopause and this initial study signposted several novel effects and promising avenues for further research in this area.

The review present the information regarding the defferent dosage forms of shatavari mentioned in Brihatrayi are Swarasa ,
Kwatha, Kshirapaka ,Gutika , Churna ,Avaleha ,Ghrita, Taila, Lepa, Manda/Yavagu , Rasayana ,Basti Yoga and other Yoga

More research is needed to define the effect of phytoestrogens from Asparagus racemosus and at the same time standardization and characterising formulation and/or isolated phytoestrogens is imperative. In addition developing an understanding of the
effect of phytoestrogens from Asparagus racemosus as opposed to human oestrogen Also holds great promise for further research

REFERENCE:

- O'Leary, M. F., et al. "Shatavari Supplementation in Postmenopausal Women Improves Handgrip Strength and Increases
- Vastus lateralis Myosin Regulatory Light Chain Phosphorylation but Does Not Alter Markers of Bone Turnover. Nutrients 2021, 13, 4282." (2021).
- Siddhpura, Bhavisha, and Bharti Umretia. "Int J Ayu Pharm Chem."2020 Vol. 13 Issue 1[e ISSN 2350-0204]
- Selvaraj, K., Sivakumar, G., Veeraraghavan, V.P., Dandannavar, V.S., Veeraraghavan, G.R. and Rengasamy, G., 2019.
- Asparagus Racemosus-a review. Systematic Reviews in Pharmacy, 10(1), pp.87-89.
- Singh, L., Choudhary, A. and Singh, G., 2018. Asparagus racemosus: The plant with immense medicinal potential. Journal of Pharmacognosy and Phytochemistry, 7(3), pp.2199-2203.
- Arya, R.H., Shincymol, V.V. and Oommen, S.M., 2018. An Insight To The Pharmacognosy Of Shatavari (asparagus Racemosus Willd.). International Journal of Ayurveda and Pharma Research.
- Sharma, A. and Sharma, D.N., 2017. A comprehensive review of the pharmacological actions of Asparagus racemosus. Am. J. Pharm. Tech. Res, 7(1).
- Shaha, Pooja, and Anurag Bellankimath. "Pharmacological profile of Asparagus racemosus: A review." Int. J. Curr. Microbiol. App. Sci 6.11 (2017): 1215-23. Asparagus Racemosus - A Review

- Mishra, J.N. and Verma, N.K., 2017. Asparagus racemosus: chemical constituents and pharmacological activities-a review. Eur. J. Biomed. Pharm. Sci, 4, pp.207-213.

- Joshi, Rakesh K. "Asparagus racemosus (Shatawari), phytoconstituents and medicinal importance, future source of economy by cultivation in Uttrakhand: A review." Inter. J. Herb. Med 4.4 (2016): 18-21.

- Gohel, R.A.C.H.A.N.A., Solanki, B.H.A.V.N.A., Gurav, N.I.L.E.S.H., Patel, G.H.A.N.S.H.Y.A.M. and Patel, B.H.A.V.N.A.,
- 2015. Isolation and characterization of Shatavarin IV from root of Asparagus racemosus willd. Int J Pharm Pharm Sci, 7, pp.3625.

- Singla, Ramit, and Vikas Jaitak. "SHATAVARI (ASPARAGUS RACEMOSUS WILD): A REVIEW ON ITS
- CULTIVATION, MORPHOLOGY, PHYTOCHEMISTRY AND PHARMACOLOGICAL IMPORTANCE." International Journal of Pharmacy & Life Sciences 5, no. 3 (2014).

- Choudhary, D. and Sharma, D., 2014. A phytopharmacological review on Asparagus racemosus. Int J Sci Res, 3, pp.742745.

- Sharma, Arti, and Vandana Sharma. "A brief review of medicinal properties of Asparagus racemosus (Shatawari)." Int J Pure Appl Biosci 1.2 (2013): 48-52.

- Sharma, Komal, and Maheep Bhatnagar. "Asparagus racemosus (Shatavari): a versatile female tonic." International journal of pharmaceutical and biological archives 2.3 (2011): 855-863.

- Hussain, A., Ahmad, M.P., Wahab, S., Hussain, M.S. and Ali, M., 2011. A review on pharmacological and phytochemical profile of Asparagus racemosus Willd. Pharmacologyonline, 3, pp.1353-1364.

- Thakur, Shifali, Hemlata Kaurav, and Gitika Chaudhary. "Shatavari (Asparagus Racemosus)-The Best Female Reproductive Tonic."

- Pharmacognosy and phytochemistry volume I, 3rd edition , Vinod D. Rangari .

- Pharmacognosy 55th edition, C. K. Kokate, A. P. Puronit, S. B. Gokhale.

- S Kumar, RK Mehla, AK Gupta… - Livestock Research for …, 2010 - lrrd.cipav.org.co

- J Negi, P Singh, G Joshi, M Rawat… - Pharmacognosy