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Aphrodisiac and antioxidant activity of *Asparagus racemosus* (Shatawar): A review

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Abstract

Asparagus racemosus belongs to the family of Asparagaceae is an important medicinal plant of Indian subcontinent. Its medicinal usage has been reported in traditional systems of medicine such as Unani, Ayurveda and Siddha. *Asparagus racemosus* has been described to use as aphrodisiac, antioxidant, immune stimulant, anti-dyspepsia and anti-tussive effects. It is also useful in treatment of epilepsy, kidney disorders, chronic fevers, stomach ulcers and regulates sexual behaviors. The major active constituents of *Asparagus racemosus* are steroidal saponins, isoflavones, asparagine, racemosol, polysaccharides, essential oils, asparagine, arginine, flavonoids (kaempferol, quercetin, and rutin), resin, and tannin. It is a well known in the indigenous system of medicine which prevent ageing, increase longevity, impart immunity, improve mental function, vigor and add vitality to the body. It is also used in nervous disorders, dyspepsia, tumors, inflammation and neuropathy.

Keywords: *Asparagus racemosus*, aphrodisiac activity, antioxidant activity

1. Introduction

Asparagus racemosus is also known as Shatavari, which belongs to family Asparagaceae. *Asparagus racemosus* is an important medicinal plant and its root paste or root juice has been used in various ailments and as health tonic [1-2]. *Asparagus racemosus* is a well known Ayurvedic rasayana which prevent ageing, increase longevity, impart immunity, improve mental function, vigor and add vitality to the body and it is also used in nervous disorders, dyspepsia, tumors, inflammation, neuropathy, hepatopathy [3]. Reports indicate that the pharmacological activities of *Asparagus racemosus* root extract include antiulcer [4], antioxidant, antidiarrhoeal, antidiabetic and immunomodulatory activities. A study of ancient classical Unani and Ayurvedic literature claimed several therapeutic attributes for the root of *A. racemosus* and has been specially recommended in cases of threatened abortion and as a galactagogue. Root of *A. racemosus* has been referred as bitter-sweet, emollient, cooling, nervine tonic, constipating, galactagogue, aphrodisiac, diuretic, rejuvenating, carminative, stomachic, antiseptic [5-6] and as tonic. Beneficial effects of the root of *A. racemosus* are suggested in nervous disorders, dyspepsia, diarrhoea, dysentery, tumors, inflammations, hyperdipsia, neuropathy, hepatopathy, cough, bronchitis, hyperacidity and certain infectious diseases.

The roots are cylindrical, fleshy and tuberous. The roots are 30-100 cm in length, 1-2 cm in thickness and yellowish-cream in colour. The roots contain long needle shaped structure known as pith which is meant for the conduction of water [7-8]. The plant enjoys considerable reputation in Indian system of medicine.

Aphrodisiacs are the substances which are used to increase sexual activity and help in fertility. Sexual feelings are an inevitable part of life. The basic and fundamental purpose of sex and sexuality is the "continuation of progeny" and the survival of human race [9]. The sex is the most intimate, indispensable and an integral part of every individual and can be a source of pleasure and fulfillment. However, unfortunately, there has been a lot of ignorance, wrong information, fear and negative attitude as for as sex is concerned. Myths and misconceptions are rampant and are passed on from generation to generation. These sexual myths can result in sexual dysfunctions, misery, silent suffering, disturbed interpersonal relationships and even divorce. Sexual ignorance is a social disease and can only be resolved through comprehensive sex education, which can increase awareness and improve the environment. In fact, it is possible that with proper sex education, the number of unwanted pregnancies and sexually transmitted diseases would be reduced considerably [10].

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Fig 1: *Asparagus racemosus*

Vernacular Names

Hindi: Satavar

Bengali: Shatamooli

Marathi: Shatavari

Gujarati: Shatawari

Telugu: Challan gadda

Tamil: Sadawari

Kannada: Majjigegade. ^[11].

Phytochemistry

The main active constituents of *Asparagus racemosus* are steroidal saponins (Shatavarins I–IV) that are present in the roots. Shatavarin IV is a glycoside of sarsasapogenin having two molecules of rhamnose and one molecule of glucose. Other active compounds such as quercetin, rutin (2.5% dry basis) and hyperoside are found in the flowers and fruits; while diosgenin and quercetin-3 glucuronide are present in the leaves ^[7]. A new isoflavone, 8-methoxy-5, 6, 4'-trihydroxyisoflavone-7-O-β-d-glucopyranoside was also reported from *A. racemosus* previously. The isolation and characterization of polycyclic alkaloid called asparagine, a new 9, 10-dihydrophenanthrene derivative named racemosol and kaempferol were also isolated from the ethanolic root extract of *A. racemosus*. Oligofurostanosides ^[12]. Other primary chemical constituents of *Asparagus* are essential oils, asparagine, arginine, tyrosine and resin ^[13-14].

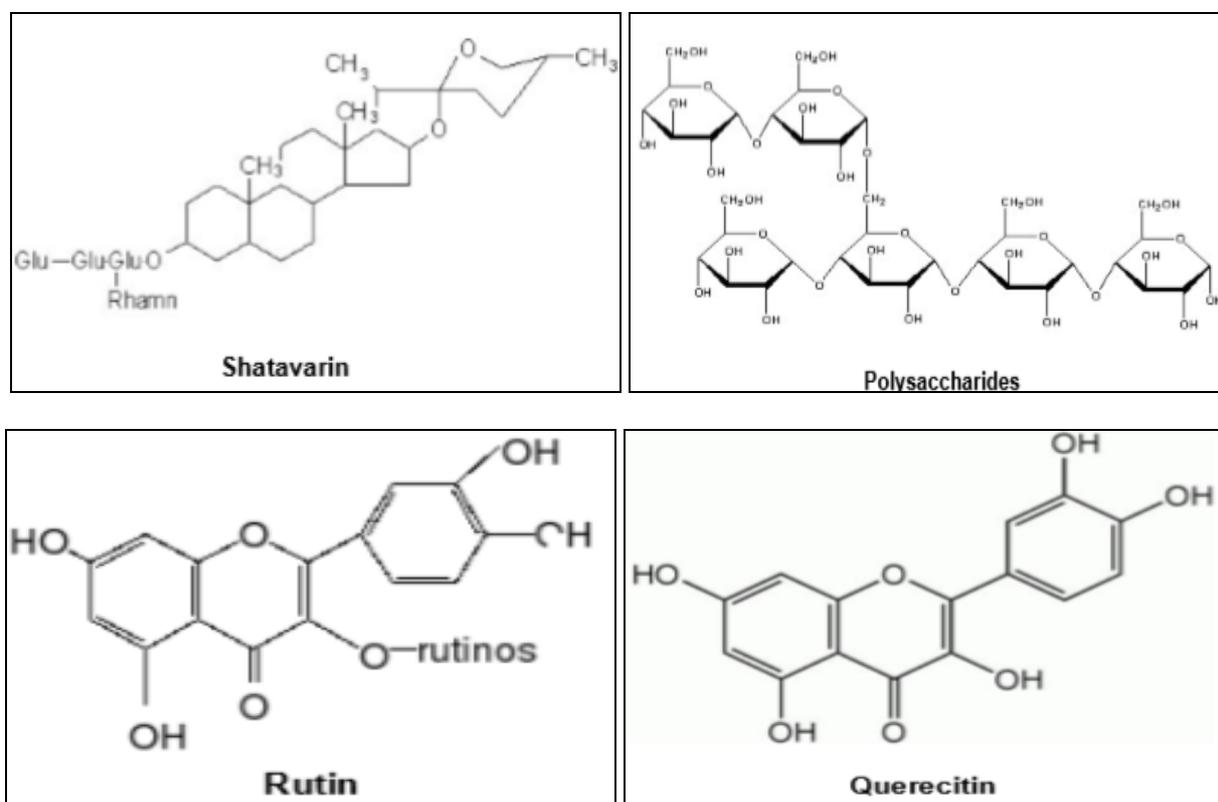


Fig 2: Phytochemical constituents

Aphrodisiac activity

In this study, the hydro-alcoholic and aqueous extracts of the roots of *Asparagus racemosus* were subjected to preliminary phytochemical screening which showed the presence of saponins, carbohydrates, glycosides and mucilages. The total extracts were tested for their aphrodisiac activity in experimental rats. The hydro-alcoholic extract of *Asparagus racemosus* root at higher concentration (400 mg/kg body weight) showed significant aphrodisiac activity on male wistar albino rats as evidenced by an increase in number of mounts and mating performance. On the other hand, hydro-alcoholic extract at lower dose (200 mg/kg. body weight) and aqueous extract (400 mg/kg body weight) showed moderate aphrodisiac property. Thus, in experimental rats, the results of the present study suggest that the extracts of *Asparagus racemosus* exert significant aphrodisiac activity ^[15].

Lyophilized aqueous extracts roots of *A. racemosus* have sexual behavioral effects in male albino rats. Administration of the aqueous extracts has pronounced anabolic effect in treated animals as evidenced by weight gains in body and reproductive organs. There was a significant variation in the sexual behavior of animals as reflected by reduction of mount latency, ejaculation latency, post ejaculatory latency, intromission latency. Penile erections are also considerably enhanced. Reduced hesitation time, also indicated an improvement in sexual behavior of extract treated animals. The observed effects appear to be the testosterone-like effects of the extracts. Nitric oxide based intervention may also be involved as observable from the improved penile erection ^[16].

Antioxidant property

Crude extract and purified aqueous fraction of *A. racemosus* have been demonstrated for its antioxidant effect [17]. The activity was tested in rat liver cell mitochondrial membrane damage induced by generated free radicals. The lipid peroxidation induced was evaluated by the formation of thiobarbituric acid reactive substances (TBARS) and lipid hydroperoxides (LOOH) [18-19]. The extract exhibited antioxidant effect against oxidative damage by providing protection against lipid peroxidation, protein oxidation and depletion in the levels of protein thiols and antioxidant enzyme, superoxide dismutase. The purified aqueous fraction which consisted of polysaccharides was found to be a potent antioxidant as compared to the crude extract. Purified fraction was more effective against lipid peroxidation whereas the antioxidant effect of the crude extract was more effective in inhibiting protein oxidation.

The crude and purified extracts indicated protection against radiation induced loss of protein thiols and inactivation of superoxide dismutase [17]. Racemofuran [20] and asparagine [21] from chloroform extract showed antioxidant activity against DPPH. A similar study indicated that an increase in the antioxidant defence owing to the significant increase in the enzymes superoxide dismutase, catalase, and ascorbic acid and significant decrease in lipid peroxidation upon treatment with *A. racemosus* root extract [22]. Anti-oxidant study was carried out on the basis of scavenging activity of the stable DPPH (1, 1-diphenyl-2-picrylhydrazyl) free radical. The antioxidant property observed was due to their redox property of the phenolic compounds present in the ethanolic root extract [23].

Antioxidants are intimately involved in the prevention of cellular damage - the common pathway for cancer, aging, and a variety of diseases. *Asparagus racemosus* possess antioxidant properties. Methanolic extract (100mg/kg BW p. o.) given to orally for 15 days and it increase the antioxidant defense, that is, enzymes superoxidase dimutase, catalase and ascorbic acid, increase significantly whereas a significantly decrease in lipid peroxidation [24]. The anti oxidant properties was found due to presence of Isoflavons specially racemofuran, asparagine A and racemosol [25].

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 intra-striatal 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 membran 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 [26].

Conclusions

Asparagus racemosus is an important medicinal plant of Indian subcontinent flora. In this review we have seen that the plant is used for many purposes and show many biological activities. Presently it is used in many Unani & Ayurvedic

medicines especially for men as a Aphrodisiac and antioxidant Activity. This review is prepared with the help of literature survey and some previously published articles.

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