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NATURAL REMEDIES: HARNESSING MEDICINAL HERBS FOR MALE FERTILITY ENHANCEMENT

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ABSTRACT:
Male infertility can result from a variety of factors, including neurohormonal imbalances, abnormalities in the reproductive tissue, decreased semen quality and quantity, and issues with sexual behavior. The state of male reproductive health is rapidly declining worldwide, and current treatments for male infertility are costly, less widely available and require lengthy course of therapy. A unique class of plants known as vajikarana, or aphrodisiacs, is found in Ayurvedic medicine. These herbs are known to nourish the sexual tissues. The use of Ayurveda to enhance male reproductive health is the main topic of this article, which also includes a list of some of the most important and well studied herbs that have been demonstrated to boost male fertility by nourishing or stimulating the male reproductive system.
KEYWORDS: Aphrodisiacs, Neurohormonal, *Vajikarana*

INTRODUCTION:

As they have ability to reproduce, organisms fight to survive and pass on their genetic traits to their offspring. Humans are among the most successful survival on Earth in this regard. However, the current situation is concerning since, in addition to female reproductive dysfunctions and difficulties, male reproductive health is declining globally. Sexual dysfunction affects 10%-52% of males and 25%-63% of women. It is a serious medical condition that interferes with social and biological connections. The inability to carry out regular sexual activity, the inability to maintain an erection in response to erectile cues, delayed ejaculation, low libido, uncontrolled sexual behavior, etc., are all examples of sexual dysfunction in men. On the international market, there are a plethora of synthetic products with promises of immediate relief. However, the majority of them are linked to reducing side effects and symptoms. As a result, people are once more drawn to herbal and ayurvedic aphrodisiacs that address male reproductive problems from the ground up using a holistic manner. When made from herbs, aphrodisiacs—agents that stimulate sexual desire and performance—have been shown to directly increase male libido, support reproductive activities, repair healthy tissue function, and support neuroendocrine regulation—all of which are necessary for exhibiting the necessary sexual strength in a contented mental and physical state[1]. The herbs that have been scientifically demonstrated to increase male fertility are the main subject of this investigation.

Overview of the disturbances to male reproduction:

For the majority of male infertility cases, standard clinical and laboratory examinations are insufficient to determine the underlying reasons. Reproductive tissue abnormalities, hormonal or neurological imbalances, and semen degradation, both qualitative and quantitative, can all be contributing factors.One of the main causes of male infertility is oxidative stress brought on by reactive oxygen species (ROS). The polyunsaturated lipid membrane that surrounds mature spermatozoa is susceptible to oxidative damage brought on by reactive oxygen species (ROS). This can hinder spermatogenesis. Primary regulator of male reproductive function is the hypothalamic-pituitary-gonadal axis, in which the anterior pituitary secretes luteinizing hormone and follicle-stimulating hormone in response to gonadotropin-releasing hormone produced by the hypothalamus.The released FSH and LH operate on the Sertoli cells and Leydig cells, respectively, to stimulate spermatogenesis and testosterone. Spermatogenesis is regulated by the normal interactions of FSH, LH, intratesticular testosterone, and other hormones. Semen parameters are thus adversely affected by disruptions to the HPG axis[2,3].

When treating men with aberrant semen parameters, reproductive endocrinologists prefer to use injectable drugs such as recombinant FSH, gonadotropin-releasing hormone and human chorionic gonadotropin. In order to increase gonadotropin release from the pituitary, the patient is additionally administered an oral estrogen receptor antagonist called clomiphene citrate. However, these choices come with a long treatment duration, high cost, limited accessibility, and a range of side effects.

Herbal medicine and the health of male reproduction:

The Ayurvedic theory holds that good health is dependent on the proper balance of the three doshas, or basic biological constituents, known as Vata, Pitta, and Kapha.Vata, often known as the "airy element," is defined as being dry, chilly, light, minute, and mobile.The bile passes through liver and heats organism as a whole. Heaviness, coldness, tenderness, slowness, lubrication, nutrition transporter, and nourishment are characteristics of the aqueous element, kapha.Within the field of According to Ayurvedic pharmacology, there is a special family of rasayana herbs called vajikarana that stimulates the libido and facilitates feeding. They also encourage the development of sex appeal. Shukrala are more categories of herbs that promote spermatogenesis [4].

Terms "vaji" and "karana" are the herbs that are known as aphrodisiacs in the West. Herbs known as vajikiranas can be taken as tonics or stimulants to increase the vitality of male reproduction. Usually, warming ingredients like fenugreek, garlic, damiana, and onion stimulate reproductive activities. Their effect on the male sexual organs is stimulating. Tonics nourish the reproductive tissues more effectively, restoring both their number and quality. Certain herbs, like garlic, fenugreek, shilajit, and ashwagandha, are both nutritious and invigorating. There are several ways to categorize Ayurvedic herbal medicines, and the following is a condensed list based on how they affect male reproductive health. Herbs including Mucuna pruriens, Roscoea procera, Asparagus racemosus, and Polygonatum verticillatum can increase the amount of semen or stimulate its production. Herbs that revitalize the ejaculatory system include Cassia occidentalis, Myristica fragrans, Cannabis sativa, and Strychnos nux vomica.

Herbs such as Sida cordifolia, Cinnamomum tamala and Mucuna pruriens that enhance sustenance and ejaculatory performance. Withania somnifera and opium are among the herbs that increase libido.

Several typical plants used in Ayurveda to increase Male Fertility:

1. Ashwagandha *(Withania somnifera):*

Ashwagandha's powerful root smells like horse urine, which is why the word "the smell of a horse" appears in Sanskrit. Nocturnal emission and enlarged prostate are among the ailments it addresses. This herb's extract has been demonstrated for enhancing spermatogenesis through increased levels of interstitial cell stimulating hormone, testosterone-mimicking properties, and nitric oxide synthase induction. Another study found that when oligospermic patients received ashwagandha root extract, their serum hormone levels increased noticeably more than when they received a placebo and their spermatogenic activity improved[5]. By increasing sperm count, decreasing lipid peroxidation and protein carbonyl concentration, and raising antioxidant enzyme levels in the seminal plasma, this herb clearly fights against oxidative stress.When given to a normozoospermic infertile male at a dosage of 4g/day for three months, ashwagandha root powder shown a

considerable reduction in stress, better antioxidant levels, enhanced semen volume, and elevated levels of vitamins C,E and A. Numerous investigations have demonstrated the herb's effect at the HPG axis level. According to ayurvedic explanations, one of the greatest medicines for soothing vata is Withania somnifera because of its extremely nourishing and anchoring characteristics. Its heat energy can aggravate pitta, hence when taken as a treatment, it is recommended to supplement it with cooling vajikarana herbs like shatavari, vidari, and licorice. It is considered the best herb because of its capacity to reduce stress and target certain aspects associated with diminished sexual vitality.

2. Kapikacchu *(Mucuna pruriens)*:

This herb tastes sweet but can also be harsh; it's fairly thick and greasy. Because mucuna pruriens increases both kapha and ama excessively, it is primarily utilized to balance pitta and vata. The powdered Mucuna pruriens is often taken in amounts of 1.5–6 grams[12]. In the male albino rat, it was discovered that alkaloids extracted from M. pruriens seeds stimulated spermatogenesis and the the combined weight of the accessory glands and testicles. Rat males engaging in sexual behavior can be stimulated by M. pruriens, as evidenced by higher intromission frequency, ejaculation delay, and mounting frequency. According to a study, M. pruriens effectively restores the spermatogenic loss that ethinyl estradiol injection caused in male rats. Decreases in reactive oxygen species (ROS) and an increase in the number of germ cells contributed to the beneficial effects of the herb.

M. pruriens seed extract significantly improved libido, sperm parameters, endocrine levels, and sexual potency and behavior. Triglycerides, phospholipids, lipids, vitamin C, A and E have all been found to be improved by M. pruriens. Furthermore, the levels of SOD and ascorbic acid have returned, and fructose nullifying oxidative stress-induced lipid peroxidation in seminal vesicles has been repaired. From a neuroendocrine perspective, men who are infertile due to M. pruriens have higher levels of testosterone, LH, dopamine, adrenaline, and noradrenaline and lower amounts of FSH and PRL. In fact, M. pruriens treatment increases steroidogenesis and semen quality in infertile men[6].

3.* Shatavari *(Asparagus racemosus):

Shatavari is an effective tonic for men. This herb has a cooling effect and captures the pitta at its major location in the small intestine. Its flavor is bittersweet and purifying impact on the liver and blood. Its cooling qualities counterbalance the heating qualities of herbs like ashwagandha, garlic, and onions that are used to increase sperm count. Shatavari thereby stops the burning of sperm due to an excess of pitta. Its weighty and nourishing qualities make it beneficial for vata, particularly when paired with warming vajikaranas like bala or ashwagandha.One of the greatest herbs for pitta pratyanika, shatavari is used in many Ayurvedic recipes to balance vata and pitta, which regulates male reproduction. This herb has been used medicinally to treat a variety of conditions, including burning sensations, urogenital infections, decreased sexual arousal, anger, stress, and irritability. The typical amount of this plant to take is 4 to 8 grams of powdered herb, taken twice or three times a day. When you have sinus or respiratory congestion, stay away from this herb[4].

4.* Vidarikandha *(Ipomoea digitata):

Vidarikandha is tuber that acts more quickly to promote spermatogenesis when consumed as a milk infusion. For kapha types, it is less potent than bala and shatavari. It works well when used with kapikacchu to treat enlarged prostates. When combined with ginseng, licorice, gokshura, and ashwagandha, this cold, sweet herb nullifies sexual debility linked to anxiety and adrenal stress and enhances ojas, muscle tone, and motor coordination. It balances the vata and pitta energies well and lies between too warming and too cooling herbs. Two to six grams, given two to three times a day, is the usual dosage of Vidarikandha[4].

5. Shilajit *(Asphaltum, mineral pitch)*:

An extremely significant Ayurvedic herb, shilajit removes excess kapha and maintains normal genital tone while increasing virility and sexual stamina through its hot energy. It is used with Ashwagandha to treat reproductive problems due to kapha. It works well as a natural remedy in conjunction with saw palmetto, punarnava, and ashwagandha for enlarged prostate. Doses of this plant should be taken twice a day, between 250 and 500 mg[4].

6. Butea superba:

Male sexual vitality has traditionally been stimulated by the consumption of Buteasuperba Roxb (Leguminosae), often known as the "Red KwaoKrua." For six months, its alcoholic extract (0.02, 0.2, or 2.0 mg/kg BW/day) dramatically increased sperm motility and concentration without having an adverse effect on the testis or sperm. Given a powdered crude extract of this herb, at doses of 3, 35, 350, and 1350 mg/kg body weight for eight weeks, male rats showed increased testis weight and sperm counts.Furthermore, it has been demonstrated that B. superba ethanol extract increases penile erection by activating the cAMP/cGMP pathways[7].

7. Chlorophytum borivilianum:

The Liliaceae family plant Safed Musli (Chlorophytum borivilianum) is known as potent aphrodisiac and sexual stimulant. In treated male rats, anabolic and spermatogenic effects of the herb's ethanolic root extract or sapogenins were demonstrated by an increase in both the overall body weight and the weight of the reproductive organs. By decreasing mount ejaculation, post-ejaculatory delay, and intromission latency, the herb may potentially influence an animal's sexual behavior by raising mount frequency and affinity toward the female. Furthermore, in Wistar male rats, the aqueous extract of the herb's dried roots increased sperm count, sexual arousal, strength, and desire. In diabetic scenarios, this plant is also said to enhance male reproductive capabilities[8,9].

8. Tribulus terrestris:

The perennial creeping herb Tribulus terrestris Linn. (Zygophyllaceae), sometimes known as puncture vine, is found all over the world and has long been used to treat a variety of illnesses, including inflammations, leucorrhoea, urinary infections, edema, and ascites. It is also considered an aphrodisiac. *T. terrestris* has been shown to increase plasma testosterone levels and stimulate spermatogenesis in animals. Additionally, it raises the activities of dihydrotestosterone,

dehydroepiandrosterone sulphate, and dehydroepiandrosterone as well as the levels of testosterone and luteinizing hormone.This herb is employed in mild to moderate cases of endocrine disturbances because it also contains androgen, testosterone, dihydrotestosterone (DHT), and dehydroepiandrosterone (DHEA) boosting properties that have stimulating effects on reproductive activities. Its purported aphrodisiac properties may possibly be explained by its capacity to trigger nitric oxide release[10].

Mechanism of action:

Male reproductive processes are restored and regulated via the induction or inhibition of neurochemicals and local mediators acting within the reproductive tissues. Three possible levels of improvement in male reproductive systems may result from herbal therapy. (1) Herbs can improve the reactivity of male reproductive tissues by acting on the central or peripheral nervous system. An array of neurochemicals and neurotransmitters, primarily dopamine and serotonin, mediate the neural control over the male reproductive organs, with dopamine acting as an excitatory neurotransmitter and serotonin as the mediating neurotransmitter. (2)The ability of herbal remedies to control nitric oxide levels validates its use in the treatment of erectile dysfunction. As an established endogenous modulator of penile erection, nitric oxide (NO) is primarily synthesized by NO synthase in brain areas implicated in sexual behavior, such as olfactory bulb, paraventricular nuclei and septal structures among others. In order to support strong reproductive functioning, NO, a recognized vasodilator, can enhance blood flow to the penis, producing penile erection, as well as to other male reproductive organs, permitting greater hormonal accessibility in the process. (3)Herbs can advantageously interfere with the HPG axis in the regulation of sex hormones, FSH, LH, and interstitial hormones in order to synchronize male reproductive activities, such as the development of secondary male sexual organs and boost overall male fertility[11].

CONCLUSION:

Aphrodisiac herbs can be to enhance the liveliness of male reproduction. Herbs that are heated and have an energizing effect on male sexual organs are commonly used as stimulants for reproductive processes. Herbal tonics nourish the reproductive tissues more effectively, restoring both their number and quality. Certain plants are not only nourishing but also invigorating. Due to the health risks and high expense of contemporary treatments for male infertility, herbal aphrodisiacs are becoming more and more popular. They improve sexual energy, behavior, and neuroendocrine modulation, all of which have a long-term impact on male reproductive health.

They also improve semen quality and quantity, sperm motility, and morphology.The field of biomedical research needs to delve deeper in order to uncover more obscure ways via which countless herbs could effectively battle male infertility—a condition that is becoming more and more dangerous for upcoming generations.

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