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Aphrodisiacs- Nature's remedy for Erectile Dysfunction.

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Key Words: Erectile dysfunction, Male impotence, Aphrodisiacs, Aphrodisiac Herbal medicines.

Abstract:

One of the characteristics of any living creature is reproduction, to produce an offspring identical to it. Male impotence is characterized as an inability of a male to produce and retain an erection of penis appropriate for equally satisfying sexual association with his partner. Sensual health and function are essential factors in determining quality of life. Various natural Aphrodisiac potentials are favored to avoid the problem of ED. This review will go through the most recent researches conducted on the most popular natural aphrodisiacs, as well as use of any of such compounds for boosting sexual drive and function. A big range of natural aphrodisiacs are recognized to have a positive outcome on sexual functioning, adding support to previous claims and also bringing a fresh hope. In particular health conditions, the existing synthetic medications and treatments have inadequate efficacy, terrible adverse effects, and contraindications regarding condition of patient for example hypotensive patients cannot be prescribed sildenafil citrate. The current research provides thorough info about the source, active chemical constituents and therapeutic relevance of naturally occurring plants specially found in India, which will aid in the development of future pharmaceutical formulations. The synthetic medications and treatments currently present in the market are ineffective, have unpleasant side effects, and are not recommended for use in specific illness conditions. The information presented in this review, which is useful for the further development of pharmaceutical products, provides specific details about the key elements and their therapeutic relevance observed in naturally present plants.

Key Words: Erectile dysfunction, Impotence, Natural Aphrodisiacs, Sex tonics.

1. INTRODUCTION:

Human sexual interactions are one of the most significant social and physical bonding. Male impotence, often known as erectile dysfunction (ED), which is a common physiological condition that affects millions of the males worldwide (1). The main cause of impotency in the males is ED, it is nothing but a man's inability to attain, also maintain an erection long enough for attaining orgasm to both the partners hence making a successful and pleasurable intercourse. Many diseases like diabetes mellitus, atherosclerosis, Hypogonadism, hyperprolactinemia, and neurological disorders have aggravating effect on the condition, certain medications like antipsychotics, antidepressants, hypnotics also contribute the erectile dysfunction (2).

Treatment of ED involves primarily use of aphrodisiacs and in advanced cases surgeries can also be performed. Aphrodisiacs can simply be defined as the medications that improve sexual pleasure by increasing erections and sometimes increasing the time of ejaculation (3). There are a variety of conditions that can cause ED, including chronic diseases like diabetes, hypertension, atherosclerosis, penile disease, phimosis, pyronines, chronic alcohol abuse, smoking, Adams syndrome, and neurological conditions like anxiety, depression, stress, and a fear of having sex. Systemic diseases include conditions affecting the heart, liver, kidney, lungs, and bones. (4,3,5). Psychotherapy approaches have become popular among natural therapies. Inhibitors of the Phosphodiesterase -5 enzyme, like as sildenafil citrate (Viagra) and tadalafil, which cause the breakdown of the second messenger cyclic GMP, released in corpus cavernosum are employed in the therapy of ED. (6,7). Phosphodiesterase enzyme has various subtypes present in many vital organs; Sildenafil has caused many deaths in hypertensive patients thus these synthetic drugs although useful but are dangerous to use.

The need of sexuality in human existence is known, Indigenous system of medicine of India i.e. ayurvedic system of medicine, which offers an entire branch for this as ‘Vijakarna'. The therapies mentioned includes use of aphrodisiacs for erectile dysfunction, infertility reasons such as, oligospermia, lesser semen production, reduced sexual drive. (8).

1.1 Mechanism of Erectile Dysfunction:

The parasympathetic nerves' axons release nitric oxide (NO) gas in response to arousal, whether it be visual or not. When the gas diffuses into the smooth muscle cells lining those arteries of the corpus carvenosum (spongy erectile tissue), the guanylate cyclase (GC) enzyme is activated. Guanosine triphosphate (GTP) eventually undergoes cyclic guanosine monophosphate (C.GMP) synthesis. An erection results from the Cyclic GMP relaxing the smooth muscle cells of the corpus cavernosum of the penis, which in turn leads to vasodilation and an increase in blood flow to the penile tissue. Hence making penis erect for intercourse. (9). This erection eventually caused by the blood that is effectively trapped in the penis (9). Because phosphodiesterase enzyme (PDE-5) which hydrolyzes C.GMP into inactive GMP, the erection eventually subsides. (The penile tissues contain the PDE-5 enzyme). PDE-5's hydrolyzing activity is inhibited by aphrodisiac potentials, allowing active C.GMP to build up. Increased blood flow allows the erection to remain "unaffected" and last longer (10). Three major categories were used by the scientific community to classify biologically significant aphrodisiacs. **First**: Some aphrodisiacs merely deliver a surge of Nutritious value enhances the consumer's immediate health or well-being, which in turn enhances libido and sexual performance. **Second**: Although not psychologically active, this group contains alleged aphrodisiacs that have more focused physiological effects. They might alter blood flow or lengthen sexual activity by numbing the vaginal region. **Third**: Compounds that are

psychopharmacological, or those that truly transcend BBB and trigger a particular area of sexual stimulation inside the brain, makes up the third type of aphrodisiacs. Numerous neurotransmitters, hormones, pheromones, and medications fall under this category since they disrupt the normal operation of these molecules. Because little is known about the mechanisms underlying sexual arousal and the psychoactive effects of drugs, this area is the most challenging to examine. Understanding of sexual arousal and the brain is simply at its most basic. (11)

2. **Herbal Aphrodisiac Agents**:

Since from ages human beings are using herbal aphrodisiac agents, most of which are very household substances, their account is well written in the book of life I.e., Ayurveda, some of them are as follows,

Sr No.	Common Name	Scientific Name	Family
1	Lehsun	Allium tuberosum	Alliaceae
2	Ginseng	Panax ginseng	Araliaceae
3	Jaiphal (Banda Soap)	Mysristica fragrans	Myristicaceae
4	Clove	Eugenia carryophyllus	Myrtaceae
5	Opium	Papver somniferum	Papaveraceae
6	Gokhru	Tribulus terristris	Zygophyllaceae
7	Ashwagandha	Withania somnifera	Solanaceae
8	Liquorice	Glycyrrhiza glabra	Fabaceae
9	Gulvel	Tinospora cordifolia	Menispermaceae
10	Junglee bhendi	Abelmoschus manihot	Malvaceae
11	Shatavari	Asparagus racemosus	Liliaceae
12	Kokilaksha	Asteracanta longifolia	Acanthaceae
13	Akarkara	Anacyclus pyrethrum	Compositae
14	Uttanjan	Blepharis edulis	Acanthaceae
15	**Wild Spinach**	Chenopodium album	Chenopadiaceae
16	**Safed musli**	Chlorophytum borivilianum	Liliaceae
17	**Palash**	Butea frondonsa	Papillionaceae
18	**Dori**	Leptadenia reticulate	Apocynaceae
19	**Van Tulsi**	Ocimum gratissimum	Lamiaceae
20	**Lajalu**	Mimusa pudica	Mimosae
21	**Hing**	Ferula foetida	Umbelliferae
22	**Zinger**	Zingiber officinalis	Zingiberaceae

Table No. 1: Plants with aphrodisiac potential

2.1 **Lehsun**:

It consists of cloves obtained from bulbs of the plant “Allium tuberosum” from the plant family Alliaceae. The plant is very frequently been consumed as food, spices, and home remedy for many ailments since the very earliest days of time. It is a rich source of sulfur-containing chemicals, alkaloids, and steroidal saponins (12). According to reports, China's traditional Chinese medicine has used its seeds. for the management of both nocturnal emissions and impotence. This plant offers scientific proof that Allium tubersum seeds used as a traditional treatment, n-butanol extract, have aphrodisiac properties (13). Its Indian

variant Allium sativum commonly used as spice also has strong aphrodisiac actions.

Allium tuberosum - Wikipedia

2.2 **Ginseng**:

It consists of dried tuberous roots of the plant Panax ginseng belonging to the family Araliaceae. Ginsenosides are Panax ginseng's primary active chemical constituents. In vitro, GS has been shown to stimulate Nitric Oxide release, the neurotransmitter essential for erection of penis, in the test organism used i.e., rabbit. Transmural nerve stimulation, tissue cGMP levels, and acetylcholine-induced relaxation were all raised by ginsenosides. The second result, which was accompanied by a drop in tissue cGMP, was reversed by tetrodotoxin. Superoxide dismutase improved ginsenoside-induced CC relaxation, but oxyhemoglobin and nitro-l-arginine hindered it. When P. ginseng is administered as recommended by traditional Chinese medicine, the powerful antioxidant NO produced by endothelial cells, particularly those in the perivascular nitric oxidergic neurons in the CC, is thought to play a role in how well P. ginseng acts as an aphrodisiac. (14)

Panax ginseng

2.3 **Jaiphal**:

It consists of dried seed kernels of the plant “Myristica fragrans” belonging to the family “Myristicaceae”. Very commonly called “Nutmeg”. Fragrant Myristica According to Unani medicine, nutmeg is useful in treating male sexual dysfunction because it contains of amino acids, phenols, alkaloids, and sterols. The seed extracts suspension reveals a boost in the sexual function that is both significant and sustained without causing any negative side effects. (15). Nutmeg's 50% ethanolic extract has aphrodisiac properties. So, it gives nutmeg's historical usage in treating male sexual issues a scientific justification.

Nutmeg.

2.4 **Clove**:

It consists of dried immature buds of flower of the plant "Eugenia carryophyllus" of the family "Myrtaceae". at male mice, MF, IF, IL, erections, and the sum of penile reflexes were markedly increased with the three doses (15mg , 30mg & 60 mg/kg body weight per organism). As an aphrodisiac, an Hexane extract of the immature flower bud of Eugenia caryophyllus is used. (16)

Clove buds.

2.5 **Opium**:

It consists of dried latex obtained from making incisions to the unripe fruit of the plant called "Papaver somniferum" belonging to the family " Papaveraceae". The drug contains many alkaloids the ultimate analgesic Morphine, ultimate cough depressant Codeine, it also contains an alkaloid called yohimbine which imparts it aphrodisiac actions vasodilation at corpus cavernosum is considered one of the major contributing factors. (17)

Capsule of Papaver somniferum

2.6 **Gokhru**:

It comsists of dried ripe fruits of the plant called "Tribulus terristris "belonging to the family "Zygophyllaceae". Its main action as aphrodisiac is thought to be contributed by Saponin glycosides and alkaloids. In a comparative sytudy with Sildenafil citrate it has shown actions like it, lacking the undesirable effects of the former one. (18)

Gokru.

2.7 **Ashwagandha**:

It consists of dried roots of the plant called “Withania somnifera”, belonging to the family “Solanaceae”. Its main activity is attributed to its steroidal lactones, saponins and alkaloids. In two conventional tests, the forced swim-induced 'behavioral despair' and 'learned helplessness' tests, ashwagandha revealed an antidepressant effect comparable to that generated by imipramine the Withanoloide VII and VIII are thought to be responsible for the action. The research supports the effectiveness of the drug as a mood stabilizer in clinical anxiety and depression. (19).

Ashwagandha.

2.8 **Liquorice**:

Liquorice consists of dried rhizomes of the plant Glycyrrhiza glabra belonging to the family Leguminosae. The aphrodisiac properties of the roots and rhizomes of the plant were examined in the current study. The extract was given orally by gavage for 28 days at doses of 150 mg/kg and 300 mg/kg body weight/day. The mounting latency (ML), intromission latency (IL), mounting frequency (MF), intromission frequency (IF), and weight of the animals (grammes) on days 0, 7, 10, 14, 21, and 28 were the parameters that were observed before and throughout the sexual behavior study. The extract significantly reduced both ML and IL. The extract also markedly increased MF and IF. These outcomes were present in sexually active male rats. demonstrating the drug's usefulness as an aphrodisiac [20]

Liquorice

2.9 **Gulvel**:

It consists of dried as well as fresh entire herb of Tinospora cordifolia belonging to the family Menispermaceae. The whole extracts were examined in the study for their chemical composition and aphrodisiac potential in test rats. In male Wistar albino rats, higher concentrations of the hydroalcoholic extract from the stem of Tinospora cordifolia (about 400 mg/kg of body weight) dramatically enhanced the number of mounts and the efficacy of mating. However, the drug's aqueous extract and hydroalcoholic extract at lesser doses (about 200 mg/kg of body weight per organism) demonstrated modest aphrodisiac qualities. [21].

Gulvel.

2.10 **Jungli Bhindi**:

It is made up of both dried and fresh fruits and seeds from the plant Abelmoschus manihot, which belongs to the Malvaceae family. The study showed very promising results, Swiss albino mice were given ethanolic extract in two doses, about 100 mg/kg of body weight and about 200 mg/kg of body weight of the test subjects, the animals in each group shown a strong anabolic and spermatogenic effect. Male mice's sexual behavior improved, as seen by increased mount and intromission frequency, as well as a significant increase in sperm count and penile erection index. It has been noticed that a higher dose of the plant improved without causing any negative side effects. [22].

Jungli Bhindi

2.11 **Shatavari**:

It is composed of dried roots. It is often known as "Talmakhana" and is made up of the complete herb of the Acanthaceae plant Asteracanta longifolia.family. By virtue of its steroidal glycosides and certain alkaloids, it is considered as a very important plant in Ayurveda, primarily is used as a galactagogue however recent studies have shown it too possess mild to moderate aphrodisiac actions. Higher concentrations of hydroalcoholic and aqueous extracts (400 mg/kg of body weight of per organism) pointedly increased the number of mounts and improved mating efficiency in male wester albino rats, indicating their aphrodisiac effects. On the other hand, aqueous extract (about 400 mg/of kg body weight of per organism) , hydro-alcoholic extract having lower dose presented a mild aphrodisiac effect. (23)

Shatavari.

2.12 **Kokilaksha**:

It is made up of dried plankton roots.It is often known as "Talmakhana" and is made up of the entire herb of the plant Asteracanta longifolia, which belongs to the Acanthaceae family. Although entire plant exhibits medicinal values, the dried seeds powder is mainly used as an aphrodisiac. Many studies are being carried out proving its aphrodisiac actions. In one study Asteracanta longifolia seeds were extracted with ethanol and administered to male rats at doses of 100 mg, 150 mg, and 200 mg/kg, po. for a total of 28 days, resulting in a substantial increase in sexual behaviour, including MF and mating performance. The number of sperm and fructose levels in seminal vesicles both increased dramatically, demonstrating its efficiency as an aphrodisiac. [24].

Talmakhana.

2.13 **Akarkara**:

It is made up of dried roots of the plant Anacyclus pyrethrum, which belongs to the Compositae family. Its main activity is found due to the presence of some saponin glycosides. Although various organs of the plant have a therapeutic value, especially roots have aphrodisiac effect and hence various studies have been conducted on them. One study investigated examined how an aqueous extract of the roots affected spermatogenesis, sperm count, and sexual behaviour. The fructose content of albino rats' seminal vesicles was also measured. After being administered to albino rats, two doses—50 mg/kg/ of body weight, 100 mg/kg of body weight of subjects under test. The aqueous extract—showed a strong aphrodisiac effect in the test organisms of the respective groups. Both sperm counts and seminal vesicle fructose contents significantly increased. Improved mount and insertion frequency and decreased mount and insertion delay were signs of improved sexual behavior in male rats hence proving its effectiveness as an aphrodisiac agent. (25)

2.14 **Uttanjan**:

It is made up of dried roots, leaves, and seeds of the plant Blepharis edulis, which belongs to the Acanthaceae family. The seeds are known to possess powerful aphrodisiac actions. Chemically it contains mainly mucilage, some alcohols and flavone glycosides. Many studies have confirmed its efficacy as an aphrodisiac agent. In one study, plant seeds were extracted with ethanol and administered to male rats for 28 days at doses of 100 mg, 150 mg, and 200 mg/kg, po. There has been a significant increase in sexual behavior, including MF and mating effectiveness. The number of sperm and the fructose content of seminal vesicles both increased dramatically, demonstrating its efficiency as an aphrodisiac drug. [26].

Uttanjan

2.15 **Kamar Kas:**

Very popularly known as “Palas” and is a sacred tree for Hindus. It is made up of a tree, Butea monosperma, of the Leguminosae family. The plant has a great variety of active ingredients, including steroids, aurones, chalcones, flavonoids (palasitrin, prunetin), butein, butin, isobutrin, monospermoside, and isomonospermoside. The plant contains alkaloids, flavonoids, phenolic compounds, amino acids, glycosides, steroids, and other phytoconstituents.. The root is helpful in treating elephantiasis and treats night blindness among other vision problems. To treat impotence, root pieces are cooked, and then 2-3 spoons of the extract are suggested at night. (27].

Palas roots.

2.16 **Wild Spinach:**

It consists of dried as well as fresgh leaves of the plant known as Chenopodium album , from the family Chenopadiaceae. C. album leaf extract had a total phenolic content of 0.94% (GAE) and a total flavonoid content of 0.27% (catechin equivalent). According to Sanjukta and Ghosh (2012), rutin, rutin hydrate, and quercetin are a few of the phenolic components detected in crude C. Album. (African J Food Agric Nut Dev. 2009;9:1174-1190., anjukta D, Ghosh S. Edible weeds' antioxidant and free radical-scavenging capabilities. In vitro effect of acephate, an organophosphate, on the anti-oxidative activities of Chenopodium album crude extract. International Food Research Journal. 2012;13:1033-1039.) Pande et al. conducted one trial in which male albino mice were given an ethanol extract of Chenopodium album at dosages of 100, 250, and 500 mg.kg, p.o. This raised the mounting frequency, Insertion Frequency, IL, penile erection, and collective penile responses while decreasing the ML and interval following an ejaculation. The highest active dose of p.o. identified was more than 500 mg/kg. [28].

Wild Spinach leaves.

2.17 **Safed Musli:**

It is made up of dried roots of the plant Chlorophytum borivilianum, which belongs to the Liliaceae family.. It was initially utilized only as a source of medication in India, but recently, its discovery as a herbal substitute for "Viagra" has increased its popularity even among western nations. (Thakur et al., 2009a, Thakur et al., 2009b, Thakur et al., 2009c). Saponins are the plant's active principles. Thakur et al. used lyophilized aqueous extracts of the drug at a dose of 200 mg/kg in each test organism, and it significantly improved body weight, penile erection, and MF, while significantly altering ML, EL, IL, and decreased hesitation time suggests improved sexual behavior in extract-treated animals. [29].

Safed Musali Roots.

2.18 **Dori**:

Commonly also called as “Jeevanti” it consists of the dried as well as the fresh leaves and twigs Leptadenia reticulate, beloning to the family Apocynaceae. Its active components include alkaloids, tannins, steroids, flavonoids, glycosides, and terpenoids. Many studies have confirmed its efficacy as an aphrodisiac agent. In one of the studies, it is proved that efficacy of the chloroform extract at 50mg, 100mg, and 250 mg/kg, p.o. was studied on the selected group of test organisms i.e., rats, for a period of 28 days. Mounting frequency has increased greatly, Insertion interval, quantity of semen ejaculations, a decrease in initial mount latency, also an increase in post-semen ejaculation time were all observed. The major sex organs have shown significant weight gain. [30]

Jeevanti

2.19 **Van Tulsi:**

It consists of dried as well as entire herb of the plant known as “Ocimum gratissimum” belonging to the family Lamiaceae. Basically, the seeds and leaves of the plant are known to possess the aphrodisiac action. It includes numerous phytochemicals that contribute to its therapeutic properties. Polyphenols such as gallic acid, rosmanol, and rosmarinic acid are found in the plant, as are flavonoids such as nepetrin, quercetin, rutin, terpenoids, and alkaloids. Apigenin, Nepetoidin, Nevadensin, Hymenoxin, Salvigenin, Naringin, Uteolin, Oleanolic acid, Methyl acetate, 2alpha, 3 beta-Dihydroxyolean-12en-28-oic acid, Basilimoside, 7,4,′-dimethyl ethyl acetate, 7,4,′-dimethyl etherr. Many studies have been conducted to confirm its efficacy as an aphrodisiac agent. In one of the studies, this is being proved that. Male mice's sexual conduct improved, as seen by a rise in MF and IF, as well as a significant increase in sperm count and penile erection index. It is also observed that a 200mg/kg body weight dose increased the subject's performance without causing any unfavourable side effects..[31].

Van Tulsi.

2.20 Lajalu:

It is made up of dried roots and leaves of the plant "Mimosa pudica" from the "Mimosae" familyMimosa pudica is believed to include "alkaloids, flavonoid C-glycosides, sterols, terenoids, tannins, saponin, and fatty acids," according to chemical analysis.[Genest, Samuel. "Comparative Bioactivity Studies on Two Mimosa Species" (2008). Latin American and Caribbean Journal of Medicinal and Aromatic Plants. 7 (1): 38-43. Tannin levels in the plant's roots have been found to be as high as 10%. Inside the plant's leaves, a chemical equivalent to adrenaline has been discovered. Many investigations have been carried out to demonstrate its efficiency as an aphrodisiac. In one study, mice were given ethanolic extracts of the plant's roots at doses of 100, 250, and 500 mg/kg p.o. for seven days, which resulted in significant increases in mating frequency, IF, and IL, as well as an accumulation of penile reflexes and a noticeable decrease in ML and PEI. Testosterone was one of the hormones studied. The extract's most dramatic effect was noticed at a dose of 500 mg/kg.. [32]

Lajalu.

2.21 **Asafoetida**:

Commonly called Hing, it consists of dried resin obtained by incisions to the rhizomes of the plant known as Ferula foetida belonging to the family Umbelliferae . It has a resin content of 40–64%, endogenous gum of 25%, volatile oil of 10–17%, and ash of 1.5–10%. Asaresinotannols A and B, ferulic acid, umbelliferone, and four unidentified chemicals are known to be the parts of resisn component of the drug. Numerous Organo sulfide chemicals, including 2-butyl-propenyl-disulfide, diallyl sulphide, and diallyl disulfide, are abundant in the volatile oil component. In one study it is found that when Male Wistar rats (230–250 g) were given the drug by oral route daily (25mg, 50mg, 100mg and 200 mg/kg), the drug greatly raised sperm counts and viability. Leydig cell counts and the process of spermatogenesis both increased as the dose was raised. [33]

Asafoetida.

2.22 **Zinger**:

It consists of dried as well as fresh rhizomes of the plant known as Zingiber officinalis, belonging to the family Zingiberaceae. Chemically it contains oleoresins as active chemical constituents among them Gingerol, Shogaol and zingiberene are main ingredients. After administering either methanolic (100 or 200 mg/kg b wt.) or aqueous extract (150mg and 300 mg/kg) orally for 65 days in a row, the treatment increased sperm motility and count, sexual serum testosterone level, and fertility index in male rats with diabetes (triggered by alloxan). [34]

Zinger Rhizomes.

Conclusion:

A range of traditional herbal medicines are used in India to improve general health and, as a result, male sexual satisfaction. Erectile dysfunction refers to a man's inability to achieve and maintain a penile erection. As a result, an aphrodisiac is a pharmaceutical medication that stimulates sexual desire and/or liking. Aphrodisiacs are commonly used to enhance erotic

performance and behavior. The present study supports efficacy of the herbs for enhancing and preventing sexual organ functionality.

These conventional herbal treatments are popular among males and give them a simple way to justify seeking medical attention for a sexual issue. About 50% of the men who participated in the study stated they were looking for natural remedies and thought utilizing phosphodiesterase type 5 (PDE5) was dangerous. Safety and the presence of a natural aphrodisiac are two more crucial aspects of SD therapy that patients look for.

The herbal medicines covered in this review have demonstrated strong aphrodisiac properties.

The market's synthetic formulations may have outstanding performance in treatment of sexual inability, yet, they also show serious side effects. For this reason, herbal medications are favored over synthetic ones in order to prevent negative side effects and dangerous side effects. Because quality control laws are either nonexistent or extremely relaxed in India, one must exercise considerable caution when using traditional herbal remedies. Additional research on plants may increase the isolation of more modern compounds that are beneficial for treating sexual inability.

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