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PHARMACOLOGICALLY SCREENED APHRODISIAC PLANTS- A REVIEW OF CURRENT SCIENTIFIC LITERATURE

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ABSTRACT

An aphrodisiac arouses or intensifies sexual desire. The word probably originated in the early 18th century, gleaned from the Greek, Aphrodisiakos- arousing sexual desire, and Aphrodite-the goddess of sexual love. A variety of nutritional supplements are safe and effective libido boosters. Some of these have undergone scientific scrutiny to investigate their pharmacological mechanisms of action. Others have stood the test of time afforded by long time traditional. The present review article summarizes the plant material which has been tested for its aphrodisiac activity in different experimental model (in vitro, in vivo on animal models, or in human clinical trials) and comply its claim in the different system of medicine. A brief overview about the data of percentage study in the last eighteen years duration on aphrodisiac activity of plant material was done on the basis of the CAB abstract database.

KEYWORDS: Aphrodisiac plants, Mounting frequency, Intromission frequency, Ejaculation latency, Mounting latency, Intromission latency *etc*

INTRODUCTION

Sexual dysfunction or sexual malfunction refers to a difficulty experienced by an individual or a couple during any stage of a normal [sexual activity](#), including [desire](#), [arousal](#) or [orgasm](#). A thorough sexual history and assessment of general health and other sexual problems (if any) are very important. Assessing (performance) [anxiety](#), [guilt](#), [stress](#) and [worry](#) are integral to the optimal management of sexual dysfunction.

An aphrodisiac is defined as any food or drug that arouses the sexual instinct, induces veneral desire

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and increases pleasure and performance. This word is derived from ÆAphroditeí the Greek goddess of love and these substances are derived from plants, animals or minerals.^[1]

Aphrodisiacs work in several ways. They may directly increase the physical desire to have sex, stimulate the strength and endurance of an erection in men, and increase lubrication and genital sensitivity in women. There are very few substances that are scientifically proven to do this on a consistent basis. Most supposed aphrodisiacs act as tonics, increasing virility over time, usually by

supplying nutrients which feed the glands and organs. Others may relate more to psychological and mind/body interactions.

Following, is a discussion of several natural substances that both ancient shamans and modern scientist's credit with the ability to enhance sexuality. [2]

REVIEW OF LITRATURE

Pharmacologically active aphrodisiac plants in experimental models:

In our country with the advent of the Ayurvedists some of the medicinal plants have proven to possess a traditional as well as scientifically-proven aphrodisiac that can enhance passion, increase libido, enhance sexual performance, and help to increase the intensity of love making.

REPORTED ACTIVITIES OF APHRODISIAC ACTIVITY:

Anacardium occidentale:

In that study the extraction of seed was carried out using a soxhlet extractor and n-hexane as solvent. 350ml of n-hexane was poured into the round bottom flask of the soxhlet apparatus. Subsequently, 20g of crushed cashew nut shell was introduced into the thimble and fitted into the soxlet extractor. Albino rats weighing between 200-250g and aged between 3-4months were selected . The rats were housed in separate cages (males and females) and kept under Normal conditions of temperature and light. The effect of cashew nut seed oil on the sexual behavior of male albino rats. Sildenafil citrate was used as the standard drug of reference. They were randomly allocated into five groups of 3 rats each, each given oral dose of 0.50 ml, 1.0, and 1.5ml of the oil extract of cashew nut seed. The significant increase in the indices of sexual vigor that is mount and intromission frequencies, and the significant decrease in mount latency compared to the negative control are indications of the aphrodisiac potential of *Anacardium occidentale* L. oil extract from seeds. [3]

Mucuna pruriens:

Mucuna pruriens Linn., belonging to the leguminous family (Papilionaceae), were used for treating male sexual disorders since ancient times. The effects of ethanolic extracts of the *Mucuna pruriens* Linn. seed on general mating behaviour, libido and potency of normal male Wister albino rats were investigated and also compared with the standard reference drug used Sildenafil citrate.

Animals were divided into one control group (Group I—received saline) and four experimental groups (Groups II–V). Experimental groups were divided on the basis of the dosage of extract to the animals as follows: 150 mg/kg body weight (Group II), 200 mg/kg body weight (Group III) and 250 mg/kg body weight (Group IV) while Group V received Sildenafil citrate (5 mg/kg body weight).

Animals were fed PO with saline or extract or standard drug once in a day for 45 days. To analyse the mating behavior, female rats with oestrus phase were used.

The extract administered PO significantly increased the mounting frequency, intromission frequency and ejaculation latency, and decreased the mounting latency, intromission latency, postejaculatory interval and inter-intromission interval. The potency test significantly increased erections, quick flips, long flips and total reflex. Therefore, the results indicated that the ethanolic extracts of *Mucuna pruriens* Linn. seed produced a significant and sustained increase in the sexual activity of normal male rats at a particular dose (200 mg/kg). When compared to control, all the drug-treated groups have shown drug-induced effects for a few parameters. However in Group II, there was an obvious enhancement in all parameters, without affecting the normal behaviour. When compared with the standard drug. [4]

Kaempferia parviflora:

In that study the *Kaempferia parviflora* is a Thai ginseng used by men for sexual enhancement. To determine the effect of *K. parviflora* ethanolic extract on the sexual behavior of male rats and its toxicity. The experiment was divided into three groups of rats given *K. parviflora* extract at doses of 60, 120, and 240 mg/kg BW for 60 days, whilst a control group received distilled water at 1ml/day

per oral. The results showed that all groups of male rats had significantly higher courtship behavior during the first 10-minute period of observation than in the 2nd and 3rd 10-minute periods, except those receiving the highest dose of *K. parviflora*. They revealed the same amount of courtship behavior throughout a whole 30-minute period, which was significantly lower than the control group. There was no significant difference between treated and control groups in other sexual behaviors; mount frequency (MF), intromission frequency (IF), mount latency (ML), or intromission latency (IL). Toxicological study revealed no significant difference of hemoglobin, WBC or differential cell count. All dosages had no effect on kidney and liver function, according to the normal values of blood urea nitrogen (BUN), creatinine (Crea), aspartate aminotransferase (AST) and alanine aminotransferase (ALT). Nevertheless, the histopathological study showed a morphological change in the liver. ^[5]

***Allium tuberosum*:**

In that study the effect seeds extract of *Allium tuberosum* upon the expression on male rat sexual behavior, The aphrodisiac activity of *Allium tuberosum* seeds *n*-BuOH extract was investigated in male rats. The extract (500 mg/kg body weight/day) and L-dopa (100 mg/kg body weight/day) were administered orally by gavages for 40 days. Mount latency (ML), intromission latency (IL), ejaculation latency (EL), mounting frequency (MF), intromission frequency (IF), ejaculation frequency (EF) and postejaculatory interval (PEI) were the parameters observed before and during the sexual behavior study at day 0, 10, 20, 30 and 40. The *n*-BuOH extract reduced significantly ML, IL, EL and PEI ($p < 0.05$). The extract also increased significantly MF, IF and EF ($p < 0.05$). These effects were observed in sexually active and inactive male rats. Present findings provide experimental evidence that the *n*-BuOH extract preparation of *Allium tuberosum* seeds possesses aphrodisiac property. ^[6]

***Camellia sinensis*:**

In that study the *Camellia sinensis* (Black Tea Brew BTB) is claimed to have male sexual

stimulant activity. As this claim is not scientifically tested and proven, this study was undertaken to evaluate the effects of BTB on male sexual competence.

Different doses of BTB made from Sri Lankan high grown dust grade no 1 tea (84, 167 and 501 mg/ml) or water were orally administered to separate groups of rats ($n = 9$ per group) and 3 h later their sexual behaviour were monitored (for 15 min) using receptive females.

The overall results showed that BTB possesses marked aphrodisiac activity (in terms of prolongation of latency of ejaculation shortening of mount- and intromission latencies and elevation of serum testosterone level). The aphrodisiac action had a rapid onset and appears to be mediated via inhibition of anxiety and elevation of serum testosterone level. Further, this aphrodisiac action was not associated with impairment of other sexual parameters like libido, sexual motivation, sexual arousal, sexual vigour or penile erection. BTB was also nontoxic (in terms of overt signs, liver and renal toxicity). It is concluded that BTB can function as a quick acting, safe. ^[7]

***Anacyclus pyrethrum*:**

Anacyclus pyrethrum DC (Compositae), commonly referred to as 'Akarkara', is widely recognized in Ayurvedic system of Indian medicine as tonic and rejuvenator. The roots are also considered aphrodisiac and sexual stimulant. Aqueous extract of the roots was studied for its effect on sexual behavior, spermatogenesis, and sperm count. Fructose levels in seminal vesicles of albino rats were also recorded. Two doses i.e. 50 and 100 mg/kg of aqueous extract on administration in albino rats showed pronounced anabolic and spermatogenic effect in animals of respective groups. The sperm count and fructose levels in seminal vesicle were markedly increased. Improvement in sexual behavior of male rats was characterized by increased mount and intromission frequency and reduced mount and intromission latency. The extract had a dose dependent influence on sperm count and seminal fructose concentration which increased significantly. The use of medicinal plants in the management of several ailments is gaining popularity nowadays. ^[8]

Massularia acuminata:

Massularia acuminata, one of such plants is commonly used as chewing sticks due to its antimicrobial activity and the aqueous extract of its stem as an aphrodisiac. Aphrodisiac activity in some plants may be due to androgen increasing property of its phytochemicals.

In that study the the androgenic potentials of aqueous extract of *Massularia acuminata* stem in male rats for 21 days. Male rats weighing between 220 and 260 g were completely randomized into four groups: A, B, C and D. Group A, the control received orally 1 ml of distilled water (the vehicle) while groups B, C and D were orally administered with 1ml each corresponding to 250, 500 and 1000 mg/kg body weight of the plant extract, respectively for 21 days. Rats were sacrificed 24 h after 1, 7 and 21 days. Compared with the control, extract administration at all the doses produced significant increase ($P < 0.05$) in testes–body weight ratio, testicular protein, glycogen, sialic acid, cholesterol, testosterone, luteinizing and follicle stimulating hormone concentrations throughout the period of administration. Testicular gamma glutamyl transferase activities were decreased significantly ($P < 0.05$) after the first dose and was sustained throughout the experimental period.

The available evidence in that study suggests that aqueous extract of *Massularia acuminata* stem has androgenic potential which may stimulate male sexual maturation and enhance normal testicular function.^[9]

Butea frondosa:

In that study, the aphrodisiac activity of *Butea frondosa* Koen. ex Roxb (Papilionaceae) bark extract was investigated. The extract (400 mg/kg body wt./day) was administered orally by gavage for 28 days. Mount latency (ML), intromission latency (IL), ejaculation latency (EL), mounting frequency (MF), intromission frequency (IF), ejaculation frequency (EF) and post-ejaculatory interval (PEI) were the parameters observed before and during the sexual behavior study at day 0, 7, 10, 14, 21, and 28. The extract reduced significantly ML, IL, EL and PEI ($p < 0.05$). The extract also increased significantly MF,

IF and EF ($p < 0.05$). These effects were observed in sexually active and inactive male rats.^[10]

Asparagus racemosus:

In that study the 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.^[11]

Tinospora cordifolia

Tinospora cordifolia is an herbaceous vine of the family *Menispermaceae*. In that study, the total extracts were tested for their constituents and tested for aphrodisiac activity in experimental rats. The preliminary phytochemical screening of hydroalcoholic and aqueous extracts of the stems of *Tinospora cordifolia* showed the presence of alkaloids, carbohydrates, glycosides, steroids, proteins, saponins, gums and mucilages. The hydroalcoholic extract of *Tinospora cordifolia* stem 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, hydroalcoholic 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 *Tinospora cordifolia* exert significant aphrodisiac activity. Further, detailed studies are needed to know whether *in vivo* administration of the extracts is beneficial for patients suffering from sexual.^[12]

Argeria nervosa:

The aphrodisiac property of *Argeria nervosa* was studied in male mice. The root, flower and, to some extent, leaf (homogenate in 2% gum acacia) of the plant showed aphrodisiac activity as evidenced by an increase in mounting behavior of

mice. When different extracts of the root were tested, the activity was found in the alcohol extract (200 mg/kg; p.o, single dose). The extract, 1 hr after administration, stimulated mounting behavior of male mice in a concentration-dependent manner. The root- or flower-treated male mice also exhibited a remarkable increase in mating performance. Further, the number of males was found to be more among the pups fathered by the herbal drug-treated mice compared to those by the control mice. Thus, the plant has promising potential to be developed into an effective medicine for stimulating male sexual activity. ^[13]

Safranal:

The aphrodisiac activities of *Crocus sativus* stigma aqueous extract and its constituents, safranal and crocin, were evaluated in male rats. The aqueous extract (80, 160 and 320 mg/kg body wt.), crocin (100, 200 and 400 mg/kg body wt.), safranal (0.1, 0.2 and 0.4 ml/kg), sildenafil (60 mg/kg body wt., as a positive control) and saline were administered intraperitoneally to male rats. Mounting frequency (MF), intromission frequency (IF), erection frequency (EF), mount latency (ML), intromission latency (IL) and ejaculation latency (EL) were the factors evaluated during the sexual behavior study. Crocin, at all doses, and the extract, especially at doses 160 and 320 mg/kg body wt., increased MF, IF and EF behaviors and reduced EL, IL and ML parameters. Safranal did not show aphrodisiac effects. The present study reveals an aphrodisiac activity of saffron aqueous extract and its constituent. ^[14]

Pedaliium murex:

It has been suggested that chronic ethanol exposure may result in testicular damage and infertility in males. Petroleum ether extract of *Pedaliium murex*, family Pedaliaceae (PEPM), is evaluated in this study for its ability to increase aphrodisiac activity and to cure ethanol induced germ cell damage and infertility in male rat models. Doses of 200 and 400 mg/kg of PEPM showed a significant increase ($P < 0.01$, $P < 0.001$) in mating and mounting behaviour. The effect on fertility factors such as total body weight, percentage of pregnancy, litter size were also significantly increased ($P < 0.01$) in comparison with the

ethanol-treated group. Significant increases in sperm motility and count were observed in PEPM treated groups in a dose-dependent manner ($P < 0.01$; $P < 0.001$) as compared with the ethanol-treated group. Similarly, reductions in the percentage of abnormal sperm were noted in animals treated with PEPM 400 mg/kg. The effects of PEPM on total protein, total cholesterol and testosterone were satisfactory, the levels being increased significantly for protein ($P < 0.05$), cholesterol ($P < 0.01$) and testosterone ($P < 0.05$) by 400 mg/kg PEPM. Microtome sections of the testes of animals treated with 400 mg/kg PEPM exhibited restoration and recovery of germinal cells and the luminal spermatozoa and were comparable with the control group animals. These effects of PEPM make this natural herb ideal as an aphrodisiac and a potent fertility enhancing drug. ^[15]

Trichopus zeylanicus:

Administration of *Trichopus zeylanicus* leaf (ethanol extract) to male mice stimulated their sexual behavior as evidenced by an increase in number of mounts and mating performance. This activity of the ethanol extract was concentration dependent and destroyed by heat treatment at 100°C for 15 min. Although oral administration of a single dose (200 mg/kg) was effective, daily administration of the extract for 6 days was found to be more effective. The pups fathered by the drug treated mice were found to be normal with reference to fetal growth, litter size and sex ratio. The water as well as *n*-hexane extracts of the plant leaf were inactive. ^[16]

Microdesmis keayana:

The aphrodisiac properties of *Microdesmis keayana* J. Le´onard root extract and major isolated alkaloids were evaluated by observing the sexual behavior of male rats. Aqueous extract (150 mg/kg body weight) and pure alkaloids (3 mg/kg body weight) were administered orally by gavage to male rats. Latent times of observation, intromission and ejaculation, mounting behavior, number of intromissions and mating performances were evaluated and compared to those obtained with untreated rats in the presence of receptive and non-receptive females. The results have shown that

aqueous extract and alkaloids of *M. keayana* stimulate sexual parameters in rats' sexual behavior. A short-term toxicity study undertaken to establish the therapeutic index of aqueous extract, showed that a high dose of the extract (2 g/kg body weight) caused no change in rat behavior and toxicity. [17]

Turnera aphrodisiaca:

In that study the investigation, various extracts (petroleum ether, chloroform, methanol and water), alkaloidal fraction, and volatile oil of *T. aphrodisiaca* were screened for aphrodisiac activity in mice. Mounting behaviour was taken as a parameter to screen aphrodisiac activity. Chloroform extract exhibited significant activity at a dose of 200 mg/kg, p.o. while methanol extract showed aphrodisiac activity at a lower dose, i.e., 50 mg/kg, p.o.. Volatile oil of *T. aphrodisiaca* was found to be devoid of aphrodisiac activity. Qualitative phytochemical screening showed the presence of alkaloids in chloroform and methanol extracts. Therefore, the alkaloidal fraction was isolated from aerial parts of *T. aphrodisiaca*, and tested for aphrodisiac activity at dose levels of 25, 50, 75, or 100 mg/kg, p.o. A dose dependent increase in activity was observed upon acute as well as sub acute administration of alkaloidal fraction chloroform and methanol extracts were found to be active. Chloroform extract exhibited maximum aphrodisiac activity at the dose of 200 mg/kg while methanol extract at the dose of 50 mg/kg during 2nd h of test with respect to control. [18]

Eurycoma longifolia:

In that study *Eurycoma longifolia* evaluated on sexual behavior (including both motivation and copulatory performance) of sexually sluggish and impotent male rats.

The root powder of the plant was orally administered to adult Sprague–Dawley male rats, classified as sexually sluggish or impotent taking in account their behavior in pre-experimental tests. Groups of 8 animals each were submitted to three different types of treatment: (1) acute at 3 dose levels (250, 500 and 1000 mg/kg); (2) subacute (daily for 6 days) at the dose of 500 mg/kg and (3) subchronic (daily for 12 days) at the same dose (500 mg/kg). Mount, intromission and ejaculation

latencies and post-ejaculatory interval were recorded during the mating test in order to evaluate sexual performance. In addition the partner preference test was used to assess sexual motivation. Testosterone serum levels were measured in subacutely treated rats and compared with the values of controls receiving vehicle. *Eurycoma longifolia* root improved sexual performance but not motivation in sluggish rats after acute or subacute administration. The effect could be mainly described to increased testosterone. [19]

Spilanthes acmella:

In that study, Characterization of ethanolic extracts of the *Spilanthes acmella* flower and its effect on general mating pattern, penile erection and serum hormone levels of normal male Wistar albino rats were investigated and compared with sildenafil citrate. For assessment of sexual behavior, animals were divided into five groups of eight male rats. The extracts (50, 100 and 150 mg/kg body weight/day) and sildenafil citrate (5 mg/kg body weight/day) (positive control) were administered orally for 28 days. The behavioral and sexual parameters were observed at days 0, 15, 28 and after a lapse of 7 and 14 days of discontinuance of drug treatment. Five N-isobutylamides, one 2-methylbutylamide and one 2-phenylethylamide were identified. The orally administered extract had a dose dependent positive effect on mounting frequency, intromission frequency and ejaculation frequency and the most significant effects ($p < 0.05$) were observed at 150 mg/kg treatment, even after a lapse of 7 and 14 days of discontinuance of drug treatment. A dose dependent effect was also observed on the FSH, LH and testosterone serum levels. With 150 mg/kg of ethanolic extract the values for FSH, LH and testosterone were 3.10 ± 0.25 mIU/ml, 6.87 ± 0.18 mIU/ml and 3.72 ± 0.12 ng/ml, respectively. In vitro nitric oxide release was 21.7 ± 2.9 μ M, which was significantly higher compared to the control group ($p < 0.01$). [20]

Fadogia agrestis:

In that study the effects of administration of aqueous extract of *Fadogia agrestis* (Schweinf. Ex Hiern) stem on some testicular function indices of male rats (*Rattus norvegicus*) and their recovery potentials for 10 days were investigated. Rats were grouped into four: A, B, C and D where A (the control) received orally 1ml of distilled water (the vehicle), B, C and D (the test groups) received orally on daily basis graded doses of 18, 50 and 100 mg/kg body weight of the plant extract, respectively, for 28 days. The alterations brought about by the aqueous extract of *Fadogia agrestis* stem are indications of adverse effects on the male rat testicular function and this may adversely affect the functional capacities of the testes. The recovery made at the dose of 18 mg/kg body weight as used in folklore medicine suggests that it does not exhibit permanent toxicity at this dose. ^[21]

CONCLUSION:

The search for natural supplement from medicinal plants is being intensified probably because of its fewer side effects, its ready availability and less cost. All the plants in this review have exhibited significant pharmacological activity. The herbs can be effective aphrodisiacs. Moreover, isolation and identification of active constituents from plants may bring a dynamic change in the modern world.

Many of the plant materials showed positive aphrodisiac activities in animals. For the determination of the safety and effectiveness of these substances for sexual enhancement it is necessary to test pre-clinically in animals and clinically in human being before consuming the drug. Further studies are also needed to check the mechanism that underlie behind such activity. Demands of natural aphrodisiacs require increasing studies to understand their effects on humans and strengthen relationships to its safety. Due to unavailability of the safety data, unclear mechanisms, and lack of knowledge to support the extensive use of these substances, uses of these products can be harmful to the human being. With more clinical data, exact mechanisms of action, safety profile, and drug interaction with

other uses of these aphrodisiacs plant materials, treating sexual disorder can become fruitful.

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