



Traditional medicinal plants as scientifically proven Aphrodisiacs

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Review Article

ABSTRACT

Aphrodisiac is the word derived from Aphrodite, the Greek goddess of sexual, love and beauty. An aphrodisiac is defined as an agent (food or drug) that arouses sexual desire. Current sexual dysfunction therapy lack satisfactory success due to adverse effect, hence patients are seeking complementary and alternative medicine to treat sexual dysfunction. This review reveals that some plants and their extract have aphrodisiac activity, which are helpful for researcher to develop new herbal aphrodisiac formulations. In the recent years (2016-2018), interest in drugs of plant origin has been progressively increased.

Key words: Aphrodisiac, Ayurveda, Herbal medicines, Medicinal property.

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Introduction

Aphrodisiac is the word derived from Aphrodite, the Greek goddess of sexual, love and beauty. An aphrodisiac is defined as an agent (food or drug) that arouses sexual desire. From time immemorial man's endeavour have been to increase his sexual powers. When man did not know metals and used only stones he exhibited his sexual powers by ritual dances accompanied by hunting. This lead early man was motivated by his quest for food, sex and self-preservation. The possibility of bioactive aphrodisiacs which may be derived from plants, animals or minerals, has been attractive throughout recorded history. Aphrodisiac are mentioned there as Vajikaranas, the word vaji meaning horse and karanta meaning making i.e. Measure to excite lust by charms etc. Many natural substances have historically been known as aphrodisiacs in Africa and Europe, such as Yohimbine and the Mandrake plant, as well as ground Rhinoceros horn in the Chinese culture and "Spanish fly" which is actually toxic. Sexual relationships are some of the most important social and biological relationship in human life. Male impotence also called erectile

dysfunction (ED or SD) is a common medical condition that affects the sexual life of millions of men worldwide. Erectile dysfunction is defined as the persistent inability to obtain and maintain an erection sufficient for naturally satisfactory intercourse. Sexual dysfunction is a serious medical and social symptom that occurs in 10%- 52% of men and 25%-63% of women. Erectile dysfunction is adversely affected by diabetes mellitus, antihypertensive, antipsychotic, antidepressant therapeutic drugs. Organic causes of ED like Hypogonadism, hyperprolactinaemia, and neurological disorders. Treatment of ED involves several natural aphrodisiac potentials. Aphrodisiac is described as any substance that enhances sexual pleasure. Sexual dysfunction caused by various factors such as psychological disorders like Anxiety, depression, stress, fear of sex, neurological disorders, stroke, cerebral trauma, Alzheimer, Parkinson's disease and chronic disorders-diabetes, hypertension, vascular insufficiency, Atherosclerosis, penile disease-phimosi, peyronies, life style-chronic alcohol abuse, cigarette smoking, aging, decrease in hormone level with age. Systemic diseases - cardiac,

hepatic, renal, pulmonary, and cancer. Since introduction of sildenafil citrate to treat erectile dysfunction, there has been renewed and vigorous interest in medicinal herbs with folkloric reputation for sexual disorders. The Ayurvedic system of medicine addresses the problem of sexual deficiencies by treatment with specialized therapy known as Rasayana therapy. Vajakarna therapy includes aphrodisiacs for erectile dysfunction, causes of infertility, spermatogenesis, semenogenesis, reproduction, methods of correcting defective semen and sexual satisfaction.[1,2]

Ayurveda has a whole science of Aphrodisiacs. It is one of the seven branches of its medical system. Ayurvedic Aphrodisiacs (Vajikarana in Sanskrit) are more than substances exiting sexual activity; they are tonics that nurture and give direct sustenance to the reproductive tissues. Others help promote the creative transformation of sexual energy for the benefit of the body-mind. Sexual desire is controlled and regulated by the central nervous system which integrates tactile, olfactory, specific auditory and mental stimuli. The aphrodisiac drugs act by altering the level of specific neurotransmitters or specific sex hormones into the body. Most of the aphrodisiacs agent acts by altering the testosterone and progesterone concentration in the body.[3-5] This review will discuss the current research done on the most popular natural aphrodisiacs and examine the weight of evidence to support the use of any of them to enhance sexual desire and/or function.

Medicinal plants with aphrodisiac potential

Flueggea leucopyrus Willd.

Sexual dysfunction is a widely found disorder worldwide now a day because of busy lifestyle and stress. Management of disease is somewhat difficult because of cost and shortage of effective treatment. In the present paper authors have investigated effect of ethanolic extract of *Flueggea leucopyrus* Willd. leaves as aphrodisiac potential on albino rats. The dried leaves of plant were extracted by cold maceration method using ethanol. It was investigated for in vivo aphrodisiac activity. Plant extract was administered at doses 200 and 400 mg/kg body weight for 45 days. The effect of extract on general mating behavior, potency test, morphological studies, organ weight and sperm motility were tested. The results were

compared with standard reference sildenafil citrate. The acute toxicity of the drug extract was also checked. On oral administration of ethanol extract 200 and 400 mg/kg doses on 15th, 30th and 45th day of treatment in all treated groups significantly increased intromission latency, mounting frequency, ejaculatory latency and significantly decreased intromission latency, mounting latency, inter intromission interval and post ejaculatory interval. Test for potency showed significant increase in long flips, quick flips and erections. In all experimental animals morphological study showed significant increase in main and accessory reproductive organs weight and sperm motility. As compared to the control the prolonged treatments for all treated groups were highly effective. This showed that aphrodisiac activity has been shown by ethanol extract but it is less than the standard. The present study showed that ethanol extract of *Flueggea leucopyrus* Willd. leaf increase sexual behavior in rats. Thus it supports the claim for this drug as an aphrodisiac[6].

Abutilon indicum (Linn)

The plant *Abutilon indicum* (Linn) is an important medicinal plant used in our Traditional System of Medicine to treat various health ailments. The plant has been traditionally used for used as demulcent, aphrodisiac, laxative, diuretic, pulmonary and sedative. The plant is found in India, Sri Lanka, topical regions of America and Malaysia. The aim of the present study was to carry out the preliminary phytochemical screening of the root extracts and further to evaluate the aphrodisiac activity of aqueous and ethanolic extracts of the of the root part of plant *Abutilon indicum* L. In this study, the aqueous and ethanolic extracts of the roots of *Abutilon indicum* L. were subjected to preliminary phytochemical screening which showed the presence of alkaloids, carbohydrates, flavonoids and phytosterol, tannins, gums and mucilages are found to be absent. The total extracts were tested for their aphrodisiac activity in experimental rats. The ethanolic extract of *Abutilon indicum* L. roots 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, mating performance, hormonal analysis, testes-body ratio and sperm count. On the other hand, ethanolic 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 root extracts of *Abutilon indicum* L. 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 disorders.[7]

Garcinia kola

Dysfunctional erectile is a common sexual disorder among the male folk. *Garcinia kola* seed is being utilized by the folklore for treating erectile dysfunction disorder. Investigation was carried out to ascertain the acute toxicity of *Garcinia kola* seed and the behavior of male Albino Wistar rats sexually, using the methanol extract. Result shows the median lethal dose (LD50) to be 1000 ± 0.66 mg/kg. The combination of 200 mg/kg *G. kola* extract with testosterone (standard drug) produced more efficacies (2.81 ± 0.31 , 3.40 ± 0.39 , 1.18 ± 0.30 , 7.84 ± 0.18 , 41.72 ± 0.45 , 38.22 ± 0.78 and 35.00 ± 0.24 for their Mount Latency ml(s), Intromission Latency Il(s), Ejaculation Latency EL (s), Penile Erection (PE), Mount Frequency (MF), Intromission Frequency (EF) and Ejaculation Frequency (EF) respectively compared with administration of the standard drug alone. Conclusively, these findings agree with the folkloric reports that *G. kola* seeds are used as aphrodisiacs in men and may be a rationale for an erectile dysfunction drug origin.[8]

Eulophia macrobulbon

This study investigated the effect of *Eulophia macrobulbon* (EM) extract on sexual performance in aged-related erectile dysfunction (ED) rats. The ethanol EM extract at the doses of 15, 150, and 450 and sildenafil citrate at the dose of 5 mg/kg body weight (BW) were administered orally to the aged male rats once daily for 21 days. Mating parameters and intracavernosal pressure (ICP) were measured to evaluate their sexual and erection functions. Numbers of sperm and sperm motility as well as the diameter of seminiferous tubules were observed. The serum testosterone and 3',5'-cyclic guanosine monophosphate (cGMP) concentration in the rat penile tissue were analyzed. The results showed the significant increased sexual motivation, copulatory performance, and ICP of aged rats treated with sildenafil citrate and all doses of EM extract as compared to control aged rats. Moreover, their serum testosterone levels were slightly increased and significant increase in penile

cGMP concentration was observed in these aged rats treated with sildenafil citrate and EM extract. The results suggest that treatment with EM could inhibit activity of PDE5 in penile tissue resulting in the increased cGMP level and bring to the improvement of erectile function and sexual performance.[9]

Zea mays

In the present study, the aphrodisiac properties of the purple corn (*Zea mays*) in male rats were analyzed. The aqueous crude extract of purple corn (at 25, 50, and 75 mg/kg) was administered to (a) copulating male rats and (b) anesthetized and spinal cord transected male rats. Behavioral parameters of copulatory behavior and parameters of the genital motor pattern of ejaculation previous to its inhibition, under the influence of the purple corn extract, are described. Administration of the aqueous crude extract of purple corn significantly facilitates the arousal and execution of male rat sexual behavior without significant influences on the ambulatory behavior. In addition, purple corn extract elicit a significant increase in the number of discharges of the ejaculatory motor patterns and in the total number of genital motor patterns evoked in spinal rats. The present findings show that the aqueous crude extract of purple corn possesses aphrodisiac activity.[10]

***Buchanania axillaris* Linn.**

The study was aimed at investigate the effect of methanolic extract of *Buchanania axillaris* linn. (Anacardiaceae) on general mating behaviour, libido, and adverse effects on sexually normal male albino rats. Methanolic extract was administered orally at the dose of 100, 200, and 400 mg / kg, to different groups of male rats (n = 8) once a day for 14 days. All the doses resulted in significant increase in mount frequency, intromission frequency and anogenital sniffing when compared to normal. The methanolic extract of *Buchanania axillaris* leaves at higher concentration (400 mg/kg body weight) showed significant aphrodisiac activity on male Wister albino rats as evidenced by an increase in number of mounts and mating performance. Thus, in experimental rats, the results of the present study suggest that the methanolic extracts of *Buchanania axillaris* exert significant aphrodisiac activity.[11]

Borassus aethiopum

Borassus aethiopum is a tropical plant with multiple uses and the hypocotyls are very appreciated by the populations in food and in traditional medicinal. In addition all parts of this tree such as the wood or the stem, the roots, the petioles, the hypocotyls, the leaves, the final bud, the resin, the fruits, the seeds and the sap constitute richness for a rural population. Ethnobotanical survey revealed aphrodisiac properties of hypocotyls and contribute also to the treatment of the disorders of men erection. It is necessary to document the medicinal importance of the different parts of *Borassus aethiopum* and to compare the chemical composition of hypocotyls with its medicinal virtues or qualities. A total of 180 people were surveyed in nine villages in two districts Glazoué and Savé located in the central of Benin. These two districts are recognized for their dynamism in *Borassus aethiopum* production and in marketing of hypocotyles. The chemical compositions were evaluated through a phytochemical screening carried out on extracts of hypocotyls and based on colouring and precipitation reactions. At the total, five (5) diseases are treated using different parts of *Borassus aethiopum*. Among which the sexual weakness is the most disease cited for the most reason of hypocotyls used (100% surveyed). The utilization modes vary from one village to another and from one socio-ethnic group to another. The analyses revealed the presence of tannins catechic, gallic, anthocyanes, leuco-anthocyanes, mucilages, saponosides, heterosides and coumarins which could be at the base of the aphrodisiac activity of *B. aethiopum* hypocotyls. These results lead us to suggest that hypocotyls could be used for the manufacture of the drugs in order to fight against the sexual weakness. However, biological studies like in vivo evaluation are necessary to evaluate the effectiveness of hypocotyls.[12]

***Nigella sativa* Linn.**

Nigella sativa L. (NS) from Ranunculaceae family is known as black cummin in Indonesia. The seed has been used as an aphrodisiac in ethnobotanical studies and reported to have pharmacological activities such as antihypertensive through the relaxant effect of vascular smooth muscles but the direct effect to the blood vessels of the corpus cavernosum is still unknown. The purpose of this study was to examine the response of NS seed extract on penile erection in vitro. NS seeds were macerated in ethanol solvent for three days in room temperature and repeated for two times.

Penile erection responses was assessed using isolated rat corpus cavernosum in Krebs-Henseleit solution, temperature 37°C, pH 7.4, aerated with carbogen gas. After acclimation, corpus cavernosum was contracted with a phenylephrine solution. Ethanolic extract of NS seeds or control solution were given after reaching the plateau phase of the highest contraction. This study showed that the contraction response of the corpus cavernosum decreased after addition of NS extract and this action was increased with the addition of the extract concentration. This study concluded that NS seed ethanol extract affects the penile erection response directly through the relaxation of blood vessels in the corpus cavernosum.[13]

Cyperus esculentus

Cyperus esculentus aqueous extract on paroxetine-mediated sexual dysfunction in male Wistar rats. Methods: Sexually dysfunctioned (SD) rats were orally treated with PowMaxM [reference drug (7.14 mg/kg)] and the extract (500 and 1000 mg/kg body weight) once daily for 10 days, and their sexual behavioural parameters were monitored and computed. Relative testes-body weight and testicular function parameters were also evaluated at the end of the treatment period. Results: Dim light observation on the animals revealed respective proceptive and precopulatory behaviours by the primed female animals and the extract-treated male rats. Compared with SD rats, the extract treated groups significantly restored and improved sexual behaviour and libido as evident from the remarkably increased frequencies of mount, intromission, ejaculation and ejaculatory latency. In addition, the latencies of mount, intromission, and post-ejaculation were significantly reduced. The significantly reduced testicular activities of alkaline phosphatase, acid phosphatase, lactate dehydrogenase and the concentrations of protein, cholesterol, glycogen, testosterone, luteinizing hormone, follicle stimulating hormone and testes-body weight in the SD rats were also markedly increased following treatment with the extract. The effects elicited by the extract competed favourably with the reference drug used. The improved sexual competences exhibited by the male rats in this study are indicative of aphrodisiac attributes of the extract and could be adduced to the presence of phytonutrients as revealed by the GC-MS chromatogram. Conclusion: The data from this study suggest that *C. esculentus* is capable of restoring and boosting sexual competence and

the probable mechanism is via synergistic influence of the adaptogenic bioactive principles.[14]

***Cynanchum wilfordii* Radix**

The purpose of the current study was to investigate the total phenolic content and the antioxidant activity of the aqueous extract of *Cynanchum wilfordii* Radix (CWW). In addition, we conducted *in vitro* and *in vivo* tests to examine whether the aqueous extract of CWW has an aphrodisiac property. The results indicated significant increases in testosterone synthesis in Leydig TM3 cells when the cells were treated with CWW at concentrations of 50, 100, and 200 µg/mL. In the *in vivo* study, CWW (50, 100, and 200 mg/kg body weight/day) and tadalafil (2 mg/kg body weight/day) were administered by oral gavage to male Sprague-Dawley (SD) rats for 15 days. On day 15, the rats were evaluated for sexual behavior parameters (mount latency, ML; mounting frequency, MF; intromission latency, IL; intromission frequency, IF; ejaculation latency, EL; post-ejaculatory interval, PEI) by pairing them with estrus females. Following the sexual interactions, blood samples were collected from the rats to evaluate their serum hormone levels. In the rats administered 200 mg/kg body weight/day of CWW, MF ($p < 0.05$) and IF ($p < 0.01$) significantly increased, while ML, IL, EL, and PEI significantly ($p < 0.05$) decreased. In addition, the serum levels of luteinizing hormone (LH), follicle-stimulating hormone (FSH), and testosterone increased. CWW improved sexual motivation, libido, and potency in the male SD rats by stimulating LH, FSH, and testosterone secretion. The results indicated that *Cynanchum wilfordii* has an aphrodisiac effect.[15]

Mutimba vula* (MTV) and *Mwana apeluke

Male potency has been a talk of many years since humanity existed and the use of various kinds of substances to stimulate sexual desire has been done for many years. Many plant-based concoctions have been released on the Zambian market for consumption without scientifically proven results or effects. Herbalists, Traditional health practitioners (THPs) have put up many advertisements to spread their market base but all the same without any proven results to show to would-be customers to use a particular product. Two local herbal extracts, *Mutimba vula* (MTV) and

Mwana apeluke (MWN) were studied for the presence of medicinally active components and for their sexual behaviour effects in male rats. Aim of the study: The main objective of this research work was to determine aphrodisiac properties of MTV and MWN aqueous herbal extracts. Methodology: Phytochemical screening to determine presence of medicinally active components was performed following standard guidelines. Thereafter, 3 g each of dried powder of MTV and MWN were soaked in 250 mL of distilled water for 3 hours for extraction of active ingredients. Two concentrations, high and low doses of the herbal extracts were administered orally to the treatment groups for 21 days followed by sexual behaviour analysis. Concentration of testosterone in blood samples was determined using a Testosterone Enzyme-Linked Immunosorbent Assay (ELISA) test. Results: Herbal extracts showed varying amounts of saponins, tannins, flavonoids, alkaloids and glycosides. The mounting frequency ($p = 0.039$), intromission frequency ($p = 0.032$) and penile erections increased ($p = 0.001$) significantly indicating enhanced sexual activity in animals treated with the plant extracts. The results indicated that there was no dose-dependent relationship between serum Testosterone levels and the treatment groups ($p = 0.061$). Conclusion: It was established that oral administration of Mutimba vula and Mwana apeluke caused increased sexual performance in rats. However, more studies are needed to exploit the possible mode of action.[16]

Smilax kraussiana

The aphrodisiac effect of methanol extract of *Smilax kraussiana* was investigated in adult albino male rats. The extract was investigated on sexual behaviour based on the parameters of sexual indices such as mount and intromission latencies and ejaculation latency. Others include mount and intromission frequencies, erection frequency, post ejaculation interval as well penile erection in adult albino male rats. The extract caused increase in mount frequency, intromission frequency and erection frequency. Others were penile erection and ejaculation latency. These increases were statistically ($p < 0.001$) significant. Similarly, the extract also caused decrease in both mount and intromission latencies and in post ejaculation interval. These effects were observed in both sexually - active and in - active rats. There was an increase in body weights of all the animals treated with the extract coupled with those of sexual organs such

as testis, epididymis and vas deference, these increases we are statistically significant ($p < 0.001$) relative to control. The methanol extract of *Smilax kraussiana* caused a significant decrease in serum cholesterol level while the serum concentrations of aspartate and alanine aminotransferases as well as the alkaline phosphatase were elevated. These effects were statistically significant ($p < 0.001$) relative to control. The free radical scavenging ability of the extract against DPPH showed that the extract possessed some antioxidant properties. The photomicrograph of the sexual organs showed no histological abnormalities, rather there was an increase in seminiferous tubules proliferation. . Phytochemical screening of the extract showed that it contained alkaloids, saponin, cardiac glycoside, tannins and phlobatannins. The median lethal dose was calculated as 243.86mg/kg. The observed effects may in part be due to the secondary metabolites of the extract. These effects of the extract justified the folkloric use of the plant.[17]

Vitex negundo

Vitex negundo was a hardy plant belonging to the family Verbenaceae, traditionally used as an aphrodisiac in male. The objective of the present study is to evaluate the aphrodisiac activity of ethanolic fruit extract of *Vitex negundo* on male albino rats and the effects were compared with the normal control and reference control sildenafil citrate. Male Wistar albino rats were divided in to 4 groups of 6 animals each. Ethanolic fruit extract of *Vitex negundo* (200 & 400mg/kg body weight) were administered orally and its sexual performance was compared to the normal and reference control animals (Sildenafil citrate 4.5mg/kg body weight). The aphrodisiac activities of rats due to the effect of the herb were observed by various parameters such as mount frequency, mount latency, intromission frequency, intromission latency, ejaculation latency, post ejaculatory Interval and total sexual behavior. The data's were analyzed using ANOVA followed by dunnetts''t'' test. *Vitex negundo* showed dose dependent increase in mounting frequency, intromission frequency, ano-genital sniffing and genital grooming and decrease in mounting latency and intromission frequency as compared to control. The ethanolic fruit extract of *Vitex negundo* showed comparable aphrodisiac effect with the reference control sildenafil citrate. From the result it was concluded that, ethanolic fruit extract of *Vitex*

negundo posses aphrodisiac activity in male rats.[18]

Chrysactinia mexicana

Chrysactinia mexicana A. Gray (Asteraceae) and *Turnera diffusa* Willd (Turneraceae) are employed in traditional medicine as aphrodisiacs; however, there is no scientific evidence supporting the prosexual properties of *C. mexicana*. The aim of this study was to determine whether an aqueous extract of *C. mexicana* (Cm) stimulates rat male sexual behavior in the sexual exhaustion paradigm. Sexually exhausted (SExh) male rats were treated with Cm (80, 160, and 320 mg/kg), an aqueous extract of *T. diffusa* (Td), or yohimbine. The sexual exhaustion state in the control group was characterized by a low percentage of males exhibiting mounts, intromissions, and ejaculations and no males demonstrating mating behavior after ejaculation. Cm (320 mg/kg), Td, or yohimbine significantly increased the proportion of SExh rats that ejaculated and resumed copulation after ejaculation. In males that exhibited reversal of sexual exhaustion, Cm (320 mg/kg) improved sexual performance by reducing the number of intromissions and shrinking ejaculation latency. The effects of treatments on sexual behavior were not related with alterations in general locomotion. In conclusion, the prosexual effects of Cm, as well as those of Td, are established at a central level, which supports the traditional use of *C. mexicana* for stimulating sexual activity.[19]

Eremomastax speciosa

We studied prosexual effects of *Eremomastax speciosa* aqueous extract in male adult rats.. 100 and 500 mg/kg of extract were administered orally (days 0, 1, 4, 7, 14, and 28 (posttreatment)). The sexual behavior of rats receiving a single dose (500 mg/kg) was also evaluated after pretreatment with L-NAME (10 mg/kg), haloperidol (1 mg/kg), or atropine (5 mg/kg). Controls received distilled water or testosterone enanthate (20 mg/kg/day/3 days (s.c.) before the test). Results. The extract (days 1–14) had no significant effect on mount, intromission, and ejaculation frequencies but on day 28 (14 days after treatment), it increased frequency of mounts and intromissions at 500 mg/kg. Mount, intromission, and ejaculation latencies reduced and postejaculatory intervals decreased but the effect did not persist 2 weeks after treatment. Extract prosex effects were greatly reduced by atropine and completely abolished by haloperidol, while L-NAME

increased mount latency and potentiated extract effect on intromission and ejaculation latencies. *E. speciosa* extract can have positive effects on male sexual motivation and performance when administered for two weeks at the dose of 500 mg/kg. The effects (dopaminergic and/or cholinergic dependent) tend to appear during the post treatment period.[20]

Conclusion

Besides the fact that several plant sources are beneficial as an immune modulator, sex stimulant and also as medication in erectile dysfunctions, there is very low range of research work carried out in this field. Current interest in traditional medicine has led to the rapid development and studies of many herbal remedies employed for sexual dysfunction. Novel information gathered from the current data is important in preserving folk indigenous knowledge as well as in the discovery of novel potential compounds with promising aphrodisiac potential. Therefore, this review has been prepared to provide a new compilation of plants with specific use as aphrodisiac only in different countries. Moreover, this review has

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incorporated latest data on new plant species/constituents which are not covered in previous reviews on aphrodisiac potential.

Limitations

The current article has been prepared by consulting the literature published in English language only, ignoring the studies published in other languages. The information mentioned in other language, if had been included, could make this review more interesting and also helpful in validating the presented data. Further, toxic studies on the cited plants/constituents is not available and not included, which otherwise, might be useful in selecting the plant for further investigation.

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