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Traditional medicinal plants and sex

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Abstract

The utilization of ethnobotanical indigenous knowledge is vital in male sexual reproductive health care delivery, Reproductive health care is the world's second most prevalent health care problem. However, this concept of reproductive health care has been focusing mainly on women disregarding men, thus, some diseases such as sexual impotence and erectile dysfunction that deserve mention are regarded as petty though important in economic productivity, family stability and sexually transmitted diseases control including HIV/AIDS.

Male sexual dysfunction is a common disorder that appears to be a consequence of a wide range of physical and psychological conditions. Due to mental stress, insufficient physical exercise and various aetiological factors, human being's life is becoming less attractive, due to the incapability to have sexual glade. The different cure drugs used for sexual dysfunction are believed to produce a variety of side effects and affect other physiological processes and, ultimately, general health. Therefore, the search for natural supplements from medicinal plants is concerning probably because of fewer side effects availability and the cost. Ethnobotanical applied studies have identified a large number of traditional plants used as aphrodisiacs but only a few of them are scientifically tested for the management and treatment of male sexual dysfunction. This article has summarized the traditionally recommended and scientifically validated medicinal plants for managing and treating male sexual dysfunction.

Medicinal plants used in traditional medicine and various cultures could be the best resources for discovering new drugs, some of the medicinal plants effective on sexual dysfunction (sexual desire disorders, erectile dysfunction, and premature ejaculation).

Key words: sexual reproductive; sexual glade; health care

Introduction

Erectile dysfunction, sometimes, which also may refer to impotence, is the repeated inability to get or keep an erection firm enough for sexual intercourse. The word impotence might also be used to describe other problems that interfere with sexual intercourse and reproduction, such as lack of sexual desire and problems with ejaculation or orgasm. Erectile dysfunction is the total inability to erection, not harmonious ability to do so, or a tendency to keep only brief erections (premature ejaculation), the impotence is the inability to end sexual intercourse due to a decrease in penile erection. These differences make defining erectile dysfunction and determining its make difficult, for purposes of this publication, since ethnobotanical indigenous knowledge (IK) could clarify between these two terms, erectile dysfunction and sexual weak are both used. The limited people providing this information are not professional enough to classify these two terms.

The determination range of men in all of the world suffering from erectile dysfunction is from 15 million to 30 million.

According to the National Ambulatory Medical Care Survey (NAMCS), for every 1,000 men in the United States, 7.7 physician office visits were made for erectile dysfunction in 1985. By 1999, that rate had nearly tripled to 22.3. This is in the USA, where statistics are clearly compiled. This is a clear indication that there are many silent men, particularly couples affected by erectile dysfunction.

Reproductive Health care is the second most wild health care problem in the world, reproductive health care did not appear on the health agenda until recently after the Cairo conference on population and the Peking conference on women that it indeed became a live issue. In some instances, reproductive health insurance includes the needs of the youth or adolescents, the causes of erectile dysfunction differ from one person to another.In any else case, since an erection requires a true sequence of events, erectile dysfunction could spear when any of the events is a disorder, this sequence contains nerve impulses in the brain, spinal column, and area around the penis, and response in muscles, fibrous tissues, veins, and arteries in and near the corpora cavernosa, thus, erectile dysfunction reports that contain, damage to nerves, arteries, smooth muscles, and fibrous tissues, these are often as a result of diseases, such as diabetes, kidney disease, chronic alcoholism, multiple sclerosis, atherosclerosis, vascular disease, and neurologic diseases that account for about 70 percent of erectile dysfunction cases, between 35 and 50 percent of men with diabetes experience erectile dysfunction, use of many reports medicines such as blood pressure drugs, antihistamines, antidepressants, tranquilizers, appetite suppressants, and cimetidine (an ulcer drug) could result in erectile dysfunction as a side effect. Nevertheless, psychological factors such as stress, anxiety, guilt, depression, low self-respect, and fear of sexual failure cause 10 to 20 percent of erectile dysfunction cases, in addition, men with physical due to erectile dysfunction frequently experience similar kinds of psychological reactions (stress, anxiety, guilt, and depression). Other possible causes are smoking, which affects blood flow in veins and arteries, and hormonal abnormalities, such as not enough testosterone.

In the modern recovery of erectile dysfunction, the oral prescription medication of world Viagra (Sildenafil) is effective, but in some men, it is not compatible and Sildenafil makes less than 70% of men with kinds of etiologies and has insurance side effects. The offer of Viagra has brought millions of doubles to erectile dysfunction treatment, oral testosterone could decrease erectile dysfunction in some men with low levels of natural testosterone, but it is often ineffective and may cause liver damage. However, this possible modern cure for erectile dysfunction in men is very expensive for most of the rural people in Egypt and other developing countries. Until now, in traditional medicine, there are many medicinal plants that depend on usage in the treatment of erectile dysfunction.

Medicinal plants and sexual disease

***Alpinia calcarata* Roscoe (Zingiberaceae)**

(Arambewela and Arawwawala, 2010), reported that.*Alpinia calcarata* is a rhizomatous perennial herb, which is commonly used in the traditional medicinal systems in Sri Lanka as an aphrodisiac drug. (Ratnasooriya and Jayakody 2006), investigated the effects of rhizomes of *A. calcarata* Roscoe (Zingiberaceae) on male sexual competence and fertility. They examined the effect of hot water extract (HWE) (150, 250 and 500 mg/kg) on the sexual behavior of male rats. HWE possessed strong aphrodisiac action as evidenced by the significant reduction in mounting and intromitting latencies; it markedly prolonged the latency for ejaculation, non-impairment in libido, sexual arousability, sexual vigor and sexual performance or penile erectile ability. The authors concluded that *A. calcarata* rhizomes possess a strong and safe oral aphrodisiac activity.

***Anacyclus pyrethrum* DC (Family Asteraceae)**

Usmaniet al, (2016) mentioned that Anacyclus pyrethrum, commonly known as Akarkara in Hindi and Pellitory in English, is an important medicinal plant that belongs to the Asteraceae family, also called Akkirakaram in Marathi. Jawhari et al, (2022) added that the roots of the plant have good therapeutic value as per the traditional systems of medicine. It is also known as the African pyrethrum.

Anacyclus pyrethrum (Spanish chamomile) is commonly known as Akarkara. It is widely recognized in the Ayurveda system of Indian medicine as a tonic and rejuvenator (Rani et al., 2013). And improves sexual function especially in males (Annalakshmi et al., 2012).In addition, Sharma et al., 2010), investigated the effect of petroleum ether extract of roots of *A. pyrethrum* on sexual behaviour in male rats. They found that extract had a marked influence on body and accessory sexual organ weights of the rats, and they were more receptive and oriented towards female rats and increased pre-copulatory activities such as licking and sniffing. The penile erection index was significantly increased with reduction in mount latency and intromission latency period, 4-fold increase in mount and 3-fold increase in intromission frequency. The authors concluded that petroleum ether extract of roots of *A. pyrethrum* has significant potential to improve sexual behaviour of male rats. In another study, (Sharma et al., 2013) investigated the androgenic and spermatogenesis potential of alkylamide-rich ethanol solution extract of the roots of A. pyrethrum. Ethanol solution extract at doses of 50, 100 and 150 mg/kg produced significant increase in body weight, sperm count, motility and viability along with serum testosterone, luteinising hormone and follicle-stimulating hormone concentrations. Histoarchitecture of the testis revealed increased spermatogenic activities. Seminal fructose content was also significantly increased after 28 days of treatment. Through HPLC/UV/electrospray ionisation mass spectrometry method, thirteen N-alkylamides were found in the extract. The authors concluded that ethanol solution extract of the roots of *A. pyrethrum* has androgenic potential and may improve

male fertility by enhancing spermatogenesis.

***Anethum graveolens* L. (Family Apiaceae)**

(Jana and Shekhawat, 2010) cleared that *Anethum graveolens* L. (dill) has been used in ayurvedic medicines since ancient times; it is a popular herb widely used as a spice and also yields essential oil. Iamsaard et al. (2013), investigated the effect of *A. graveolens* (AG) extracts on the mounting frequency, histology of testis and epididymis, and sperm physiology. AG (50 mg/kg BW) significantly increased the mounting frequency on days 1 and 7, and the rat testis showed high levels of phosphorylated proteins. In histological analyses, AG extract did not affect the sperm concentration, acrosome reaction and histological structures of testis and epididymis. The authors concluded that AG extract enhances the aphrodisiac activity and is not harmful to spermatozoa and male reproductive organs

***Arctium lappa* L. (Family Asteraceae)**

(Chan et al., 2011) cited thhat *Arctium lappa*, commonly known as burdock, is being promoted/recommended as a healthy and nutritive food in Chinese societies. Burdock has been used therapeutically in Europe, North America and Asia for hundreds of years. (JianFeng et al., 2012) investigated the effects of aqueous extract of *A. lappa* L. roots on sexual behavior in normal male rats. They observed that oral administration of *A. lappa* L. roots extract at 600 and 1,200 mg/kg body weight significantly increased the MF, IF and EF ($p < .05$). The ML IL and PEI were significantly reduced and EL was prolonged. The extract also significantly increased the frequencies of all components of penile reflexes as well as serum testosterone levels. The authors concluded that aphrodisiac effects of the plant extract may be related to the presence of flavonoids, saponins, lignans and alkaloids, acting via a multitude of central and peripheral mechanisms.

***Asparagus adscendens* Roxb (Liliaceae)**

(Panda et al., 2011), found that *Asparagus adscendens* Roxb belongs to family Asparagaceae, is also known as shweta musali or satavar bhed, which is used to treat seminal weakness. (Bansode et al., 2015) studied the dose-dependent effects of *A. adscendens* root extract on anabolic, reproductive and sexual behavioural activities with a view to emphasise the pharmacological basis at 100, 200 and 300 mg/kg body weight, respectively, orally for 30 days. They assessed the copulatory and potency tests, organ weights, and spermatogenesis, daily sperm production rate (DSP) and epididymal sperm counts (ESC). It was found that the extract (200 and 300 mg/kg doses) significantly increased body weight, testes weight, testicular tubular diameter and number of round/elongated spermatids, MF, IF and EL. The authors concluded that *A. adscendens* possessed aphrodisiac activity and could be used for the treatment of sexual disorders as evidenced by the results showing increased anabolic, reproductive and sexual activities.

***Butea frondosa* Koenig ex Roxb. (Family Papilionaceae)**

The plant *B. frondosa* has been indicated in the Indian system of medicine as a plant augmenting memory and as a rejuvenator (Soman et al.,2004) and is traditionally claimed to possess aphrodisiac potential (Sindhia et al., 2010). Ramachandran et al. (2004), scientifically investigated and confirmed that *B. frondosa* extract significantly increased the MF, IF and EF and significantly reduced ML, IL, EL and PEI in experimental male rats. Meanwhile (Goswami et al., 2013), investigated and reported that bark methanol extract of *B. frondosa* increased sexual behaviour of young and aged rats, inhibited Rho-kinase 2 (ROCK-II) enzyme activity *in vitro* with an IC50 of 20.29 ± 1.83 µg/ml, relaxed corpus cavernosum smooth muscle (CCSM) up to 21.77 ± 2.57% and increased the ratio of smooth muscle to collagen level in rat penile tissue. The authors concluded that increased sperm production and decreased defective spermatozoa in young and aged rats corroborate the usefulness of *B. frondosa* in male infertility in addition to ED.

***Caesalpinia benthamiana* (Baill.) Family Caesalpiniaceae)**

(Dickson et al., 2007), cocluded that *Caesalpinia benthamiana* is an African tropical plant,they added that the aqueous decoction from roots has been used in traditional medicine for many purposes, especially for treatment of erectile dysfunction. (Zamblé et al.,2008) investigated the aqueous extract of *C. benthamiana* for vasorelaxing properties using isolated rat aortic rings pre-contracted by phenylephrine. They found that *C. benthamiana* roots are rich in phenolic compounds (gallic acid, resveratrol and tannins) and possess significant vasorelaxing properties. Stimulation in sexual parameters was also observed. The authors concluded that the enhanced sexual activity of male rats might be due to the vasorelaxant properties of *C. benthamiana*, which may be caused by an increase in NO production in the vascular bed and a decrease in its destruction.

***Chione venosa* Sw. (Family Rubiaceae)**

The Caribbean island of Grenada furnishes the popular aphrodisiac drug Bois Bandé, which consists of the stem bark and the roots of *C. venosa*, a native tree growing in the islands rain forest According to (Johnson, 1998). But (Lendl et al., 2005), performed a phytochemical investigation of dichloromethane and methanolic-aqueous extracts of the bark and the roots. 1D and 2D NMR analysis, UV-Vis and ESI-MS identified the structures of three acetophenone derivatives described for the first time in plants—ortho-hydroxy-acetophenone-azine, acetophenone-2-O-[β-D-apiofuranosyl-(1′6)-β-D-glucopyranoside] and acetophenone-2-O-β-D-glucopyranoside—along with five known compounds, α-morroniside, sweroside, diderroside, daucosterol and β-sitosterol. The authors concluded that *C. venosa* consists of three acetophenones, three iridoids and two well-known triterpenes. (Watcho et al., 2012) found that β-sitosterol obtained from *M. whitei* significantly increased the mount frequency, penile erection and ejaculation latency in experimental male rats. However, a further study based on pre-clinical and clinical findings for the aphrodisiac potential of other identified phytoconstituents is required to

scientifically validate the traditional claim.

***Chlorophytum borivilianum* L. (Family Liliaceae)**

Chlorophytum borivilianum family Liliaceae, known as Safed musli, is a traditional rare Indian medicinal herb widely used as aphrodisiac, which is mainly identified as herbal viagra (Singh et al., 2012). Meanwhile (Kenjale et al., 2008) investigated the aphrodisiac and spermatogenic potential of the aqueous extract of dried roots of *C. borivilianum* (CB) in rats. At 125 mg/kg, CB had a marked aphrodisiac action and increased libido, sexual vigour and sexual arousal. Similarly, at the higher dose (250 mg/kg), all parameters of sexual behaviour were enhanced but showed a saturation effect after day 14. On day 60, the sperm count increased significantly in both CB groups, 125 and 250 mg/kg, in a dose-dependent manner. The authors concluded that roots of CB can be useful in the treatment of certain forms of sexual inadequacies, such as premature ejaculation and oligospermia. In another study (Ray et al., 2014) cited that the spermatogenesis and androgenesis augmentative efficacy of hydromethanolic (40:60) extract of root of *C. borivilianum* against cyproterone acetate-induced subfertility in Wistar strain male albino rat. They assessed the reproductive deviations towards negative by screening the spermatogenic and steroidogenic biosensors. Oxidative stress profile in reproductive organs and sperm pellet were evaluated by biochemical assessment of antioxidative enzyme activities and level of end products of the lipid peroxidation. Apoptosis profile was evaluated by Western blot study, TUNEL assay and DNA fragmentation study of testicular tissues. It was found that co-administration of *C. borivilianum* root extract enhanced male reproductive potentiality and prevented the negative deviations after treatment with cyproterone acetate by means of increasing oxidative defence and maintaining homoeostasis in testicular apoptosis process.

***Cinnamomum cassia* (Family Lauraceae)**

Cinnamomum cassia (Blume), commonly known as cassia, is among the earliest, most popular spices used by mankind and is believed to arouse sexual desire. It is an important ingredient of many Ayurvedic formulations to treat male sexual disorder including erectile dysfunction (ED). (Goswami et al., 2014) published that the erectogenic and aphrodisiac activity of methanol extract of *C. cassia* bark in young male rats, evaluated *in* the *vitro* arginase inhibition potential, and IC50 was determined. *Cinnamomum cassia* extract inhibited arginase activity *in vitro* with an IC50 of 61.72 ± 2.20 µg/ml, relaxed phenylephrine pre-contracted isolated rat CCSM up to 43% and significantly increased ($p < .05$) sexual function. The extract also increased smooth muscle level and decreased collagen level in rat penile tissue. The authors concluded their studies by scientifically validating the *C. cassia* effect on increasing sexual function.

***Corchorus depressus* Linn. (Family Tiliaceae)**

Corchorus depressus (L.) Stocks (Tiliaceae) is a perennial herb found in drier parts of North India, the whole plant is used as an aphrodisiac.(Kataria et al., 2013) investigated the aphrodisiac activity in vitro of petroleum ether, chloroform, ethyl acetate, *n*-butanol and aqueous fractions of 95% methanol extract of *C. depressus* on rabbit CCSM. They further investigated the most active chloroform fraction for general mating behavior, libido and potency of normal male Wistar albino rats. The chloroform fraction of methanolic extract significantly reduced ML, IL, PEI and III and significantly increased MF, IF and EL, serum testosterone levels, erections, quick flips, long flips and total reflex. It was concluded that chloroform fraction of *C. depressus* produces a significant increase in sexual activity as exhibited by 25 mg/ml *in vitro* and 400 mg/kg in vivo.

***Crocus sativus* L. (Family Iridaceae)**

Crocus sativus L. is a perennial stemless herb (Rios et al., 1966), botanical name saffron, which belongs to the family Iridaceae and has been traditionally used as aphrodisiac. It is cultivated in some countries such as India, Greece and also in Iran (Malathi, et al., 2014). investigated the aphrodisiac activities of *C. sativus* stigma aqueous extract and its constituents, safranal and crocin in male ratsand found that 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. Sexual behaviour was monitored by investigating MF, IF, EF, ML, IL and EL. Crocin and the extract increased MF, IF and EF behaviours and reduced EL, IL and ML parameters, while safranal did not show aphrodisiac effects. The authors concluded that saffron aqueous extract and its constituent crocin possess significant aphrodisiac activity. In a pilot study (Shamsa et al., 2009), cleared that saffron showed a positive effect on sexual function with increased number and duration of erectile events seen in patients with ED even only after taking it for 10 days. However, (Safarinejad et al., 2010) investigated the *C. sativus* potential for treating erectile dysfunction in men through an open-label, randomized, fixed-dose and crossover study, but their findings do not support a beneficial effect of saffron administration in men with ED. They reported that none of the aspects of male sexual function were affected by saffron.

***Cydonia oblonga* Miller (quince) (Family Rosaceae)**

Cydonia oblonga Miller (quince) is obtained from a tree cultivated in South Africa, Central Europe and Middle East (Minaiyan,et al., 2012). While (Aslam and Sial 2014) investigated the aphrodisiac activity of the hydroalcoholic extract of the fruits of *C. oblonga* Miller (quince) in Wistar rats at doses of 500 and 800 mg/kg body weight per day as a single dose for 28 days. They observed sexual parameters such as mounting frequency, assessment of mating performance and orientation activities towards females, towards the environment and towards self. It was found that the extract significantly increased the MF, mating performance and attraction to females in comparison with non-treated rats.

***Cyperus esculentus* L. (Family Cyperaceae)**

(Prakash and Ragavan, 2009), cited that *Cyperus esculentus* L. or tiger nutsedge, also known as Bhadra musta in Sanskrit, is an annual or perennial herb that has been reported as aphrodisiac in Ayurveda. (Allouh, et al., 2015) showed that the aphrodisiac properties of *C. esculentus* in sexually active of male rats was highly active and moderately active. They administered 1 and 2 g kg^{-1} day^{-1} of *C. esculentus* to highly active rats and 2 g kg^{-1} day^{-1} to moderately active rats and assessed copulatory behavior and serum hormone levels after 30 days. The treatment reduced mount and intromission latencies in both groups, while intromission frequency and ratio were increased in moderately active rats and serum testosterone levels increased significantly in both groups. The main constituents were analysed using liquid chromatography/mass spectrometry and atomic absorption, which identified the presence of quercetin, vitamin C, vitamin E and mineral zinc in tiger nut. The authors concluded that *C. esculentus* significantly stimulated sexual motivation and improved the sexual performance of male rats.

***Dracaena arborea* Wild (Family Dracaenaceae)**

According to (Watcho, et al., 2014), *Dracaena arborea* is a traditional Cameroonian medicine used as aphrodisiac to treat sexual inadequacy and stimulate sexual vigour. (Wankeu et al., 2014) cleared the effects of aqueous and ethanolic (100 and 500 mg/kg respectively) extracts of dried root barks of *D. arborea* on the sexual behaviour in sexually experienced streptozotocin-induced type 1 diabetic rats over a period of 4 weeks, they found that both extracts significantly increased mounting frequency (MF) and intromission frequency (IF) while mounting latency (ML), intromission latency (IL) and post-ejaculatory interval (PEI) decreased. They concluded that *D. arborea* possesses aphrodisiac potential and that this effect might be due to antioxidant and androgenic properties of phenols, flavonoids, saponins and sterols. On another hand (Watcho et al., 2012) reported that flavonoids and sterols found in aqueous and ethanolic extracts of *D. arborea* roots may be responsible for the enhancement of sexual activity in rats through stimulation of dopaminergic and/or cholinergic pathways.

***Eriosema kraussianum* (Family Papilionaceae)**

(Ojewole et al., 2006), proved that traditional health practitioners of Zulu (an ethnic group of Southern Africa) have claimed that the root of *Eriosema kraussianum* N. E. Br (Papilionaceae) is an effective remedy for the treatment of erectile dysfunction and/or impotence.(Drewes et al. 2002) isolated five pyrano-isoflavones (kraussianones 1–5) from the rootstock of *E. kraussianum* and screened them for smooth muscle relaxation of rabbit penile muscle .But (Siegfried et al.,2002), cited that the most active of the compounds had an activity of 75% of that found in Viagra in the erectile dysfunction test on rabbit penile smooth muscle.

***Eurycoma longifolia* Jack (Family Simaroubaceae)**

Eurycoma longifolia Jack (EL), a herb found in South-East Asia, has been widely used in traditional medicine as aphrodisiac (Bhat and Karim, 2010). The plant belongs to the Simaroubaceae family and is known locally as Tongkat Ali in Malaysia and Indonesia (Wahab et al., 2010). While (Ang et al., 200203), reported that *E. longifolia* enhanced the sexual qualities of middle-aged male rats by decreasing their hesitation time as compared to controls.(Kotirum et al., 2015) investigated the efficacy of *E. longifolia* herbal extract on erectile function improvement through randomised controlled trials and found that the extract may have clinical effect on erectile function. However, more efficacy trials are required. (Wahab et al., 2010), published that *E. longifolia* heightens testicular functioning and inhibits the effects of an excessive oestrogenic state, therefore, *E. longifolia* can be used as a supplement for treating fertility conditions caused by testosterone deficiency or excess of oestrogen.on another study (Low, et al., 2013), investigated the effects of a standardised bioactive fraction of *E. longifolia* and its chemical constituents on male fertility and the mechanisms of action involved. The HPLC analysis revealed that 25 mg/kg of fraction 2 and 250 mg/kg of the aqueous fraction were almost similar in the concentration of eurycomanone, the major and most potent quassinoid. Fraction 2 caused a significant increase in the number of spermatocytes and round spermatids at Stage VII of the spermatogenic cycle. The estimated sperm production rate and the number of Leydig cells were also elevated. In addition, the fertility and fecundity index as well as litter sizes delivered from the females after mating with males treated with fraction 2 were increased. Likewise, the testicular testosterone concentration peaked in the animals treated with 25 mg/kg of fraction 2 compared to the relevant plasma concentration. The same was observed for the plasma LH and FSH levels. On the contrary, the plasma oestrogen levels significantly decreased under the treatment. Among the isolated quassinoids, eurycomanone and 13α (21) - dihydroeurycomanone significantly increased the testosterone secretion from *in vitro* cultured Leydig cells ($p < .05$).

***Fadogia agrestis* (Schweinf. Ex Hiern) (Family Rubiaceae)**

(Yakubu et al., 2005) investigated the aphrodisiac potential of the aqueous extract of *F. agrestis* (Rubiaceae) stem in male albino rats and screened it for its phytoconstituents, they found that all the doses resulted in significant increase in mount frequency and intromission frequency and significantly prolonged the ejaculatory latency, while mount and intromission latency was reduced. There was also a significant increase in serum testosterone concentrations in all the groups in a manner suggestive of dose dependence. Phytochemical screening revealed the presence of alkaloids and saponins while anthraquinones and flavonoids are weakly present. The aqueous extract of *F. agrestis* stem increased the blood testosterone concentrations, and this may be the mechanism responsible for its aphrodisiac effects and various masculine behaviors. In another work, (Yakubu et al., 2008)

cleared administration of aqueous extract of *F. agrestis* to male rats for 28 days resulted in a significant increase ($p < .05$) in the percentage testes–body weight ratio, testicular cholesterol, sialic acid, glycogen, acid phosphatase and gamma-glutamyl transferase activities, while a significant decrease ($p < .05$) was observed in the activities of testicular alkaline phosphatase, acid phosphatase, glutamate dehydrogenase and concentrations of protein. They concluded that the extract variously altered the testicular function indices and this may adversely affect the functional ability of the rat testes, especially at higher doses of 50 and 100 mg/kg body weight; however, the animals were able to recover from the effect of the plant extract at 18 mg/kg body weight.

***Garcinia kola* Heckel (Family Clusiaceae)**

Garcinia kola Heckel (Guttiferae) seeds (bitter kola) traditionally used in African systems of medicine are recommended as aphrodisiac, (Sewani et al., 2015), investigated the effects of 70% ethanolic extract of *G. kola* at 100, 200 and 400 mg/kg daily for 56 days in adult male Wistar rats and assessed them for sexual behavior, organ weights, sperm count, reproductive hormone levels and testicular histology. It was found that *G. kola* significantly increased the components of libido, erection, ejaculation, testicular weights and sperm count and increased serum testosterone in treated rats. They concluded that *G. kola* seed extract possesses potent aphrodisiac activity in male albino rats with resultant increase in sperm count and testosterone levels.

***Humulus lupulus* L. (Family Cannabaceae)**

Hop or hops (*Humulus lupulus*), a climbing vine belonging to the genus Humulus in the family Cannabaceae, is a very common plant, found wild or cultivated in Europe, Asia and North America. In the folk medicine, it is reported to exert an aphrodisiac effect (Koetter and Biendl, 2010). I,n addition (Zanoli et al., 2009), investigated the influence of *H. lupulus* extract on sexual behavor of both naïve and sexually potent male rats by observing sexual behaviour manifestation during the mating test, they observed and reported that in naïve rats the acute administration of *H. lupulus* extract at doses of 25 and 50 mg/kg significantly reduced the percentage of mounting and ejaculating animals.

***Kaempferia parviflora* (Family Zingiberaceae)**

Kaempferia parviflora Wall. Ex. Baker (KP), one of the plants in the Zingiberaceae family. (Weerateerangkul,et al., 2013), investigated the effects of feeding three different extracts (alcohol, hexane and water extracts) for 3–5 weeks on reproductive organs, the aphrodisiac activity, fertility, sperm motility and blood flow to the testis of male rats. They observed that among all extracts only alcohol extract significantly decreased mount and ejaculatory latencies and produced a significant increase in blood flow to the testis. They concluded that alcohol extract had an aphrodisiac activity probably via a marked increase in blood flow to the testis. A study was done by (Chaturapanich, et al., 2012) to illustrate the effects of *K. parviflora* extract (KD) and exercise training on reproductive function in male rats. It was observed that the weights of epididymis, seminal vesicles, prostate gland and levator ani muscle were significantly increased in the exercise training with the extract treated group. ML and EL were shortened, but PEL was decreased. They concluded that *K. parviflora* enhanced sexual motivation, whereas exercise training promoted both sexual motivation and performance.

***Lecaniodiscus cupanioides* (Family Sapindaceae)**

(Mikhail et al., 2013), cite that d*Lecaniodiscus cupanioides* is a tropical plant widely distributed in Africa and Asia. It belongs to the Sapindaceae family. (Nurudeen , 2012), reported that aqueous root extract of *L. cupanioides* restored the alterations in the testicular function parameters by reversing the decrease in the specific activities of acid and alkaline phosphatases, lactate dehydrogenase and gamma-glutamyl transferase and testosterone level in the testes of paroxetine-induced sexual impaired rats. (Ajiboyeet al., 2014), investigated the aphrodisiac activity of phytochemical constituents of the aqueous root extract of *L. cupanioides* Planch. Ex Bth. on male rat sexual behaviour and reproductive hormones in paroxetine-induced sexual dysfunction. It was found that alkaloids, anthraquinones, phenolics, saponins and tannins were present in the extract. *Lecaniodiscus cupanioides* significantly reversed the paroxetine-mediated alterations in MF, IF, EF, mount latency (ML), intromission latency (IL), ejaculatory latency (EL), post-ejaculatory interval (PEI), and testosterone, follicle-stimulating hormone and luteinising hormone concentrations dose dependently. The authors concluded that the aqueous root extract of *L. cupanioides* restored sexual competence in sexually impaired rats possibly by increasing sexual drive through enhanced reproductive hormone concentration, particularly testosterone, thus supporting the folkloric claim of the plant for management of sexual disorders in males.

***Monsonia angustifolia* (Family Geraniaceae)**

Monsonia angustifolia (Geraniaceae) is a medicinal plant traditionally used in South Africa to increase libido and to treat erectile dysfunction. (Fouche, et al., 2015), investigated aphrodisiac activities of the crude aqueous extracts of *M. angustifolia* (Geraniaceae) at 3, 30 and 300 mg/kg body weight and evaluated different sexual parameters during a 7-day experimental study on male rats. They found that the extract different dose significantly ($p < .05$) increased the mount frequency, intromission frequency, ejaculation frequency, ejaculation latency and serum hormone concentrations. Computed indices such as erection, quick flips, long flips and total penile reflexes were also increased. Mount latency, intromission latency and post-ejaculation interval were significantly decreased throughout the experimental period. They concluded that administration of 300 mg/kg bw of the aqueous extract produced the best effects in all parameters.

***Montanoa grandiflora* and *Montanoa frutescens* (Family**

Asteraceae)

(Rodríguez et al., 2014), published that Cihuapatli is the common name assigned to some plants of the genus Montanoa (family: Asteraceae; tribe: Heliantheae), in which *M. frutescens* and *M. grandiflora* are included. (Carro et al., 2014) investigated comparative aphrodisiac activity of *M. grandiflora* and *M. frutescens* using the fictive ejaculation model in spinal male rats. They reported that systemic administration of the aqueous crude extracts of Montanoa plants elicited significant increase in the ejaculatory capacity of spinal male rats with very robust ejaculatory motor patterns that included the expression of tonic penile erections and penile movements and the potent expulsion of urethral contents. *Montanoa frutescens* and *M. grandiflora* increased the ejaculatory potency with aphrodisiac activity similar to *M. tomentosa*.

***Montanoa tomentosa* (Family Asteraceae)**

Cihuapatli, the Mexican zoapatle (*Montanoa tomentosa*), has an extensive ethnomedical history of use as a traditional remedy for reproductive impairments. Copulatory behaviour of sexually active male rats receiving doses of 38, 75 and 150 mg/kg of the aqueous crude extract of *M. tomentosa* was assessed by (Carro et al., 2004). In addition, they evaluated the effect of the 75-mg/kg dose of the extract on males with anaesthetisation of the genital area and on sexual behaviour of sexually inactive male rats (noncopulators). The study provides evidence that the aqueous crude extract of *M. tomentosa* is a potent stimulator of sexual behaviour, particularly of sexual arousal in male rats, and that it promotes the expression of masculine sexual behaviour in previously sexually inactive animals. On these bases, this extract can be considered to possess aphrodisiac properties. On another hand, (Carro et al., 2014), found that the cihuapatli extract acts directly at the male rat spinal system in charge of the expression of the ejaculatory motor patterns; it is suggested that the aqueous crude extract exerts its aphrodisiac properties by increasing sexual potency acting as an oxytocic agent.

***Moringa oleifera* Lam. (Family Moringaceae)**

(Paliwal et al., 2011), cited that *Moringa oleifera* Lam is an important tropical crop that is used as human food, medicine and in oil production. Leaves of this plant are traditionally known for or reported to have various biological activities. (Prabsattroo et al.,2015), cleared that the effects of hydroethanolic extract *M. oleifera* on factors that play important roles in male sexual behavior, such as antioxidant effects, the suppression of monoamine and phosphodiesterase type 5 (PDE-5) activities, serum testosterone and corticosterone levels, and histomorphological changes in the testes in male rats. During 7-day treatment, the extract improved sexual performance in stress-exposed rats by decreasing IL and increasing IF, suppressing PDE-5 activity, decreasing serum corticosterone level, but increasing serum testosterone and numbers of interstitial Leydig cells and spermatozoa. The authors concluded that the increased sexual performance during the intromission phase may be due to the suppression of MAO-B and PDE-5 activities and increased testosterone; possibly, this is due to the effect of antioxidant phytoconstituents of the extract.

***Musa paradisiaca* L. (Family Musaceae)**

Musa paradisiaca (family Musaceae), also known as plantain, is a tropical plant native to India. The fruit has been reportedly used as aphrodisiac by (Onyenekwe et al.,2013).Meanwhile (Yakubu et al., 2013), investigated the effect of oral administration of the aqueous extract of M. paradisiaca root on the testicular function parameters of male rat testes. They observed that the extract significantly increased ($p < .05$) the testes–body weight ratio, total protein, sialic acid, glycogen, cholesterol, activities of alkaline phosphatase, γ-glutamyltransferase, acid phosphatase and the concentration of testicular testosterone. In contrast, the extract decreased the concentrations of both luteinising and follicle-stimulating hormones in the serum of the animals. They concluded that the aqueous extract of *M. paradisiaca* stimulated the normal testicular functioning of the testes and exhibited both androgenic and anabolic properties.

***Myristica fragrans* Houtt. (Family Myristicaceae)**

(Tajuddin et al., 2003) referred that *Myristica fragrans* Houtt (family Myristicaceae) known as Nutmeg is an evergreen tree indigenous to India, Indonesia and Srilanka, which has been mentioned in ethnomedical literature as aphrodisiac. (Tajuddin et al., 2005), found that oral administration of the extract of nutmeg significantly increased the MF, IF and IL and caused significant reduction in the ML and PEI. They added that nutmeg extract significantly increased mounting frequency with penile anaesthetisation as well as erections, quick flips, long flips and the aggregate of penile reflexes with penile stimulation. They concluded that the aphrodisiac activity of nutmeg might be attributed to its nervous stimulating property.

(*Panax quinquefolius*) and (*Panax ginseng*), Ginseng

Ginseng has been used in traditional Chinese medicine for centuries., there are many types of this herb, but the most popular are American ginseng (*Panax quinquefolius*) and Asian ginseng (*Panax ginseng*).American and Asian ginseng vary in their concentration of active compounds and effects on the body, it is believed that American ginseng works as a relaxing agent, whereas the Asian variety has an invigorating effect. Ginseng contains two significant compounds, ginsenosides and gintonin, these compounds complement one another to provide health benefits, this herb can stimulate the human sex drive in terms of increasing male and female sexual arousal, (Bella and Shamloul, 2014). One in vivo study revealed that ginseng can improve sperm kinematic values compared with an immobilization control group. It can attenuate altered expression levels of spermatogenesis-related proteins such as nectin-2, cAMP responsive element binding protein-1, inhibin-α, and sex hormone receptors in the testes, (Lee et al., 2019). A clinical study of 45 men who

had moderate to severe erectile dysfunction found that three daily doses of 900 mg Korean ginseng for 8 weeks resulted in a significant improvement in erectile performance and sexual satisfaction scores, (Hong et al., 2006).

***Pedalium murex* Linn. (Family Pedaliaceae)**

(Rajashekar et al., 2012), reported that *Pedalium murex* (*P. murex*) Linn (family Pedaliaceae) is an annual herb which grows abundantly on the sea costs in South India, Srilanka, Ceylon, Mexico and tropical Africa. (Sharma et al., 2012) investigated the effects of *P. murex* fruit extract on sexual behaviour and testosterone level of male rats during and past withdrawal of treatment. They observed that ethanolic extract significantly reduced the ML, IL, EL and PEjI ($p < .05$). There was a significant increase in the PEI, MF and IF and serum testosterone level ($p < .05$). It was concluded that ethanolic extract produced a significant effect on sexual behavior and serum testosterone level past withdrawal of the treatment. *In vitro* nitric oxide release was significantly higher in the extract.

***Phoenix dactylifera* Linn (Family Arecaceae)**

Date palm pollen (DPP) is used in the traditional medicine for male infertility (Vayalil, 2012). Recent studies reported that DPP could ameliorate the deleterious effects of cadmium and cyclophosphamide on reproductive toxicity by (El-Neweshy et al., 2013). The effect of *P. dactylifera p*ollen on sperm parameters and reproductive system of adult male rats was studied by (Bahmanpour et al.,2006), and the results indicated that the consumption of DPP suspensions improved sperm count, motility, morphology and DNA quality with a concomitant increase in the weights of testis and epididymis. Date palm contains oestradiol and flavonoid components which have positive effects on the sperm quality. Date palm pollen suspension seems to improve sperm quality and enhance fertility in male adult rats. In another work (Mehraban et al., 2014) observed that suspension of DPP in distilled water increased fertility parameters such as sperm count and motility, LH, testosterone and oestradiol levels, and diameter of seminiferous tubules in the treated rats. Hassan, El-kashlan et al., (2012), also reported that co-administration of DPP suspension with cadmium chloride in adult male rats resulted in a protective effect against testicular dysfunction induced by Cd. DPP has modulating effects on Cd-induced testicular dysfunction through normalisation of the serum testosterone level and increases serum oestradiol level and sperm characteristics. DPP also protected rat testicular tissue via suppressing testicular histopathological abnormalities and modulating DNA damage. Therefore, it may be useful to solve infertility problems.

***Ruta chalepensis* L. (Family Rutaceae)**

Ruta chalepensis belongs to the Rutaceae family and has been scientifically known for its spermotrophic action. Phytochemical investigations of *R. chalepensis* have shown that the leaves and young stems of the plant are a rich source of several alkaloids, coumarins, flavonoids, phenols, amino acids, furocoumarins, sterols and/or triterpenes and saponins by (Lourdes et al., 2011). But (Qarawi,2005), reported that *R. chalepensis* increased sperm count, motility and living per cent and decreased sperm abnormalities; testosterone and FSH levels were significantly increased in male rats. (Al-Said et al., 1990), added that the stimulatory effects of *R. chalepensis* are mediated through a pituitary-testicle axis participating in the physiological events of spermatogenesis. Aerial parts of *R. chalepensis* showed the presence of alkaloids, flavonoids, coumarins, tannins, volatile oil, sterols and/or triterpenes.

***Satureja khuzestanica* (Family Lamiaceae)**

Satureja khuzestanica Jamzad (Marzeh khuzestani in Persian, family of Lamiaceae, subfamily of Nepetoidae) is an endemic plant that is widely distributed in the southern parts of Iran (Vosough et al., 2010).While (Haeri, Minaie et al., 2006), reported that *S. khuzestanica* essential oil significantly improved fertility in male rats as observed by increase in potency, fecundity, fertility index, litter size, concentrations of FSH and testosterone, weights of testes, seminal vesicles and ventral prostate weights. Histopathological observations found that the number of spermatogonia, spermatid cords, Leydig cells and spermatozoids was increased in the treated groups. (Safarnavadeh and Rastegarpanah 2011), reported that *S. khuzestanica* possesses significant antioxidative potential due to which it may improve either sperm quality or pregnancy rate; pre-clinical and clinical findings also recommend its effectiveness for the improvement of infertility.

***Turnera diffusa* (Family Turneraceae)**

Turnera diffusa Wild, commonly known as Damiana de California, is widely recognized as an aphrodisiac in Latin America and has been used for centuries as traditional medicine to stimulate male sexual drive and performance. (Estrada et al., 2009), illustrated that the potential of *T. diffusa* to recover sexual behaviour in sexually exhausted (SExh) male rats. *Turnera diffusa* (80 mg/kg) significantly increased the percentage of males achieving one ejaculatory series and resuming a second one and also reduced the post-ejaculatory interval. On another hand (Estrada et al., 2013), investigated the involvement of NO pathway in increased sexual motivation and the augmented sexual performance of sexually sluggish (SL) male rats treated with aqueous extract of *T. diffusa*. They observed that *T. diffusa* (10 mg/kg) facilitated expression of male sexual behaviour by shortening mainly ejaculation latency, number of discharges in the ejaculatory motor pattern and number of ejaculatory motor patterns and its associated penile erections. They concluded that pro-sexual effect of the aqueous extract of *T. diffusa* in rats involves the participation of NO pathway, mainly at central level.

Medicinal plants effective on erectile dysfunction:

C. sativus:

C. sativus is a flowering plant in the Iridaceae family and is commonly known as saffron, C. sativus is a perennial herb cultivated in several countries of mild and dry climate, such

as Iran, India, Greece, Morocco, Spain, Italy, Turkey, Pakistan, Azerbaijan, China, and Egypt, its extract effect was investigated on fluoxetine-induced sexual impairment in depressed men under treatment with fluoxetine, that study demonstrated that use of 15 mg *C. sativus* twice a day caused improvement of erectile dysfunction in these men, Emad et al., 2018). In patients with diabetes, the local application of *C. sativus* gel leads to treatment of erectile dysfunction,. A study was done by (Shamsa et al., 2009), reported that treatment with 200 mg of *C. sativus* a day improved tip rigidity and tip tumescence as well as base rigidity and base tumescence in studied people.

Zingiber officinalis:

Ginger (*Zingiber officinale* Roscoe) is a common and widely used spice. It is rich in various chemical constituents, including phenolic compounds, terpenes, polysaccharides, lipids, organic acids, and raw fibers. *Z. officialis* belongs to the Zingiberaceae family plant has certain uses in traditional medicine and food industries, the extract of *Z. officialis* root can improve erectile dysfunction in studied samples through specifying human platelet cAMP and cyclic guanosine monophosphate phosphodiesterase (cGMP) inhibitory activity, (Solati et al., 2018). They added that *Peganum harmala* is a perennial, herbaceous plant, with a woody underground root-stock, of the family Nitrariaceae, usually growing in saline soils in temperate desert and Mediterranean regions. Peganum harmala, commonly called wild rue, Syrian rue, African rue, esfand or harmel, *P. harmala* is a plant that mostly occurs in tropical regions; the study demonstrated that *P. harmala* extract displayed a more potent cGNIP-PDEI activity than sildenafil and therefore treated erectile dysfunction.

Conclusion

From the researcher's point of view, the usage of herbal remedies in managing male sexual disorders is useful because of long cultural history of utilization and the current renewed interest in natural products to sustain health globally. As a way recognizing the values and roles of traditional medical knowledge in health care provision, further research into the efficacy and safety of herbal remedies in male sexual disorders is precious in wold. More so, the establishment of rapport between relevant government department in Ministry of Health, modern health workers through collaborative and networking ventures with traditional healers under close supervision and monitoring of herbal treatments is noble, traditional medicine, several medicinal plants are used to treat some sex disorders such as HSDD, erectile dysfunction, and premature ejaculation. Although information about how it is that medicinal plants do affect these disorders is inadequate and ambiguous aspects of their effects have not yet been satisfactorily investigated, the medicinal plants and their derivatives can help to improve these disorders in human through several mechanisms such as affecting the cerebral neurotransmitters and sex cells, increasing physical strength, causing hormonal changes, and affecting neurons and certain parts of the brain.

However, it should be constantly taken into account that associated and underlying factors for sex disorders medicinal plants play important role in developing such disorders, and therefore therapeutic strategies should incorporate physical, psychological, and social aspects.

References:

1. Ajiboye, T. O., Nurudeen, Q. O. and Yakubu, M. T. (2014). Aphrodisiac effect of aqueous root extract of Lecaniodiscus cupanioides in sexually impaired rats. Journal of Basic and Clinical Physiology and Pharmacology, 25, 241– 248.
2. Allouh, M. Z., Daradka, H. M. and Ghaida, J. H. (2015). Influence of Cyperus esculentus tubers (Tiger Nut) on male rat copulatory behavior. BMC Complementary and Alternative Medicine, 15, 331.
3. Al-Said, M. S., Tariq, M., al-Yahya, M. A., Rafatullah, S., Ginnawi, O. T. and Ageel, A. M. (1990). Studies on Ruta chalepensis, an ancient medicinal herb still used in traditional medicine. Journal of Ethnopharmacology, 28, 305– 312.
4. Ang, H. H., Ngai, T. H. and Tan, T. H. (2003). Effects of Eurycoma longifolia Jack on sexual qualities in middle aged male rats. Phytomedicine, 10, 590– 593.
5. Annalakshmi, R., Uma, R., Subash Chandran, G. and Muneeswaran, A. A. (2012). Treasure of medicinal herb - Anacyclus pyrethrum. A review. Indian Journal of Drugs and Diseases, 3, 59– 67
6. Arambewela, L. S. R. and Arawwawala, L. D. A. M. (2010). Standardization of Alpinia calcarata Roscoe rhizomes. Pharmacognosy Research, 2, 285– 288.
7. Aslam, M. and Sial, A. A. (2014). Effect of hydroalcoholic extract of Cydonia oblonga Miller (Quince) on sexual behaviour of Wistar rats. Advances in Pharmacological Sciences. 2014, 1– 6
8. Bahmanpour, S., Talaei, T., Vojdani, Z., Panjehshahin, M. R., Poostpasand, A., Zareei, S. and Ghaeminia, M. (2006). Effect of Phoenix dactylifera pollen on sperm parameters and reproductive system of adult male rats. Iranian Journal of Medical Sciences, 31, 208– 212.
9. Bansode, F. W., Arya, K. R., Singh, R. K. and Narender, T. (2015). Dose-dependent effects of Asparagus adscendens root (AARR) extract on the anabolic, reproductive, and sexual behavioral activity in rats. Pharmaceutical Biology, 53, 192– 200.
10. Bella and Shamloul, 2014. Traditional Plant Aphrodisiacs and Male Sexual Dysfunction .Phototherapy Research, vol; 28, 831-835
11. Bhat, R. and Karim, A. A. (2010). Tongkat Ali (Eurycoma longifolia Jack): A review on its ethnobotany and pharmacological importance. Fitoterapia, 81, 669– 679.
12. Carro-Juárez, M., Cervantes, E., Cervantes-Méndez, M. and Rodríguez-Manzo, G. (2004). Aphrodisiac properties of Montanoa tomentosa aqueous crude extract in male rats. Pharmacology, Biochemistry and Behavior, 78, 129– 134.

13. Carro-Juárez, M., Franco, M. Á. and Rodríguez-Peña Mde, L. (2014). Increase of the ejaculatory potency by thesystemic administration of aqueous crude extracts of cihuapatli (Montanoa genus) plants in spinal male rats. Journal of Evidence-Based Complementary & Alternative Medicine, 19, 43– 50.
14. Chan, Y. S., Cheng, L. N., Wu, J. H., Chan, E., Kwan, Y. W., Lee, S. M., Chan, S. W. (2011). A review of the pharmacological effects of Arctium lappa (burdock). Inflammopharmacology, 19, 245– 254.
15. Chaturapanich, G., Chaiyakul, S., Verawatnapakul, V., Yimlamai, T. and Pholpramool, C. (2012). Enhancement of aphrodisiac activity in male rats by ethanol extract of Kaempferia parviflora and exercise training. Andrologia, 44, 323– 328.
16. Dickson, R. A., Houghton, P. J. and Hylands, P. J. (2007). Antibacterial and antioxidant cassane diterpenoids from Caesalpinian benthamiana. Phytochemistry, 68, 1436– 1441.
17. Drewes, S. E., Horn, M. M., Munro, O. Q., Dhlamini, J. T., Meyer, J. J. and Rakuambo, N. C. (2002). Pyrano-isoflavones with erectile-dysfunction activity from Eriosema kraussianum. Phytochemistry, 59, 739– 747.
18. El-Neweshy, M. S., El-Maddawy, Z. K. and El-Sayed, Y. S. (2013). Therapeutic effects of date palm (Phoenix dactylifera L.) pollen extract on cadmium-induced testicular toxicity. Andrologia, 45, 369– 378.
19. Emad E.K. Ali, Tarek A Sayed Rageh, Ahmed A., A. Abdel Mageed, Doaa A Sayed Mahdy. (2018). Erectile dysfunction in cerebrovascular stroke patients. Journal of Current Medical Research and Practice, Volume 3, Issue 3 [p. 127-129.
20. Estrada-Reyes, R., Ortiz-López, P., Gutiérrez-Ortíz, J. and Martínez-Mota, L. (2013). Turnera diffusa Wild (Turneraceae) recovers sexual behavior in sexually exhausted males. Journal of Ethnopharmacology, 123, 423– 429.
21. Fouche, G., Afolayan, A. J., Wintola, O. A., Khorombi, T. E. and Senabe, J. (2015). Effect of the aqueous extract of the aerial parts of Monsonia angustifolia E. Mey. Ex Rich., on the sexual behaviour of male Wistar rats. BMC Complementary and Alternative Medicine, 15, 343.
22. Goswami, S. K., Inamdar, M. N., Jamwal, R. and Dethe, S. (2014). Effect of Cinnamomum cassia methanol extract and sildenafil on arginase and sexual function of young male Wistar rats. The Journal of Sexual Medicine, 11, 1475– 1483.
23. Goswami, S. K., Inamdar, M. N., Pandre, M. K., Jamwal, R. and Dethe, S. (2013). Erectogenic and aphrodisiac effects of Butea frondosa Koenig ex Roxb. in Rats: Involvement of enzyme inhibition. Evidence-Based Complementary and Alternative Medicine, 2013, 1– 10.
24. Haeri, S., Minaie, B., Amin, G. and Nikfar, S. (2006). Effect of Satureja khuzestanica essential oil on male rat fertility. Fitoterapia, 77, 495– 499.
25. Hassan, W. A., El-kashlan, A. M. and Ehssan, N. A. (2012). Egyptian date palm pollen ameliorates testicular dysfunction induced by cadmium chloride in adult male rats.J. American Scientist, 8, 659– 669.
26. Hong S.G., Kang H.L., Jangyul K. and Kyung S. B. (2006). Diversity of Yeasts associated with Panax ginseng. Journal of Microbiology, vol. 44, p. 674- 679
27. Iamsaard, S., Prabsattroo, T., Sukhorum, W., Muchimapura, S., Srisaard, P., Uabundit, N., Wattanathorn, J. (2013). Anethum graveolens Linn. (dill) extract enhances the mounting frequency and level of testicular tyrosine protein phosphorylation in rats. Journal of Zhejiang University Science B, 14, 247– 252.
28. Jana, S. and Shekhawat, G. S. (2010). Anethum graveolens: An Indian traditional medicinal herb and spice. Pharmacognosy Reviews, 4, 179– 184.
29. Jawhari FZ, el Moussaoui A, Bourhia M, Imtara H, Mechchate H, Es-Safi I, et al. Anacyclus pyrethrum (L): Chemical Composition, Analgesic, Anti-Inflammatory, and Wound Healing Properties. Molecules [Internet]. 2020 Nov 23 [cited 2022 Feb 24];25(22):5469.
30. JianFeng, C., PengYing, Z., ChengWei, X., TaoTao, H., YunGui, B. and KaoShan, C. (2012). Effect of aqueous extract of Arctium lappa L. (burdock) roots on the sexual behavior of male rats. BMC Complementary and Alternative Medicine, 12, 8.
31. Johnson, T. (1998). CRC ethnobotany desk reference (p. 196). New York: CRC Press.
32. Kataria, S., Rao, S. K., Bhandari, A. and Kaur, D. (2013). Pharmacognostical standardization of Corchorus depressus (L.) Stocks (Tiliaceae) - A promising ethnomedicinal plant. Indian Journal of Traditional Knowledge, 12, 489– 497.
33. Kenjale, R., Shah, R. and Sathaye, S. (2008). Effects of Chlorophytum borivilianum on sexual behaviour and sperm count in male rats. Phytotherapy Research, 22, 796– 801.
34. Koetter, U. and Biendl, M. (2010). Hops (Humulus lupulus): A review of its historic and medicinal uses. HerbalGram, 87, 44– 57.
35. Kotirum, S. Ismail, S. B., and Chaiyakunapruk, N. (2015). Efficacy of Tongkat Ali (Eurycoma longifolia) on erectile function improvement: Systematic review and meta-analysis of randomized controlled trials. Complementary Therapies in Medicine, 23, 693– 698.
36. Lee J, Kyoung S. P., Ik-Hyun C., (2019). Panax ginseng: a candidate herbal medicine for autoimmune disease. Journal of Ginseng Research, vol, 43, pp 342-348.
37. Lee,K.H. Choi, K.M. Cha, S.-Y. Hwang, U.-K. Park, M.-S. Jeong, J.-Y. Hong, C.-K. Han, G. In, S.R. Kopalli, l. (2019). Protective effects of Korean Red Ginseng against sub-acute immobilization stress-induced testicular damage in experimental rats. J Ginseng Res, 43, pp. 125-134
38. Lendl, A., Werner, I., Glasl, S., Kletter, C., Mucaji, P., Presser, A., Taylor, D. W. (2005). Phenolic and terpenoid compounds from Chione venosa (sw.) urban var. venosa (Bois Bandé). Phytochemistry, 66, 2381– 2387.
39. Lourdes, C. H., Dieter, M., Marco Antonio, J. O. and José, F. C. P. C. (2011). Effects of the chronic ingestion

of an infusion of Ruta chalepensis on the vasomotor responses of rat aortic rings. Bole tín Latinoamericano y del Caribe de Plantas Medicinales y Aromáticas, 10, 414– 422.
40. Low, B. S., Das, P. K. and Chan, K. L. (2013). Standardized quassinoid-rich Eurycoma longifolia extract improved spermatogenesis and fertility in male rats via the hypothalamic-pituitary-gonadal axis. Journal of Ethnopharmacology, 145, 706– 714.
41. Malathi, M., Ramya Devi, D. and Vedha Hari, B. N. (2014). Crocus sativus Linn - A potential source for diverse therapeutic applications. International Journal of Pharma Research, 26, 299– 305.
42. Mehraban, F., Jafari, M., Akbartabar, M. T., Sadeghi, H., Joodi, B., Mostafazade, M. and Sadeghi, H. (2014). Effects of date palm pollen (Phoenix dactylifera L.) and Astragalus ovinus on sperm parameters and sex hormones in adult male rats. International Journal of Reproductive BioMedicine, 12, 705– 712.
43. Mikhail, O. N., Taoheed, A. A. and Musbau, A. A. (2013). Phytochemical Analysis and Antimalarial Activity Aqueous Extract of Lecaniodiscus cupanioides Root. Journal of Tropical Medicine, 2013, 1– 4.
44. Minaiyan, M., Ghannadi, A., Etemad, M. and Mahzouni, P. (2012). A study of the effects of Cydonia oblonga Miller (Quince) on TNBS-induced ulcerative colitis in rats. Research in Pharmaceutical Sciences, 7, 103– 110.
45. Nurudeen, Q. O. (2012). Aqueous root extract of Lecaniodiscus cupanioides restores the alterations in testicular parameters of sexually impaired male rats. Asian Pacific Journal of Reproduction, 2, 120– 124.
46. Ojewole, J. A., Drewes, S. E. and Khan, F. (2006). Vasodilatory and hypoglycaemic effects of two pyrano-isoflavone extractives from Eriosema kraussianum N.E.Br. [Fabaceae] rootstock in experimental rat models. Phytochemistry, 67, 610– 617.
47. Onyenekwe, P. C., Okereke, O. E. and Owolewa, S. O. (2013). Phytochemical screening and effect of Musa paradisiaca stem extrude on rat haematological parameters. Current Research Journal of Biological Sciences, 5, 26– 29.
48. Paliwal, R., Sharma, V., Pracheta, S. S., Yadav, S. and Sharma, S. (2011). Anti-nephrotoxic effect of administration of Moringa oleifera Lam in amelioration of DMBA-induced renal carcinogenesis in Swiss albino mice. Biology and Medicine, 3, 27– 35.
49. Panda, S. K., Das, D. and Tripathy, N. K. (2011). Botanical studies of plants sold in market as 'Safed Musli'. International Journal of Pharma Research and Development, 3, 1– 18.
50. Prabsattroo, T., Wattanathorn, J., Iamsaard, S., Somsapt, P., Sritragool, O., Thukhummee, W. and Muchimapura, S. (2015). Moringa oleifera extract enhances sexual performance in stressed rats. Journal of Zhejiang University Science B, 16, 179– 190.
51. Prakash, N. and Ragavan, B. (2009). Phytochemical observation and antibacterial activity of Cyperus esculentus L. Ancient Science of Life, 28, 16– 20.
52. Qarawi, A. A. A. (2005). Stimulatory effect of the aqueous extract of Ruta chalepensis on the sex organs and hormones of male rats. Journal of Applied Research, 5, 206– 211.
53. Rajashekar, V., Upender Rao, E. and Srinivas, P. (2012). Biological activities and medicinal properties of Gokhru (Pedalium murex L.). Asian Pacific Journal of Tropical Biomedicine, 2, 581– 585.
54. Ramachandran, S., Sridhar, Y., Sam, S. K. G., Saravanan, M., Leonard, J. T., Anbalagan, N. and Sridhar, S. K. (2004). Aphrodisiac activity of Butea frondosa Koen. ex Roxb. extract in male rats. Phytomedicine, 11, 165– 168.
55. Rani, S., Kaushik, V., Saini, V., Nain, P. and Rani, D. (2013). Biological studies of Anacyclus pyrethrum. IAJPR, 3, 4590– 4596.
56. Ratnasooriya, W. D. and Jayakody, J. R. (2006). Effects of aqueous extract of Alpinia calcarata rhizomes on reproductive competence of male rats. Acta Biologica Hungarica, 57, 23– 35.
57. Rios, J. L., Recio, M. C., Giner, R. M. and Mhnez, S. (1966). An update review of saffron and its active constituents. Phytotherapy Research, 10, 189– 193.
58. Safarinejad, M. R., Shafiei, N. and Safarinejad, S. (2010). An open label, randomized, fixed-dose, crossover study comparing efficacy and safety of sildenafil citrate andsaffron (Crocus sativus Linn.) for treating erectile dysfunction in men naïve to treatment. International Journal of Impotence Research, 22, 240– 250.
59. Sewani-Rusike, C. R., Ralebona, N. and Nkeh-Chungag, B. N. (2015). Dose- and time-dependent effects of Garcinia kola seed extract on sexual behaviour and reproductive parameters in male Wistar rats. Andrologia, 48, 300– 307.
60. Shamsa, A., Hosseinzadeh, H. Molaei, M., Shakeri, M. T., and Rajabi, O. (2009). Evaluation of Crocus sativus L. (saffron) on male erectile dysfunction: A pilot study. Phytomedicine, 16, 690– 693.
61. Sharma, V., Boonen, J., Spiegeleer, B. D. and Dixit, V. K. (2013). Androgenic and spermatogenic activity of alkylamide-rich ethanol solution extract of Anacyclus pyrethrum DC. Phytotherapy Research, 27, 99– 106.
62. Siegfried, E. D., Marion, M. H., Orde, Q. M., Jabu, T. B. D., Marion, M. J. J. and Christopher, R. N. (2002). Natural sexual stimulant. Phytochemistry, 59, 739– 747.
63. Sindhia, V. R., Bairwa, R., Tajuddin, A. S., Latif, A., Qasmi, I. A. and Amin, K. M. Y. (2010). Plant review: Butea monosperma. International Journal of Pharmaceutical and Clinical Research, 2, 90– 94.
64. Singh, D., Pokhriyal, B., Joshi, Y. M. and Kadam, V. (2012). Phytopharmacological aspects of Chlorophytum borivilianum (safed musli): A review. International Journal of Research and Pharmceutical Chemistry, 2, 853– 859.
65. Solati Dehkordi, Seyed kamal. Heidari-Soureshjani, Saeid. Luther, Tahra and Asadi-Samani, Majid. (2017). Iranian medicinal plants effective on sexual disorders.

Journal of Pharmaceutical Science and Research, 8(6). Pp.2415-2420.
66. Soman, I., Mengi, S. A. and Kasture, S. B. (2004). Effect of leaves of Butea frondosa on stress, anxiety, and cognition in rats. Pharmacology, Biochemistry and Behavior, 79, 11– 16.
67. Tajuddin, A. S., Latif, A., Qasmi, I. A. and Amin, K. M. Y. (2003). Aphrodisiac activity of 50% ethanolic extracts of Myristica fragrans Houtt. (nutmeg) and Syzygium aromaticum (L) Merr. & Perry. (Clove) in male mice: A comparative study. BMC Complementary and Alternative Medicine, 3, 6.
68. Tajuddin, A. S., Latif, A., Qasmi, I. A. and Amin, K. M. Y. (2005). An experimental study of sexual function improving effect of Myristica fragrans Houtt. (nutmeg). BMC Complementary and Alternative Medicine, 5, 1– 7.
69. Usmani A, Khushtar M, Arif M, Siddiqui MA, Sing SP, Mujahid M. Pharmacognostic and phytopharmacology study of Anacyclus pyrethrum: An insight. Journal of Applied Pharmaceutical Science. 2016 Mar 1;6(3):144-50
70. Vayalil, P. K. (2012). Date fruits (Phoenix dactylifera Linn): An emerging medicinal food. Critical Reviews in Food Science and Nutrition, 52, 249– 271.
71. Vosough-Ghanbari, S., Rahimi, R., Kharabaf, S., Zeinali, S., Mohammadirad, A., Amini, S., Abdollahi, M. (2010). Effects of Satureja khuzestanica on serum glucose, lipids and markers of oxidative stress in patients with type 2 diabetes mellitus: A double-blind randomized controlled trial. Evidence-Based Complementary and Alternative Medicine, 7, 465– 470.
72. Wahab, N. A., Mokhtar, N. M., Halim, W. N. H. A. and Das, S. (2010). The effect of Eurycoma longifolia jack on spermatogenesis in oestrogen-treated rats. Clinics, 65, 93– 98.
73. Wankeu-Nya, M., Watcho, P., Nguelefack, T., Carro-Juarez, M., Tapondjou, L. and Kamanyi, A. (2014). Effects of Dracaena arborea (Dracaenaceae) on sexual dysfunction in 4 weeks hyperglycemic male rats. Asian Pacific Journal of Tropical Medicine, 7, 609– 619.
74. Watcho, P., Modeste, W. N, Albert, K. and Carro-Juarez, M. (2014). Dracaena arborea extracts delay the pro-ejaculatory effect of dopamine and oxytocin in spinal male rats. International Journal of Impotence Research, 26, 213– 217.
75. Watcho, P., Zelefack, F., Ngouela, S., Nguelefack, T. B., Kamtchouing, P., Tsamo, E. and Kamanyi, A. (2012). Enhancement of erectile function of sexually naïve rats by ß-sitosterol and α-ß-amyrin acetate isolated from the hexane extract of Mondia whitei. Asian Pacific Journal of Tropical Biomedicine, 2, S1266– S1269.
76. Weerateerangkul, P., Surinkaew, S., Chattipakorn, S. C. and Chattipakorn, N. (2013). Effects of Kaempferia parviflora Wall. Ex. Baker on electrophysiology of the swine hearts. Indian Journal of Medical Research, 137, 156– 163.
77. Yakubu, M. T., Akanji, M. A. and Oladiji, A. T. (2008). Effects of oral administration of aqueous extract of Fadogia agrestis (Schweinf. Ex Hiern) stem on some testicular function indices of male rats. Journal of Ethnopharmacology, 115, 288– 292.
78. Yakubu, M. T., Oyeyipo, T. O., Quadri, A. L. and Akanji, M. A. (2013). Effects of aqueous extract of Musa paradisiaca root on testicular function parameters of male rats. Journal of Basic and Clinical Physiology and Pharmacology, 24, 151– 157.
79. Zamblé, A., Martin-Nizard, F., Sahpaz, S., Hennebelle, T., Staels, B., Bordet, R., Bailleul, F. (2008). Vasoactivity, antioxidant and aphrodisiac properties of Caesalpinia benthamiana roots. Journal of Ethnopharmacology, 116, 112– 119.