Aphrodisiacs agents from medicinal plants: an ethnopharmacological and phytochemical review.


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ABSTRACT

This article provides a comprehensive review of medicinal flora inhabitating throughout the world regarding their traditional usage as aphrodisiacs. Aphrodisiacs are substances that stimulate/increase sexual desire and performance.

Key words: Anticancer, Antioxidant, BHA, FRAP, Operculina turpethum

INTRODUCTION

Biodiversities of plants can be a great source of drugs. The long history of folklore medicines demonstrates the potential of plants as sources of lead compounds. Traditionally employed, indigenous plant based herbal medicines have been popular from time immemorial, and recently have commanded major attention worldwide due to their potential nutraceutical values1-4. There are numerous reports of aphrodisiac activity exhibited by plants 5-7.

Allium tuberosum Rottl. ex Spreng (Chinese chive, Liliaceae): Chinese chive is one of the daily edible green vegetables for Chinese. The scientific name is Allium tuberosum Rottl. ex Spreng (Chinese chive, Liliaceae) which is distributed all over mainland of China and used as food and in medicine. It is widely cultivated in China, the seeds have been used in traditional Chinese medicine for treating both impotence and nocturnal emissions8. Steroidal saponins, alkaloids and amides have been reported from the seeds of this plant 9-18. The n-BuOH extract of Allium tuberosum seed was evaluated on the sexual behavior of male rats. Sexually active and inactive animals showed increased and improved sexual performance, when administering Allium tuberosum seeds extract (500mg/kg body weight) for a period of 30-40 days19.

Ginseng (Panax quinquefolium and Panax ginseng) (Araliaceae). Ginseng is the root of the perennial herbs of Panax quinquefolium which grows in Unites States and Canada known as American ginseng and Panax ginseng known as Korean or Chinese ginseng, is indigenous to the mountainous forests of eastern Asia. Ginseng has been used in eastern Asia for more than 500 years as a tonic and to promote health and longevity. Traditionally, ginseng is used to improve stamina, concentration, healing process, stress resistance, vigilance and work efficiency in healthy individuals as a short term use and to improve well-being in debilitated and degenerative conditions especially those associated with old age as a long term use20. Ginseng contains a series of tetracyclic triterpenoid saponins, ginsenosides, derivatives of 20(S)-protopanaxadiol, and derivatives of 20(S)-protopanaxatriol21. Ginseng is an essential constituent in traditional medicine for the treatment of sexual impotence. This effect reflects the tonic and restorative properties of this plant. Experimental studies have indicated that ginsenosides relax rabbit corpus cavernosum and this effect is mediated by nitric oxide, released from endothelial or neural cells, account for the aphrodisiac effect of Panax ginseng22. Clinical studies showed Korean red ginseng to be effective in erectile dysfunction (changes in penile rigidity and girth, libido and patients satisfaction) in 30 patients23.

Butea frondosa Koen. ex Roxb. (Papilionaceae): Butea frondosa Roxb is a small tree which grows to a height of 12 to 15 meters. It truly stands out like a flame in the forest with its orange coloured flowers very often it has a crooked trunk and irregular branches24. The phytochemical investigation Butea frondosa leaves revealed the presence of hydrocarbons (ecicosane 22.5%), triterpenes (β-amyrin 20.5%) and sterols (campisterol 3.2%, β-sitosterol 2.4%), lauric (4.8%), myristic (3.3%), palmitic (24.9%), linoleic (36.8%) and linolenic (5.1%) acids. They are also rich in flavonoids such as vicinin II, vitexin chrysoeriol 7-O-β-D-glucuronic acid 6, 8-di-Crhamnosyl apigenin and luteolin25. Aqueous bark extract of B. frondosa at doses of 400 mg/kg body wt was investigated for the aphrodisiac activity in male rats and found to possess increased and improved sexual performance in sexually active and inactive animals when administered for a period of 21 to 28 days26.

Montanoa tomentosa Chiuapatli, the Mexican zoapatle (Montanoa tomentosa) has an extensive ethnomedical history of use as a traditional remedy for reproductive impairments. New sesquiterpene lactones27 and Tomexanthin, an oxepane diterpene28 has been reported from this plant. Volatile organic compounds have also been reported from leaves and flowers of this plant29. The aphrodisiac property of aqueous extract of M. tomentosa was reported by investigating on the expression of male rat sexual behavior in sexually experienced animals, on sexually inactive rats, i.e., noncopulators, and on animals with local anesthesia of the glans penis. The study confirmed the ability of the crude extract of the plant to enhance male sexual behavior expression in sexually active rats and to promote sexual activity in sexually inactive male animals30.

Caesalpinia benthamiana (Mezoneuron benthamianum) (Fabaceae)

C. benthamiana (Baill.) Herend. and Zarucchi (=Mezoneuron benthamianum Baill.) (Caesalpiniaceae)31. It is a tropical plant successfully used in African traditional medicine for the treatment of erectile dysfunction. Two cassane diterpenoids, benthaminin 1 and 2 were isolated and reported from this plant32. The aphrodisiac properties of this plant were evaluated by observing the sexual behaviour of male rats, on administration of aqueous extract of C. benthamiana (AECB) orally (50 mg/kg body weight) by gavage. Latent times of observation, intromission and ejaculation, mounting behaviour, number of intromissions and mating performances were evaluated. Male rats in the presence of both receptive and non-receptive females showed improved sexual performance when treated with AECB. Observation at each
experimental time in the presence of a receptive female rat exhibited that all sexual parameters were significantly enhanced compared to untreated rats. 

_Tinospora cordifolia_ (Gaerten (Trichopodaceae)).

_Tinospora cordifolia_ Gaerten Trichopodaceae, is a small glabrous herb growing in the Agasthyar hilly forests of Kerala, India. This plant is known as “Arogappacho” the greener of health, in this area and peoples use this plant as a health tonic and rejuvenator. Reports on the phytoconstituents present in this plant are not available. _Trichopodus cordifolia_ leaf (ethanol extract) when administered to male mice stimulated their sexual behavior by showing increase in number of mounts and mating performance. Oral administration of a single dose (200 mg/kg) was effective, daily administration of the extract for 6 days was found to be more effective. The pups delivered by the mice treated with the extract were found to be normal in growth, litter size and sex ratio. The water as well as n-hexane extracts of the plant leaf were found to be inactive.

_Tongkat Ali_ (Eurycoma longifolia Jack) (Simaroubaceae) 

_Eurycoma longifolia_ Jack (Tongkat Ali, Family, Simaroubaceae) has been one of the most popular tropical herbal plants, indigenous to South-East Asian countries like Malaysia, Indonesia, and Vietnam. The root extract of this plant has been used in indigenous traditional medicines for its antimarial, anti-pyretic, antilucer, cytotoxic and aphrodisiac properties. Number of chemical compounds such as canth-6-one alkaloids, -b-carbonic, alkaldoids, quassinoids, quassinoid diterpenoids, Eurycmaoise, tirucallane-type triterpenes, squalene derivatives, biphenylneolignans, eurycolactone, laurycolactone, and eurycolamalactone have been isolated and reported. The roots of this plant has been reported as a health tonic and rejuvenator. Four quassinoids diterpenoid, viz., _eurycomalide_ A, _eurycomalide_ B, 13b, 21-dihydroxyeurycomanol, and 5a, 14b, 15b-trihydroxyklaineanone have been isolated and reported from this plant.

The effects of _E. longifolia_ roots extracts (chloroform, methanol, water and butanol) were reported on the libido of sexually experienced male rats treated with various doses (200, 400 and 800 mg/kg BW, 2 times daily for 10 days). A dose-dependent increase in mounting frequency of the treated animals with 400 mg/kg of chloroform, methanol, water and butanol fractions were observed. The aphrodisiac effect of fractions of _E. longifolia_ roots (0.5 g/ kg) was reported in non-copulator male rats using an electrical cage. Male rats treated with 800 mg/kg of E. longifolia increased orientation activities towards the receptive females (anogenital sniffing, licking and mounting) accompanied with the increased genital grooming towards themselves and restricted movements to a particular area of the cage.

_Tinospora Cordifolia Miers._ (Menispermacae).

_Tinospora cordifolia_ Miers. (Menispermacae) popularly known as Amrita in Sanskrit, has been used for several centuries in Ayurvedic medicine for the treatment of various ailments. It is an important medicinal plant used in traditional system of medicine. The major phytoconstituent in _Tinospora cordifolia_ includes tinosporine, tinosporide, tinosposide, cordifoline, cordifol, heptacosanol, clerodane furano diterpenes, diterpenoid furanocloacetone, tinosporidine, and b-sitosterol. Berberine, Palmatine, Tembertarine, Magniflorine, and Tinosporin are reported from the stem. 

A new clerodane furano-diterpene has been reported from the stems of _Tinospora cordifolia_. A new daucane-type sesquiterpenoid, _Tinocordiside_, a cadinane sesquiterpene glycoside consisting of a tricyclic skeleton with a cyclobutane ring, has been isolated and reported from this plant. A new trihydroxyklaineanone has been isolated and reported from this plant.

_Crocus sativus_ Linn. (Iridaceae)

_Crocus sativus_ L. (Iridaceae) is an autumn-flowering plant extensively grown in the Mediterranean basin and Near East. The dried red stigmas of _C. sativus_, saffron has been used as a flavouring and colouring agent and is currently considered the world’s most expensive spice. Saffron consists of complex mixture of volatile and non-volatile compounds that is responsible for its overall aroma and flavour. The major components of saffron are the apocarotenoids cis- and trans-crocins, picrocrocin and its degradation product, the odour-active safranal. Aphrodisiac activities of aqueous extract of _Crocus sativus_ stigma and its constituents, safranal and crocin, has been reported in male rats when treated with 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). Crocin, at all doses, and the extract, at doses of 160 and 320 mg/kg body wt., increased Mounting frequency (MF), intromission frequency (IF), erection frequency (EF), and reduced mount latency (ML), intromission latency (IL) and ejaculation latency (EL). Safranal did not show aphrodisiac effects.

_Microdesmis keayana_ J. Leonard (Pandaceae)

_Microdesmis keayana_ (Pandaceae) is an African tropical plant, the stem bark, leaves and roots have numerous medicinal uses. Three new N1,N5,N10-tris(4-hydroxycinnamamoyl) spermidines were isolated and reported from methanolic root extract of this plant. Two new quinoline and tris(4-hydroxycinnamamoyl)pyrrole derivatives has been isolated and reported from the hydromethanolic root extract of _Microdesmis keayana_. Effects of two major alkaloids of _Microdesmis keayana_ roots, keayainine B and keayainine, on vascular parameters of erectile dysfunction has been reported. Effect of the aqueous extract and two major alkaloids of _M. keayana_ were reported to stimulate all sexual parameters in male rats’ sexual behavior.

REFERENCES
