



Ethnobotanical Survey of Medicinal Plants Used as Aphrodisiacs in Bauchi Local Government Area

S. Y. Sabo^{1*}, S. O. Otimenyin¹, M. O. Uguru¹ and B. B. Bukar¹

¹Department of Pharmacology, Faculty of Pharmaceutical Sciences, University of Jos, Plateau State, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Author SYS designed the study, wrote the protocol and wrote the first draft of the manuscript. Authors MOU and SOO managed the analysis of the study. Author BBB managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: An aphrodisiac can be defined as any type of food or drink that is capable of causing sexual desire or arousal, increase sexual potency and increase sexual pleasure. The use of synthetic aphrodisiacs results in unwanted side effects that are noxious to the patients, thus there is a growing need to look for aphrodisiacs of herbal origin with lesser side effects.

Aim: The aim of the study is to conduct an Ethnobotanical survey of medicinal plants used as aphrodisiacs in Bauchi Local Government area.

Methods: Traditional medical practitioners with expertise in management of sexual problems were interviewed using a well structured ethnobotanical questionnaire

Results: Medicinal plants such as *Waltheria indica*, *Trephrosia purpurea*, *Hygrophilla auriculata*, *Gardiera erubescense*, *Olax subscorpioidea*, *Fadogia agrestis*, *Hymenocardia acida*,

*Corresponding author: E-mail: Sysabo@gmail.com;

Borassus aethiopum, *Dichrostachys cinerea* and *Cyperus esculentus* were identified to be used singly as aphrodisiacs.

Conclusion: All plants should be investigated scientifically to substantiate the traditional claims except *Fadogia agrestis* which was pharmacologically proven to possess aphrodisiac activity.

Keywords: Medicinal plants; aphrodisiacs; aphrodisiac activity; ethno-medicine; traditional medicine; male; sexual drive.

1. INTRODUCTION

Aphrodisiac refers to any food, drink or drug that increases sexual desire or arouses sexual response [1]. The two main types of aphrodisiacs include psycho-physiological stimuli (visual, tactile, olfactory and aural) and preparations that include food, alcoholic drinks and love potions. [2]. Natural substances such as *Yohimbine*, *Mandrake* plant, ground *Rhinoceros horn* and “*Spanish fly*” have historically been used as aphrodisiacs in some parts of the world [3]. These natural substances are believed to exert their activity via increase in *serum testosterone* or a combined increases *Follicular Stimulating Hormone*, *Luteinizing Hormone* along with *testosterone*, it can also be as a result of inhibiting the hydrolyzing action of *phosphodiesterase type-5* and also can be through an increased nitric oxide synthesis [4].

Normal sexual function requires the integrity of the genitalia, the reliable coordination of blood flow, the activation of various smooth and skeletal muscles and the stimulation of local secretions [5], therefore the repeated inability of the male to perform at least effectively or a disorder that interfere with this full sexual response cycle is termed male sexual dysfunction [6]. The increased incidences of sexual dysfunction among men and high cost/side effects associated with most synthetic drugs necessitated the search for safer and cost-effective aphrodisiac agents from plant sources [4].

The aim of the study is to conduct an Ethnobotanical survey of medicinal plants used as aphrodisiacs in Bauchi Local Government Area.

2. MATERIALS AND METHODS

2.1 Study Area

The study area is Bauchi Local Government Area of Bauchi state. Bauchi state is located in the North-east geopolitical zone of Nigeria. It was

created in the 1976 and currently has about 20 local government areas.

2.2 Methods

Traditional medical practitioners with expertise in the management of sexual dysfunction were identified and their consent was sorted for on the aim of the research. Those who agreed to disclose the required information were then interviewed using a well structured ethnobotanical questionnaire. Samples of the medicinal plant obtained from the traditional medicinal practitioner at Bauchi Local Government area were authenticated by a horticulturist at Federal College of Forestry Jos, Plateau state, Nigeria, where voucher specimens were deposited.

2.3 Ethical Issues and Consent Disclaimer

A written informed consent was obtained from respondents. Ethical clearance was obtained from ethical committee of the Department of Pharmacology Faculty of Pharmaceutical Sciences University of Jos to embark on the research.

3. RESULTS AND DISCUSSION

3.1 Results

A total of 10 medicinal plants were identified during the study to be used as aphrodisiac within the local Government area. *Fadogia agrestis* has the highest frequency usage of about 22% as an aphrodisiac.

3.1.1 *Waltheria indica* Linn

Waltheria indica also known as sleepy morning belongs to the family *Sterculiaceae*; it is widely spread in West Africa. The Hausas call it *Hankufa* while the Yorubas call it *korikodi* [7].

Waltheria indica is Locally used as an anti-inflammatory agent [8], anti-diarrhea [9], anti-

malaria [10], treatment of dysentery [11], management of hemorrhoids [12] and as anti-cancers [13]. The plant is also used for the treatment of epilepsy [14], syphilis [15], infertility, bladder ailments, erectile dysfunction and impotence [16].



Fig. 1. *Waltheria indica* Linn

In traditional medicine, cold decoction was used in the treatment of many ailments: wounds, skin ulcer, rheumatism, convulsion, diarrhea and conjunctivitis. Infusion of leaves or roots were used to treat gingivitis [16], diarrhea [17] and anemia [18].

Waltheria indica contains different chemical groups including alkaloids, flavonoids, sterols, terpenes, cardiac glycosides, saponins, anthraquinones and carbohydrates [16]. Experimentally *Waltheria indica* was shown to possess Analgesic and anti-inflammatory activities [15], antidiarrheal [19], antibacterial activities [20,9], antiviral activity [21,22], moderate anti-plasmodial activity [10], anticonvulsant and sedative actions [23] and antioxidant activity [20].

3.1.2 *Hymenocardia acida* Tul.

Hymenocardia acida (Tul.) is a small browse tree or shrub with palatable foliage, widely distributed within the savanna region of Nigeria. It is called “Enache” by Idoma people of North Central Nigeria while the local or vernacular name among the Hausas in Nigeria is “Janyaro”. All

parts of the plant are useful as remedies for many ailments. The powdered roots or stem bark decoction are used to treat fever, jaundice, muscular pains, diarrhoea, dysentery and sexual incapacity in males. It is commonly used as an agent for female genital hygiene [24]. The leaf infusion is also used in the treatment of urinary tract infections [25] and as topical applications for skin diseases in Nigeria. Among the Idoma and Igede people of North Central Nigeria, the decoction of root and stem bark is used in the treatment of diabetes [26]. Experimentally the plant possess anti-tumor, anti-HIV and anti-inflammatory [25], anti-sickling [27], antiulcer [28], anti-diarrhoeal [29], antitrypanosomal [30] and antiplasmodial activities [31].



Fig. 2. *Hymenocardia acida* (Tul)

3.1.3 *Gardenia erubescens*. Stapf and Hutch

Gardenia erubescens Stapf and Hutch popularly called *Gaude* in Hausa belongs to the family Rubiaceae. It is a local medicinal plant found in northern Nigeria [32].



Fig. 3. *Gardenia erubescens*. (Stapf and Hutch)

The roots and fruits are commonly used as aphrodisiac in traditional medicine among the Hausa community [33]. Water decoction of the aerial parts of the plant is used for the treatment of gonorrhoea, abdominal disorder, loss of appetite and insomnia [34]. Experimentally methanolic extract and saponin fraction of *Gardenia erubescens* showed sedative, analgesic, hypotensive and diuretic effects *in-vivo* in rats, mice and cats [32]. The *in vitro* antitrypanosomal activity of the aqueous stem bark and ethanolic leaf extract were reported [35].

3.1.4 *Cyperus esculentus*. Var. *Sativus*

Cyperus esculentus (Tiger nuts) is an underutilized plant of the family *Cyperaceae*, which produces tubers from the base that are somewhat spherical [36]. The plant is not really a nut but a tuber first discovered some 4000 years ago [37]. *Cyperus esculentus* is known in Nigeria as aya in Hausa, ofio in Yoruba and akihausa in Igbo. *Cyperus esculentus* grows mainly in the middle belt and northern regions of Nigeria [38], where three varieties (black, brown and yellow) are cultivated [39]. Among these, only two varieties, yellow and brown are readily available in the market. The yellow variety is preferred to all other varieties because of its inherent properties like its bigger size, attractive colour and fleshier body [40]. *Cyperus esculentus* can be eaten raw, roasted, dried, baked or be made into a refreshing beverage called kuunu [41].

Cyperus esculentus is a perennial crop cultivated particularly in tropical and subtropical areas worldwide and extensively in Africa, Asia, and some European countries for their sweetish tubers. In Africa, Tigernut is mostly cultivated in the west, Ivory Coast, Ghana, Mali, Niger, Nigeria, Senegal and Togo [42].

Tigernut is known to activate blood circulation, to reduce risk of colon cancer and diabetes, and to favor weight loss [43]. Tigernut is also known to have aphrodisiac, carminative, diuretic, stimulant, and tonic effects and even some medicinal uses such as treatment of flatulence, indigestion, diarrhea, dysentery, and excessive thirst [44]. Tigernut flour is a rich source of carbohydrate, oil, and some useful mineral elements such as iron and calcium which are necessary for body growth and development [45]. Experimentally Tiger nuts (*Cyperus esculentus*) exhibited a potential hepatoprotective activity against carbon tetrachloride induced hepatotoxicity [46] and anti-diarrhoeal effect [47].



Fig. 4. Root Tuber of *Cyperus esculentus*. (Var. *Sativus*)

3.1.5 *Hygrophila auriculata*. (K. Schum). Heine

The plant *Hygrophila auriculata* (K. Schum) Heine (Acanthaceae) has been traditionally used for the treatment of inflammation, pain, urinary infection, edema, gout and as a diuretic. The plant contains saponins, alkaloids, steroids, tannins, flavonoids and triterpenoids are the main phytoconstituents [48].

A scrutiny of literature revealed some notable pharmacological effects like anti-nociceptive [49], antitumor [50], antioxidant [51], hepatoprotective [52], haematinic [53], diuretic [54], free radical scavenging [55], anthelmintic [56], anti-inflammatory and antipyretic [57] and analgesic and antimotility activities [58]. *Hygrophila auriculata* methanol extract was found to possess antibacterial activity [59].



Fig. 5. *Hygrophila auriculata*. (K. Schum. Heine)

3.1.6 *Tephrosia purpurea*. (Linn.) Pers

Tephrosia purpurea (Linn.) Pers, belongs to the family Fabaceae, subfamily Faboideae, tribe Millettieae, and it is a highly branched suberect

herbaceous perennial, up to 60 m in height with spreading branches; the leaves are narrow imparipinnate, the flowers are Lavender or purple colour in extra-axillary racemes, the pods are slightly curved, 3 – 4.5 cm long, grey, smooth and containing 5–10 seeds per pod [60].

According to Ayurveda, plant is used as, anthelmintic, alexiteric, antipyretic; alternative cures for diseases of liver, spleen, heart and blood. The plant is also used in the treatment of tumors, ulcers, leprosy, asthma, poisoning etc. According to Unani system of medicine, root is diuretic, allays thirst, enriches blood, cures diarrhea, useful in bronchitis, asthma, liver, spleen diseases, inflammations, boils and pimples; Leaves are tonic to intestines and a promising appetizer. Good in piles, syphilis and gonorrhoea [61].

Tephrosia purpurea roots has been shown to experimentally possess anti-carcinogenic and Anti-lipid Peroxidative [62], anti-Inflammatory and analgesic [63] and In-Vitro antioxidant [64] activities. The leaves were also found to possess In-Vitro Anthelmintic Activity [65], Antimicrobial Activity [66] and Anticancer Activity [67]. The whole plant was found to possess Antidiarrheal [68], the seed was also experimentally determined to possess anti-hyperglycemic and antioxidant effect [69]. The flowers also revealed Antiviral Activity [60]. nephroprotective and nephrocurative Activity of the plant was also demonstrated [70].



Fig. 6. *Tephrosia purpurea*. (Linn. Pers)

3.1.7 *Fadogia agrestis*. Schweinf

Fadogia agrestis Schweinf (Rubiaceae) also known as Black aphrodisiac (English), Baakin gagai (Hausa) is an erect shrub of 1–3 ft high. The leaves and stem are yellowish and tomentellous.

The aqueous extract of the stem consist of saponins, alkaloids, anthraquinones and flavonoids [71]. The stems of the plants are largely used in folklore medicine as aphrodisiac [72]. In the African traditional medicine, the decoction of this plant is extensively used as a febrifuge which could be associated with its use as an anti-malarial drug [73].

In vitro antiplasmodial activity has been reported for extracts from leaves collected in Burkina Faso [74]. The aphrodisiac potentials of *Fadogia agrestis* was recently proved scientifically by Yakubu et al. [71], In addition, the chloroform extract showed presence of saponins and flavanoids. In ethyl acetate extract: terpenoids was found, while methanolic extracts contain saponins, steroids, terpenoids and flavanoids. The extracts exhibited antibacterial activities [75]. The aqueous extract of *Fadogia agrestis* stem increased the blood testosterone concentrations and this may be the mechanism responsible for its aphrodisiac effects and various masculine behaviors. It may be used to modify impaired sexual functions in animals, especially those arising from hypotestosteronemia [76].



Fig. 7. *Fadogia agrestis*. (Schweinf)

3.1.8 *Borassus aethiopum*. Mart

Borassus aethiopum Mart (Arecaceae) is a tropical plant species that grows widely across Africa.

Ornamentally, the leaves of the palm have served the basketry and mat industries. The trunk has been used in constructing bridges, and telegraphic poles due to its tough and termite resistant nature [77]. The Plant: *Borassus aethiopum* mart has been described as a palm

tree with huge fan shaped leaves. The various ethnic groups in Nigeria identify this plant by different names. The Hausas call it *Giginya*, the Yorubas call it *Agbon Oludu*, the Igbos call it *Ubiri* and the Kanuri's call it as *Kemelutu*. The young germinating shoot of the plant is called *Muruchi* in Hausa is indigenous in northern Nigeria and it is seasonally in the local markets. The people both young and old consume *Muruchi* either raw or boiled as food and they claim that it enhances libido in women and has aphrodisiac properties in men [78]. Fruits and shoot of the plants are the major constituents of traditional medicine in northern Nigeria and they also provide the cheapest means of providing supplies of carbohydrates fats, protein and minerals to the people [79].



Fig. 8. Young germinating shoot *Borassus aethiopum*. (Mart)

The roots, leaves, flowers and fruits are used for multiple purposes such as nutrition agents, treatment for sexually transmitted diseases (e.g., benign herpes), cutaneous fungal infections, and viral infections particularly measles [80]. The flowers are used to treat impetigo, whereas the roots are used for asthma treatment [77]. The fruit contains sugars, pro vitamin A and vitamin C [81]. Experimental studies have revealed that the young shoot of the germinating fruit of *Borassus aethiopum* extract has an anabolic effect of androgens; thus, supporting its local use as an aphrodisiac [78]. The antipyretic activities of this plant have also been reported [82].

The anti-fungal and anti-bacterial activities of a 50:50 dichloromethane-methanol extract of the male inflorescences of *Borassus aethiopum* in mice have been reported [83].

3.1.9 *Dichrostachys cinerea* W&Arn

Dichrostachys cinerea belongs to the family of *mimosaceae* [84]. It is commonly called “*Dundu*” among the Hausa speaking people of northern

Nigeria and “*Kora*” among the Yoruba speaking people of Western Nigeria. The plant is a shrub, usually attaining a height of up to 5 – 10 m. The leaves are compound and pinnate. The inflorescence consists of a penduculate spike. The flowers have two sets of colours – pinkish white basally and yellow terminally [85].

Traditionally, the leaves are used as anti-inflammatory, in treatment of pneumonia and leprosy. Dried bark is used to treat diarrhea and postpartum pain. Root is used in the treatment of syphilis and leprosy and as an aphrodisiac [86]. Phytochemical investigation reports revealed that the bark contains α -amyrin, β -amyrin, friedelan-3- β -ol, friedelin, hentriacontan-1-ol, β -sitosterol and octacosan-1-ol (Joshi and Sharma, 1974). Presence of α -amyrin, ceryl-cerotate, friedelin, lacceric acid, pentacosyl-pentanoate, 6-hydroxy, β - sitosterol, γ -sitosterol, stigmasterol and triacontane have been reported from the heartwood [87].



Fig. 9. *Dichrostachys cinerea* (W&Arn)

The antibacterial [84], angiotensin-converting enzyme inhibition [88], antilithiatic [89], antidiarrhoeal [90], antilice [91], hypoglycaemic [92] and antioxidant activity [86], hepatoprotective [93], antiurolithiasis and diuretic activity [93] of different extracts of *Dichrostachys cinerea* have been reported.

3.1.10 *Olax subscorpioidea*. Oliv.

Olax subscorpioidea is a shrub or tree which belongs to the family of *Olacaceae*. It is widely distributed in West African countries such as Nigeria, Zaire and Senegal [94]. Due to the wide usage of the plant, it has many household names in Nigeria. It is referred to as Ifon, Aziza and

Table 1. List of medicinal plants used as aphrodisiacs in Bauchi Local Government area

| Numbers of respondents | Frequency (%) | Local name | Botanical name | Family | Type | cultivated or wild | Part used | Sources | Medicinal use | Method of preparation and use |
|------------------------|---------------|----------------------|---|---------------|-------|--------------------|-------------------------|----------------|------------------------------------|--|
| 3 | 13% | Hankufa | <i>Waltheria indica</i> linn. | sterculiaceae | shrub | wild | root | Very difficult | Aphrodisiac, increases sperm count | Boil with red potash and spices. |
| 1 | 4% | Maraguwa | <i>Trepshrosia Purpurea</i> (Linn.) Pers. | Fabaceae | shrub | wild | root | Very difficult | Aphrodisiac | Chew dry root with one cube of sugar |
| 1 | 4% | Kayar rakumi | <i>Hygrophilla auriculata</i> (Schum.) Heine. | Acanthaceae | | wild | root | easy | Aphrodisiac | Mix with spices in special soup |
| 3 | 13% | Gaude | <i>Gardiena erubescens</i> (Stapt&Hutch); G | Rubeaceae | shrub | wild | root | easy | Aphrodisiac | cold decoction with tea/Lipton ½ tea cup 3times |
| 1 | 4% | Gwano | <i>Olax subscorpioidea</i> Oliv | Olacaceae | shrub | Wild/cultivated | roots | easy | Aphrodisiac | Chew raw or powdered mixed with spices. |
| 5 | 22% | Baakin Gagai | <i>Fadogia agrestis</i> Schweinf. Ex Hiern) | Rubiaceae | shrub | wild | root | Very difficult | Aphrodisiac | Boil with lipton and take small tea cup at night Can be chewed raw with red potash or boiled with spices and taken at night |
| 2 | 9% | Jan Yaro (Jan Gagai) | <i>Hymenocardia acida</i> Tul. | Euphorbiaceae | tree | wild | root | easy | Aphrodisiac, treating Hepatitis | Chewed raw or cold/hot decoction |
| 4 | 18% | muruchi | <i>Borassus aethiopum</i> . Mart | Arecaceae | TREE | cultivated | Young germinating shoot | easy | Aphrodisiac, Food | Chewed raw |
| 1 | 4% | Dundu | <i>Dichrostachys cinerea</i> (Forssk) Chiov | Fabaceae | Shrub | wild | root | easy | Aphrodisiac | Cold decoction ½ tea cup taken daily. |
| 2 | 9% | Aya | <i>Cyperus esculentus</i> Var. <i>Sativus</i> | Cyperaceae | Grass | Cultivated/wild | Small round tuber | easy | Aphrodisiac | Chewed raw |

Gwano kurmi in the Western, Eastern and Northern part of Nigeria, respectively [95,96].

Ethnobotanical surveys have revealed that this plant is used in traditional medicine for the management of asthma [97], cancer [98], Hyerlipidaemia [99], infectious diseases, mental illnesses [95], rheumatism [100] and diabetes mellitus [98]. *Olox subscorpioidea* leaves are used as antimalaria and bark of roots is drunk to clean the belly [101]. The plant is also used as remedy for impotency [102]. The plant is often used as genital stimulants, pain killers, treatment of venereal diseases, rheumatoid arthritis, tooth aches, etc [103].



Fig. 10. *Olox subscorpioidea*. (Oliv)

Previous studies have shown that the plant displayed Antinociceptive [104], anti-ulcer [96], antimicrobial [94] and anti-protease [105] activities. Recently, The Antidepressant effects of the plant were also reported [106]. *Olox subscorpioidea* leaf possesses hypoglycaemic potential [107] and antifungal activity [108].

4. CONCLUSION

From the survey all the plants listed above have been used either as a single entity or in combination to give the desired out come. Literature review shows that *Waltheria indica*, *Hymenocardia acida*, *Gardenia erubescens*, *Cyperus esculentus*, *Fadogia agrestis*, *Dichrostachys cinerea*, *Borassus aethiopum*, and *Olox subscorpioidea* have been using traditionally for management of sexual dysfunction in males. Only *Fadogia agrestis* stem extract have been pharmacologically proven to have aphrodisiac activity. *Tephrosia purpurea* and *Hygrohila auriculata* were only mentioned just like other but have no literature back for their traditional use as aphrodisiacs.

The plants should be investigated scientifically to substantiate the traditional claims.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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