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Streblus Asper (Shakotaka): A Review on its chemical, Ethnomedicinal and pharmacological properties focused on antidepressant activity

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Abstract

This review is based on the ethanobotany, chemistry, uses and pharmacological activity basically focused to antidepressant activity of *Streblus asper* plant. It is a tree known by several common names, including Siamese rough bush, Khoi, serut, and toothbrush tree. It is a medium-sized tree native to dry region in Indonesia, Cambodia, Thailand, India, Sri Lanka, Malaysia, and Vietnam. Various parts of this plant are used in Ayurveda and other folk medicines for the treatment of different ailments such as antidepressant, filariasis, leprosy, toothache, diarrhea, dysentery and cancer. Different researches were carried out *in vitro* and *in vivo* for the biological evaluation to support most of these claims.

Keywords: *Streblus asper*, Antidepressant Activity, Ethanobotany, Biological evaluation, India

Introduction

Mental depression is a chronic condition that is emotional distresses a person's state of mind, ideas, actual health, and behavior. Combinations of biological and emotional component are related with depression. Retardation of idea, activity, and appetite are biological signs & mental indicators feature mystery, apathy and pessimism, low consisting this is certainly self-esteem of guilt, inadequacy, and ugliness, indecisiveness, and loss of inspiration [1]. World Health Report showed proof that about 450 million individuals throughout the globe suffer from mental or syndrome this is certainly behavioral. What this means is about 12.3 % of this burden that is globally of, and it may increase at 15% rate in 2020. Clients with significant condition that is depressive symptoms are mirror alterations in brain, monoamine neurotransmitters, especially norepinephrine, serotonin, dopamine. It anticipated that in 2020, after cardiovascular disease, depression may spot in the 2nd boost price that is greatest of morbidity being a socioeconomic burden. The number of medications can be obtained for treatment against despair, but, those medicines incorporate some side that are severe such as for example dry mouth, tiredness, intestinal and breathing dilemmas, anxiety, agitation, drowsiness also cardiac arrhythmias. Medicinal flowers generate the opportunity for alternate treatment plan for despair. Medications of all-natural source are believed as less dangerous and less complicated than synthetic drugs. The purpose of this research was to determine a fresh antidepressant drug from the source this is certainly natural [2].

Herbs will be the earliest cures known to mankind. Herbs have been employed by all cultures throughout history but India features among the earliest, richest & most diverse social practices being living with the usage medicinal plants. The interest in organic services and products keeps growing exponentially around the world and significant pharmaceutical companies are carrying out considerable research on plant materials due to their potential medicinal value in today's scenario. In several journals, nationwide and intercontinental, we locate a number that is increasing of journals according to organic medications. Herbs form a component that is significant of in standard medical methods such as Ayurveda, Rasa, Siddha, Unani, and Naturopathy. Ergo all pet and scientific studies which can be clinical herbs were reviewed. The data when it comes to years 1981-1983 were taken as baseline when it comes to contrast of present drug that is organic trends. The study this is certainly presents that interest has grown in organic medication study in India, which supported the findings of Adithan (1996), with maximum utilization of the strategy that is phytotherapeutic in crude plant products were utilized. The work that is optimum observed with polyherbal arrangements. Recently there has been a move in global trend from synthetic to medicine that is natural which we could say 'Back to nature'. Medicinal herbs being known for millennia and are also very esteemed all over the globe as an origin that is rich of representative for avoidance of condition and ailment. India is perhaps the producer that is biggest of medicine or herbs and it

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is rightly called the “Botanical garden of this world”. India in this regard possesses really place that is special the planet, where a quantity of recognized indigenous systems of medicine viz., Ayurveda, Siddha, Unani, Homeopathic, Yoga and Naturopathy tend to be practiced and utilized when it comes to health care for the men and women^[3].

India has a heritage this is certainly old of medicine. *Materia medica* of India provides a lot of information about the folklore practices and conventional areas of therapeutically important items that tend to be all-natural. Indian medicine that is old-fashioned predicated on different system including Ayurveda, Siddha and Unani. The assessment of these medicines is mainly according to phytochemical, pharmacological and allied approaches including various techniques being instrumental chromatography, microscopy and others. These old-fashioned systems of Indian medication have actually their particular uniqueness no doubt but there is a thread that is typical through these methods within their fundamental key and methods. The assessment associated with wealthy history of the conventional medicine is essential utilizing the promising curiosity about the world to adopt and learn the traditional system and to take advantage of their particular potentials based on different health care system. The federal government and exclusive sectors are attempting their best to explore all possibilities when it comes to assessment of those methods to bring completely healing methods obtainable in original system of medicine also to assist in producing data to put these products on national health care program^[3,4].

The World Health Organization (WHO) estimates that about 80 % associated with the populations residing in the establishing nations count virtually exclusively on old-fashioned medicine with regards to their health this is certainly primary treatment. The medicinal flowers play a major role and constitute the backbone of standard medication in most all the traditional medication. Indian material medica includes about 2000 drugs of normal beginning all most all of which derived from different system this is certainly standard folklore practices. Away from these drugs produced from conventional system, 400 tend to be of mineral source even though the sleep is of veggio source. India possesses wealthy heritage of old-fashioned medication and the wellness this is certainly conventional system specifically Ayurveda, Siddha and Unani. Lot of efforts was taken because of the federal government and personal sectors for the growth of the device this is certainly conventional on these three methods.

The utilization of medicinal plants had been created in Ayurveda, which indexed more than 8000 cures that are herbal. India is one of the world’s twelve biodiversity that is leading aided by the presence of over 45,000 various plant species. Of those, about 15,000-20,000 plants have good properties being medicinal of which only 7000-7500 are now being utilized by old-fashioned professionals. The Siddha system of medication uses around 600, Ayurveda 700, Amchi 600, Unani 700 and medicine that is modern 30 plant types. Projection is being made that next to information technology, herbal technology will be India’s biggest revenue earner.

When you look at the perspective this is certainly global there’s a change towards the usage of medicine of natural origin, since the potential risks plus the shortcoming of modern medicine have begun getting ultimately more apparent, greater part of Ayurvedic formula have decided from natural herbs. It could be the cardinal responsibility associated with the regulating authorities to make sure that the consumers have the medication, which guarantee purity,

security, effectiveness and efficacy. This responsibility is discharged by the regulating authorities by rigidity after numerous standards of quality prescribed for natural products and finished products in pharmacopoeias production that is managing by using formularies and production operation through statutory imposed “Good manufacturing practices”^[3-5].

Streblus asper

Streblus asper Lour. (Moraceae) is an ethnomedicinally essential little tree, characterized by its straggling branchlets with brief stiff hairs, elliptic-ovate to elliptic coriaceous leaves, puberulous fragrant perianth, white stamens, and ovary that is globose. This species is used into the Indian subcontinent ethnomedicinally for the treatment of different conditions, including leprosy, piles, diarrhea, dysentery, and elephantiasis^[6]. In Bangladesh, the Marma tribe this is certainly cultural the liquid of origins of *S. asper* to treat irregular menstruation and market delayed menstruation^[7]. A decoction of bark and seeds of *S. asper* can be used for the treatment of diarrhea and dysentery by the tribal healers of hilly districts of Bangladesh^[8], while aqueous leaf this is certainly removed is applied to treat diabetes^[9].

Various chemical classes of compounds have been isolated from roots of *S. asper*, e.g., cardiac glycosides, β -sitosterol, lupanol, and vijaloside^[10]. Recently, seven compounds viz. trans-streblusol A, erythro-streblusol B, threo-streblusol B, R-streblusol C, streblusquinone, streblusol D, and streblusol E have been isolated from the stem bark of *S. asper*^[11]. The acid-base fractions of *S. asper* were studied for antibacterial, antioxidant, anti-acetylcholinesterase, and tasks which are neuroprotective^[12]. The species has additionally been examined for its results which are anti-cancer^[13], anti-inflammatory tasks^[14], and antidiarrheal effects^[15]. Earlier studies depict that petroleum ether ethanol and herb extract associated with the stem bark^[16], and methanol herb of root^[17] of *S. asper* have been examined with regards to their anti-diabetic impact. Nevertheless, no report this is certainly scientific open to support the standard utilization of this species, i.e., usage of aqueous herb of stem bark and leaves of *S. asper* to treat diabetic issues in Bangladesh. The methanol extract of stem bark and leaves have not been investigated also so far. Therefore, in our study that is present measure the antidiabetic and antioxidant properties of aqueous extract and methanol herb of stem bark and leaves of *S. asper*. Despite ethno medicinal utilizes of different preparations of *S. asper* are administered in Bangladesh, hardly any is known about its toxicity. Prolonged and safe utilization of the standard natural products will not always guarantee the preparation as safe; consequently, testing on its poisoning is needed to conquer the short- or long-lasting effect that is poisonous person health. Therefore, inside our study, we additionally mainly gauge the cytotoxicity regarding the extracts of *S. asper* utilizing Brine Shrimp lethality assay. This research will notably subscribe to developing the plant as alternate resource that is medicinal Bangladesh, where affording traditional modern-day medicine is farfetched for many of the residents as a result of impoverishment.

Ethno Medicinal/Traditional Uses

Streblus asper is a really known plant this is certainly ethnomedicinal is also used in Ayurveda. It’s used in the Indian folk that is standard can also be really documented. Table 1 provides different traditional utilizes of different

components of this species additionally the sourced elements of information.

Phytochemistry

Streblus asper is a source that is wealthy of glycosides. Reichstein and co-workers have actually isolated a lot more than 20 glycosides being cardiac the root bark of *S. asper* and could actually structurally characterize 15 such substances, primarily as a result of the use of degradative techniques, namely kamloside, asperoside, strebloside, indroside, cannodimemoside, strophalloside, strophanolloside, 16-O-acetylglucogitomethoside, glucogitodimethoside, glucokamloside, sarmethoside and glucostrebloside. One other glycoside reported from the origins include b-sitosterol-3-O-b-d-arabinofuranosyl-O-a-l-rhamnopyranosyl-O-b-d-glucopyranoside, lupanol-3-O-b-d-glucopyranosyl-[1-5]-O-b-d-xylofuranoside and vijalloside, in other words. periplogenin-3-O-b-d-glucopyranosyl-[1-5]-O-b-d-xylopyranoside. From the stem bark for this plant, a-amyrin acetate, lupeol acetate, b-sitosterol, a-amyrin, diol and lupeol, strebloside and mansonin have now been separated. A glycoside that is pregnane sioraside has also been separated. N-Triacontane,

tetraiacontan-3-one, b-sitosterol, stigmasterol, betulin and acid that is oleanolic identified from the aerial parts. A cardenolide that is unidentified, b-sitosterol, a-amyrin and lupeol were separated from root bark and leaves. Figure 2 provides frameworks of a few substances which can be biologically active being separated from *S. asper*. The volatile oil from fresh leaves of *S. asper* was acquired in 0.005 per cent yield as being a liquid that is brown. The most important constituents are regarding the oil this is certainly volatile phytol (45.1%), a-farnesene (6.4%), trans-farnesyl acetate (5.8%), caryophyllene (4.9%) and trans-trans-a-farnesene (2.0%). One other constituent were a-copaene, b-elemene, caryophyllene, geranyl acetone, germacrene, d-cadinene, caryophyllene oxide and 8-heptadecene^[7, 18].

Pharmacological activities^[7]

Several workers have reported the different biological activities of *S. asper* in various *in-vivo* test models. Different parts of this plant have been found to exhibit cardiotoxic, antifilarial, and anticancer, antimicrobial, anti-allergic and antimalarial activities. The antidepressant activity is discussed below.

Table 1: Ethnomedicinal uses of different parts of *S. Asper*

S. No.	Plant part	Traditional uses
1	Leaves	Eye complaints, antidepressant activity
2	Fruit	Eye complaints
3	Seeds	Epistaxis and diarrhea
4	Stem bark	Fever, dysentery, diarrhea, stomachache, decoction effective against lymphedema
5	Stem	Toothache
6	Root	Ulcers and sinuses
7	Juice/latex	Antiseptic, astringent

Antidepressant Activity of *Streblus Asper* L.

The leaf extract was reported to contain chemical constituents such alkaloids, flavonoids, tannins, terpenes, saponins, anthraquinones, reducing sugars, and cardiac glycosides. Photochemical constituents such as flavonoids have been implicated in antidepressant action on the CNS, while polyphenols especially flavonoids like quercetin and rutin have also been reported to exhibit antidepressant effect. Different types of neuroactive steroids were found to be ligands for the GABA receptors in the central nervous system; which indicates that they act as a benzodiazepine like molecules. In the leaves of *Strebulus asper* L. fatty acids, phytosterol, triterpenoids, sugar, acid, aldehyde, diterpene, terpene, carboxylic compounds, acid and sugar are present. Topmost abundant compounds are α -D-glucopyranoside (10.60%), glycerol (7.96%), myo-inositol (4.90%), and butanedioic acid (3.30%). Hexane consists of the higher amount of hexadecanoic acid (18.07%), octadecanoic acid (7.39%), β -sitosterol (4.50%), and α -D-glucopyranoside (4.03%)^[3, 19].

Conclusion

The presence of fatty acids, flavonoids, phytosterol, triterpenoids, polyphenol, acidic sugar, aldehyde, diterpene, terpene, carboxylic compounds, acid and sugar in leaves extract of *Strebulus asper* L. is shown in various literatures. Depression is associated with a decrease in monoamine levels in the synaptic cleft, namely, of the catecholamine NE and of the indoleamine 5-HT. The main biochemical causes of depression are metabolic disorders of monoamine neurotransmitters that are involved in NE, 5-HT, and DA signaling. Moreover, in many depressed patients, the impairment of the function of the HPA axis was noticed. It has been reported that many flavonoids possess antidepressant activity. As per the literature survey we concluded that the leaves of *Strebulus asper* L. have antidepressant activity as the presence flavanoids restore the brain level of monoamines as well as increase the serotonin and dopamine level in CNS. It is also helpful in up-regulating the monoaminergic neurotransmitters.

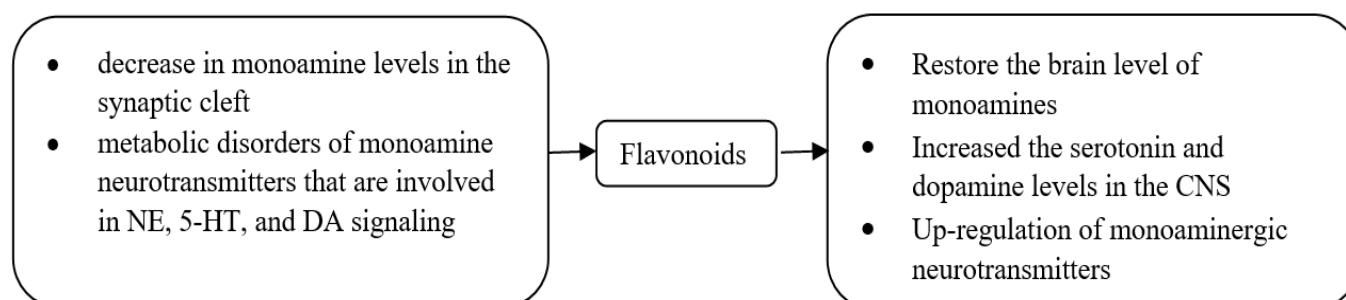


Fig 1: Mechanism of action of flavonoids with depressant activity

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