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MEDICINAL HERBS FOR THE TREATMENT OF ANXIETY: A SYSTEMATIC REVIEW

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Abstract: - Anxiety is defined as a central nervous system disorder in which a patient suffers from an emotional state of mind, discomfort, uneasiness and fear about future. It is thus explained as mental disorder in which pathological anxiety causes disturbance of mood including thinking, behaviour & physiologicals. Anxiety is linked to a number of conditions, including obsessive-compulsive disorder, terror illness, anxiety, general panic disorder, a particular phobia, social phobia, acute psychological illness, and post-traumatic stress syndrome. among others. There are other problems resulting from substance-induced anxiety disorders,general medical illnesses, and adjustment disorders having anxiety symptoms. Nowadays, lot of interest has been generated in traditional and folklore medicines as researchers consider phyto-constituents as more effective in treating various diseases with minimal side effects. Thus there is a drift from synthetic ways to traditional and natural ways to fulfil the various health care needs. One such plant is A. pungens HB&K also called khaki weed that comes in botanical family Amaranthaceae which is studied under the present study. The traditional systems of medicines explore plants as the major weapon in healing different types of ailments).The phytoconstituents present in the plant are saponins, alkaloids, steroids, triterpenoids, flavonoids, anthraquinones, tannins, cardiac glycosides, coumarins, leucoanthocyanins. The biomarkers are isolated using different techniques from naturally occurring sources. With the advancement of modern techniques and organic chemistry man started synthesizing synthetic medicines using different types of substitution reactions by using naturally isolated compounds as a template.

Key words: - Anxiety, Natural compounds, Alternanthera pungens etc.

INTRODUCTION

Anxiety is defined as a central nervous system disorder in which a patient suffers from an emotional state of mind, discomfort, uneasiness and fear about future [1]. It is thus explained as mental disorder in which pathological anxiety causes disturbance of mood as well as affects thinking, behaviour and physiological activity [2, 3].

Anxiety is linked to a number of conditions, including obsessive-compulsive disorder, panic disorder, agoraphobic disorder, generalized anxiety disorder, a particular phobia, social

phobia, acute psychological disorder, and post-traumatic stress disorder. Moreover, there are disorders resulting from general medical problems, substance-induced anxiety disorders, and adjustment disorders with anxiety symptoms [4, 5, 6.]

One theory is that abnormal CNS modulation is the cause of anxiety symptoms and the problems that follow. The cause of this dysregulation's emotional and physical symptoms is varied degrees of elevated sympathetic arousal. 6. Although some anxiety is a part of normal life but when it affects an emotional state of person, then to combat the symptoms, anti-anxiety drugs are required. Although there are many classes of synthetic Antipsychotic drugs which are used to cure anxiety but due to side effects, there is an urge to look into natural substances which can cure the underlying cause of anxiety. One such plant viz., Alternanthera pungens has been chosen to explore its anti-anxiety activity. Now a days, there is a trend to explore herbal drugs for various pharmacological activities. The herbal drugs are an integral part of traditional Ayurvedic system of medicine in many countries and have been used to treat variety of diseases[7, 8,9,10]. The demand for herbal therapy has increased manifold and due to less toxic effects and better bioavailability, the demand for phyto extraction has increased for the preparation of natural medicines[11, 1213].

Alternanthera pungens Kunth

Although it originated in central and south America, reports of it have also come from other tropical nations, such as India. It's a perennial plant that is frequently seen growing on lawns, roadside ditches, vacant lots, and other areas as a mat-like structure. Its prostrate, hairy stem is between 10 and 50 cm long, and it occasionally develops roots between nodes. The leaves are typically 0.5 to 4.5 cm long &0.3 to 2 cm broad. They are green in color and have an oval to obovate form. Flowers are stalkless, sparsely velvety spikes adorned with bracteoles and spiky bracts14. It was used as a pain reliever, for nasopharyngeal infections, stomachaches, edema, and other conditions in traditional medicine. In veterinary medicine, it was additionally believed to stimulate lactation15. The phytoconstituents present in the plant are saponins, alkaloids, steroids, triterpenoids, flavonoids, anthraquinones, tannins, cardiac glycosides, coumarins, leucoanthocyanins[16].

Macroscopy

The leaves are simple with green in color, orbicular, ovate, unequal, opposite pairs, obtuse and tapering at the base and 35 mm length and 28 mm breadth. Stem are yellowish brown to light brown in color. Stems are 10-50 cm long, cylindrical, sub quadrangular covered with shaggy hair and short fracture. Sometimes rooting is present at the nodes. Roots are cream to white in color. These are cylindrical, 1-6 mm diameter Seeds are round and lenticular shaped. They are shiny and brownish in color. Flowers are stalk less, velvety spikes, spiny bracts bisexual, bract lance late, glabrous, 4.25 mm long, small bracteoles, 3.75 mm long. Fruits are 1.2-1.5 mm long and enclosed with sepals [16, 17, 18].

Taxonomical classification[19, 20].

Kingdom	Plantae
Phylum	Angiospermae
Order	Caryophyllales
Family	Amaranthaceae
Subfamily	Gomphrenoideae
Genus	Alternanthera
Species	Pun

Figure 1: Aerial parts of Alternanthera pungens.

Traditional medicinal uses

Different parts of the plant have been reported for its various medicinal uses:

- Aerial parts: headache and abdominal pain [21].
- Whole plant- in gastric, hepatic and intestinal disturbances and as diuretic and emollient agent, abortifacient, galactogogue, abortifacient, antidiarrheal, to treat constipation and blood dysentery [22,23].
- Leaf: asthma, amenorrhea, dropsy, alcohol poisoning, rheumatism, vermifuge decongestant, anti-inflammatory, against liver discomfort, kidney problems, and teething problems in children and in treatment of skin and digestive disorders. It is used in treatment of burns, wounds, ulcers and chronic disorders such as HIV/AIDS [24, 25].
- Fruit: to relieve itching [26, 27].

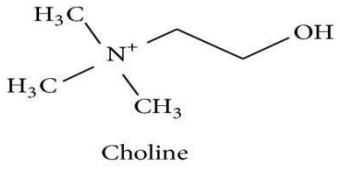
Table 1:- Research summary of the anxiolytic activity of plant extact[28-39].

Sr.No.	Plant	Phytochemical	Model	Target of Action
1.	Magnolia obovata	A Obovate	in vivo, mice; in vitro test	GABA/BZD binding site receptor
2.	P. guajava	Hyperin	in vivo, mice	GABA: GABAA receptorSerotonin: 5-HT1Areceptor
3.	Z.mucronata	Alkaloids	in vivo, rats	Serotonin: 5-HT1A receptor Noradrenalin
4.	Tibetan herbs	Flavonoids	in vivo, mice	GABA/BZD binding site
5.	Echium amoenum	Flavonoids	in vivo, mice	GABA receptor
6.	Capsicum annuum	Kaempferol, Qurecetin and luteolin	in vivo, mice	GABA receptor
7.	Cuminum cyminum	Quercetin	in vivo, rats	GABA receptor
8.	Piper methysticum	Kava lactones	in vivo, mice; in	GABA receptor
9.	Cymbopogon	Flavonoids and	in vivo, rats	GABA: GABAA

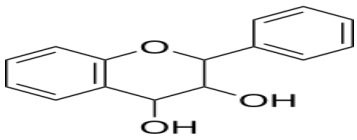
	flexuosus	geraniol		receptorSerotonin: 5-HT1A and 5-
10.	Ficus carica L.	Coumarins , Steroids, flavonoids	in vivo, mice	HT1B receptors
11.	Blumea lacera	Sit sterol, vitamin E & cuminol.	in vivo, mice	GABA receptor
12.	Inochinohaha white	Phenolic	in vivo,	GABA receptor
13.	Passiflora incarnations	Oleamide & flavonoids	premenstrual	GABA receptor

Chemical Constituents

Nine varieties of Alternanthera have become the subject of scientific reports including plant-based constituents such as alkaloids, hydroxyl cinnamic acids, phenolic compounds, triterpenoids/saponins, sterols, ionone, and anthraquinone. Alternanthera Pungens Kunth has two chemical components: choline and leucoantocyanidin.



Choline



Pharmacological Profile

Leucoantocyanidin

Numerous scientific studies were been out to support traditional claims made by different Alternanthera species. Many of the above scholarly pharmacological research employed extracts of different Alternanthera speciesthat were uncharacterized or non-standardized. Different pharmacological properties have been observed in Alternanthera speciesthat are mentioned below.

Analgesic Activity

The analgesic activity of Alternanthera brasiliana (L.) Kuntze's aerial parts was assessed by Pelisoli Formagio and colleagues using an aqueous extract. Mice administered with 25 mg/kg of the an aqueous extract showed a 90.35% decrease in acetic acid-induced contractions. Coutinho and colleagues evaluated the analgesic potential of an ethanolic extract derived from Alternanthera brasiliana (L.) Kuntze leaves using the formalin test on mice. Ethanolic extract was able to suppress the edematogenic process by 64.17% at a dose of 100 mg/kg. Alternanthera brasiliana (L.) Kuntze may have analgesic properties due to phytoconstituents such as vitexin, kaempferol, and quercetin.

Antianxiety Property

Anti-anxiety effectiveness of A. brasiliana (L.) Kuntze has been evaluated by several research teams independently: Pelisoli Formagio used the leaves' aqueous extract, Oyemitan & team utilized leaves' ethanolic extract, and Barua and the team used the leaves' methanolic extract. Thus, the promise for antianxiety properties of leaves of A. brasiliana (L.) Kuntze is fairly established. Those researchers noticed a number of mechanisms for this behavior. A few of them resemble partial agonistic activity of the 5-HT receptor and GABA receptor activation. It's possible that phytomolecules including p-coumaric acid, quercetin, kaempferol, stigma

sterol, and others are what provide Alternanthera brasiliana (L.) Kuntze its antianxiety properties.

Antiapoptotic Activity

Alternanthera bettzickiana (Regel) G. Nicholson's whole plant ethanolic extract's antiapoptotic potential was investigated by Wu and colleagues. The high propensity of ethanolic extract to prevent apoptosis was discovered by the researchers. This effect was controlled by a number of procedures , that include the decrease of reactive oxygen variety andcaspase-3 and caspase-9 activationinhibition . The main component of that extract, quercetin, was identified by them, and when they assessed quercetin's antiapoptotic possibility, they discovered the same processes.

Antiarthritic Activity

Using in vitro, in silico, and in vivo techniques, Manan and colleagues investigated the antiarthritic activity l of an ethanol extract derived from portions of A. bettzickiana (Regel) G. Nicholson.Comparing the results with normal medication and disease control, they discovered that even 250 mg/kg/day of ethanol extract may change the parameters showing the Antiarthritic potential.

Antidiabetic Activity

The anti diabetic effectiveness of 80% ethanolic extracts from A. brasiliana (L.) Kuntze's stem and leaves was evaluated by Reza and colleagues. Researchers discovered that in alloxan-induced diabeticmice, ethanolic extracts were able to drastically regulate biochemical markers such lipid peroxidation, including free-radicals. Alternanthera brasiliana (L.) Kuntze may have antidiabetic properties due to phytomolecules such as kaempferol, quercetin, stigmasterol, p-coumaric acid, ferulic acid, and chlorogenic acid.

Antihypertensive Activity

Anti-hypertensive impact of A. sessilis (L.) R.Br. ex DC. was assessed by Saqib & Janbaz using a 70% ethanolic entire planextract, together with its dichloromethane & aqueous fractions. According to the in vivo investigations, the ethanolic extract has the ability to lower the diastolic and systolic blood pressure. Alternanthera sessilis (L.) R.Br. ex DC may have antihypertensive properties due to phytomolecules such as kaempferol, quercetin, vitexin, βsitosterol, ellagic acid, ferulic acid, and chlorogenic acid.

Anti-Inflammatory Activity

While P Shivashankar and colleagues employed the methanolic extract of A. brasiliana (L.) Kuntze leaves, Pelisoli Formagio and colleagues conducted in vivo tests to evaluateanti-inflammatory efficacy of aqueous extraction product. Pelisoli Formagio and colleagues had noted a high decrease in polymorphonuclear cells and a hike in mononuclear cells in the exudate of the rats treated with aqueous extract; P Shivashankar and colleagues discovered a reduction in colon weight in the adult Wistar albino rats used in the model of acetic acid-induced colitisfollowing treatment with the methanolic extract. Alternanthera may have anti-inflammatory properties due to phytomolecules such as kaempferol, quercetin, stigmasterol, p-coumaric acid, ferulic acid, and chlorogenic acid.

Antioxidant Activity

The antioxidant potential of the 80% aqueous methanol solution that was extracted from A. bettzickiana G. Nicholson's flowers was assessed by Petrus and colleagues. They had noticed that the extract has the ability to chelate ferrous ions and scavenge radicals. Conversely, A. bettzickiana (Regel) G. Nicholson leaf extracts produced inethyl acetate hexane, methanolic,chloroform, and aqueous extracts were assessed for their antioxidant properties by Vidhya and colleagues. They found that the methanolic extract had the most radical scavenging activity of all. This antioxidant capability may be attributed to phytomolecules such as apigenin analogs, which were previously identified from A. bettzickiana G. Nicholson.

Conclusion

Alternanthera Pungens is already reported to play an important role in the treatment of inflammation, pain, gastric disorders and as anti-infectious. A. Pungens is acting through GABA receptors. Low GABA activity is associated with depression, insomnia and anxiety too thus the action of A. Pungens through GABA receptors can be explored further to treat anxiety issues also. The current study was designed with the purpose to explore novel and therapeutic potential of A. Pungens in treating anxiety.

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