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Der Pharmacia Sinica, 2015, 6(5):1-7

Der Pharmacia Sinica
ISSN: 0976-8688
CODEN (USA): PSHIBD

Medicinal plants possessing anxiolytic activity: A brief review

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ABSTRACT

Anxiety, fear and worry are all completely natural human feelings. If these feelings occur for a longer period, it affects both physical and mental health. It is considered to be a major cause of disability worldwide. It comprises of generalized anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder, panic attacks, phobias and depression. Neurotransmitters in the brain involves in anxiety include gamma-aminobutyric acid (GABA), serotonin, nor-epinephrine and dopamine. Anti-anxiety medicines use to treat anxiety. They act by reducing brain activity to alleviate the symptoms of anxiety, nervousness, mood stabilizing and improving sleep. Long term use of anti-anxiety agents may develop psychological and physiological dependence. Moreover, many of the medicines used to treat anxiety can cause troubling side effects such as cholinergic symptoms, paradoxical effects, weight gain, sleep disturbances, sexual dysfunction, medication dependence, blurred vision or gastrointestinal problems. There are very few anti-anxiety remedies available for the management of anxiety. Thus urgent need for new anti-anxiety drugs is a global concern. Therefore, the demand of herbal medicines is increasing due to their wide application and therapeutic efficacy with least side effects. The present review collected the information of anti-anxiety potential plants with emphasis their botanical source, common name and other biological activities, which are helpful to develop new anti-anxiety herbal formulations.

Key words: Anxiety, anxiolyic medications, anxiolytic phyto-constituents and anxiolytic plants

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INTRODUCTION

Anxiety disorder is one of the most common mental disorders that experienced as a part of everyday life. It is a condition of fear and worry completely natural human feelings. If these feelings occur for a longer period, it affects both physical and mental health. It concern one-eighth of the total population worldwide [1]. It is a state of excessive fear and is characterized by motor sympathetic hyperactivity, feeling of apprehension, nervousness, restlessness, thanatophobia, sweating, stomach upset and dry mouth. In phobia, when the anxiety involves excessive fears of things or situations (e.g. snakes, open spaces, flying, fire) and a social disorder when the fear is related to social interactions [2]. Panic attacks are episodic and sudden attack which includes unexplainable terror reactions, triggering rapid heart rate, tachycardia, chest pains, trembling, chocking and sweating [3]. In generalized anxiety disorder (GAD), the individual experiences chronic anxiety that causes distress, impairment and depression [4]. Post-traumatic stress disorder (PTSD) involves an anxiety triggered by insistent recall of past traumatic experience and life-threatening events [5]. An individual who experience reoccurring & new disturbing thoughts and who act out repetitive and compulsive behaviors to relieve these distressing thoughts have obsessive compulsive disorder (OCD). Neurochemicals involve in anxiety are GABA, monoamines (Dopamine, noradrenaline, serotonin), neuropeptides (galanin, neuropeptides Y, arginine vasopressin, tackykinin, substance P), neurosteroids and cytokines [6].

Table 1. Etiology of anxiety disorders

Biological causes	Psychological causes	Social causes
• Heredity • Neurotransmitter Imbalance such as- GABA, dopamine, serotonin, norepinephrine etc. • Medications • Nutritional factors	• Personality traits • Low self-esteem • Cognitive dissonance • Negative emotions • Inter/intra-personal conflicts • Perception of situational factors	• Adverse Life Experiences • Lack of social support • Work stress • Lack of social skills • Conflict of societal norms • Natural calamities

ANTI-ANXIETY MEDICATIONS

These are also called minor *tranquilizers*, are used for treating anxiety disorders. Before the introduction of benzodiazepines, the barbiturates were largely used as anti-anxiety medicines. Phenobarbital and other long-acting barbiturates were generally used to treat anxiety. In 1960s, the barbiturates were replaced by benzodiazepines for the treatment of anxiety. Benzodiazepines are prescribed more frequently than barbiturates because they have a higher margin of safety in overdose. On the other hand, benzodiazepines are associated with abuse, dependence, and withdrawal symptoms [7]. Buspirone, a nonbenzodiazepine, is another medicine used in the treatment of anxiety. Unlike the benzodiazepines, buspirone is not associated with dependence and withdrawal symptoms [8]. Anti-depressants are also effective in the treatment various anxiety disorders, such as panic disorder, GAD, PTSD, and OCD. Now a day, there is very few synthetic anti-anxiety medicines are available. Furthermore, anxiety patients are faced with multifarious difficulties associated with the currently approved anti-anxiety drugs. Therefore, the demand of herbal medicines is increasing due to their wide application and therapeutic efficacy with least side effects.

Table 2: Phyto-constituents responsible for anti-anxiety activity

Sr.	Phytoconstituents
1.	**Alkaloids:** Erysodine, erysothrine, gelsemine, koumine, gelsevirine, gelsenicine, magnoflorine, piplartine, sanjoinine A
2.	**Flavonoids:** Quercetin, kaempferol, apigenin, luteolin, chrysin, 5,7-dihydroxy-8-methoxyflavone or wogonin, bacicalin
3.	**Triterpenoids**: Galphimine A, galphimine B and α, β-amyrin
4.	**Glycosides:** Cardiospermin, Hypericin
5.	**Sterol**- β-sitosterol**,**
6.	**Coumarins:** Imperatorin (IM) and isoimperatorin
7.	**Fatty acids:** Trideca-7,9,11-trienoic acid
8.	**Lignan:** Honokiol, magnolol, obovatol
9.	**Terpene:** Linalool
10.	**Ginkgolic acids:** 6-alkylsalicylates (n-tridecyl-, n-pentadecyl-, n-heptadecyl-, n- pentadecenyl- and n-heptadecenylsalicylates)
11.	**Organic compounds:** Cinnamic acid, p-coumaric acid, caffeic acid, ferulic acid, sinapic acids

Table 3: A brief description of some anti-anxiety plants [9-114]

Sr.	Botanical Source	Common Name	Other Biological Activities
1.	*Abies pindrow* Family: Pinaceae	Pindrow fir	Bronchoprotection and ulcer protection
2.	*Achiellea millefolium* Family: Asteraceae	Yarrow	Anti-inflammatory, anti-microbial and anti-spasmodic
3.	*Aegle marmelos* Family: Rutaceae	Bael	Anti-diabetic, anti-inflammatory, anti-pyretic, analgesic and anti-hyperlipidaemic
4.	*Albizia julibrissin* Family: fabaceae	Pink silk tree	Anti-microbial and anti-depressant
5.	*Albizzia lebbeck* Family: Mimosaceae	Lebbeck	Anti-tumour, anti-diabetic and anti-inflammatory
6.	*Aloysia polystachya* Family: Verbenaceae	Burrito	Anti-spasmodic, anti-depressant and anti-emetic
7.	*Angelica sinensis* Family: Apiaceae	Female ginseng	Anti-alzheimer and anti-osteoporosis
8.	*Aniba riparia* Family: Lauraceae	Nees	Anti-depressant, anti-inflammatory and analgesic
9.	*Annona cherimola* Family: Annonaceae	Custard apple	Anti-diabetic, anti-microbial and anti-tumour
10.	*Apocynum venetum* Family: Apocynaceae	Luobuma	Anti-depressant, anti-hypertensive and hepatoprotective
11.	*Azadirachta indica* Family: Meliaceae	Neem	Anti-ulcer, anti-bacterial, hepatoprotective, hypoglycaemic
12.	*Bacopa Monniera* Family: Plantaginaceae	Brahmi	Anti-stress, anti-inflammatory, anti-amnesic, anti-microbial
13.	*Calotropis gigantea* Family: Asclepiadaceae	Crown flower	Antibiotic, anti-asthmatic and wound healing
14.	*Casimiroa edulis* Family: Rutaceae	White sapote	Anti-depressant, sedative, anti-convulsant and hypotensive
15.	Cassia siamea	Siamese senna,	Analgesic, anti-inflammatory and anti-diabetic

	Family: fabaceae		
16.	Cecropia glaziouri Family: umbelliferae	Red cecropia	Anti-ulcer, anti-hypertensive and cardio-tonic effect
17.	*Celastrus paniculatus* Family: Celastraceae	Black oil plant	Anti-depressant, analgesic, anti-inflammatory, anti-convulsant and nootropic
18.	*Centella asciatica* Family: Umbelliferae	Centella	Wound healing, anti-microbial, anti-allergic, and anti-inflammatory
19.	*Cinnamomum cassia* Family: Lauraceae	Chinese cinnamon	Anti-inflammatory, anti-microbial and anti-diabetic
20.	*Citrus paradise* Family: Rutaceae	Grapefruit	Anti-fungal, anti-hypertensive and anti-cancer
21.	*Citrus sinensis* Family: Rutaceae	Orange	Anti-thyroid, anti-diabetic and anti-microbial
22.	Clitoria ternatea Family: Fabaceae	Butterfly pea	Anti-hyperglycaemic, anti-hyperlipidaemic, anti-asthmatic and anti-pyretic
23.	*Colocasia esculenta* Family: Araceae	Taro	Anti-cancer, hypoglycaemic, and hypolipidaemic
24.	*Coptis chinensis* Family: Ranunculaceae	Chinese goldthread	Hypolipidaemic anti-microbial
25.	*Coriandrum sativum* Family: Apiaceae	Cilantro	Anti-bacterial, anti-helmintic and hepatoprotective
26.	*Crinum giganteum* Family: Amaryllidaceae	Giant Himalayan lily	Reduce motor activity and sedative effect
27.	Davilla rugosa Family: Dilleniaceae	Cipo´ -caboclo	Anti-ulcer and aphrodisiac
28.	*Drymaria cordata* Family: Caryophyllaceae	Tropical chickweed	Anti-tussive, anti-inflammatory, analgesic and anti-pyretic
29.	*Echium amoenum* Family: Boraginaceae	Borage	Analgesic, anti-viral and anti-bacterial
30.	*Erythrina mulungu* Family: fabaceae	Mulungu	Analgesic, anti-inflammatory and anti-convulsant
31.	*Erythrima velutina* Family: fabaceae	Mulungu	Anti-convulsant and anti-inflammatory
32.	*Eschzoltzia California* Family: Papaveraceae	California poppy	Anti-psychotic, anti-depressant, anti-histaminic and analgesic activity
33.	*Euphorbia hirta* Family: Euphorbiaceae	Dudhani	Anti-inflammatory, anti-diarrhoeal and anti-cancer
34.	*Euphorbia longana* Family: Sapindaceae	Longan	Treat colon cancer, anti-malarial and anti-microbial
35.	*Euphorbia neriifolia* Family: Euphorbiaceae	Thor	Anti-convulsant, anti-inflammatory, analgesic, anti-diabetic, aphrodisiacs and hepatoprotective
36.	Eurycoma longifolia Family: Simaroubaceae	Tongkat ali	Anti-malarial, anti-diabetic, anti-cancer and aphrodisiac
37.	*Galphimia glauca* Family: Malpighiaceae	Gold shower	Sedative and anti-depressant
38.	*Garcinia indica* Family: Clusiaceae	Kokam	Anti-ulcer, hepatoprotective, anti-microbial, cytoprotective, anti-inflammatory and analgesic
39.	*Gastrodia elata* Family: Orchidaceae	Tian ma	An-inflammatory, anti-angiogenic and anti-convulsant
40.	*Gelsemium elegans* Benth Family: Loganiaceae	Yellow Jasmine	Analgesic, anti-inflammatory and anti-neoplastic
41.	*Ginkgo biloba* Family: Ginkgoaceae	Maidenhair tree	Prevention of dementia, Raynaud's disease, hypotension
42.	*Hypericum perforatum* Family: Hypericaceae	Saint John's wort	Anti-obesity, hypolipidaemic and Treat minor burns
43.	*Ipomoea reniformis* Family: Convolvulaceae	Mushakparni	Anti-epileptic, anti-psychotic, hypotensive and diuretic
44.	Kielmeyera coriacea Family: Calophyllaceae	Pau santo	Anti-depressant and anti-tumour
45.	*Lonchocarpus cyanescens* Family: fabaceae	Elo and anunu	Anti-oxidant and anti-psychotic
46.	*Magnolia dealbata* Family: Magnoliaceae	Cloudforest magnolia	Anti-convulsant, sedative, anti-diabetic and insecticidal
47.	Magnolia officinalis Family: Magnoliaceae	Magnolia-bark	Memory enhancer, anti-microbial and anti-inflammatory
48.	Matricaria recutita Family: Asteraceae	Chamomile	Anti-tumour, wound healing
49.	Melissa officinalis Family: Lamiaceae	Lemon balm	Anti-viral, anti-inflammatory, anti-nociceptive and anti-tumour
50.	*Morinda citrifolia* Family: Rubiaceae	Noni	Analgesic, anti-inflammatory, anti-oxidant, antiepileptic, anti-tumor, wound healing and hepatoprotective, anti-fungal
51.	*Ocimum sanctum* Family: Lamiaceae	Tulsi	Analgesic, anti-inflammatory, anti-asthmatic, anticancer, anticonvulsant, anti-diabetic, antioxidant

52.	*Paeonia moutan* Family: Paeoniaceae	Moutan or tree peony	Anti-diabetic, anti-inflammatory and anti-ulcer
53.	*Panax ginseng* Family: Araliaceae	Ginseng	Anti-diabetic, analgesic and anti-tumour
54.	*Passiflora edulis* Family: Passifloraceae	Passion fruit	Anti-bacterial and anti-inflammatory
55.	*Passiflora incarnata linn* Familly: Passifloraceae	Passion flower	Analgesic, anti-inflammatory, anti-asthmatic, anti-tussive, anti-convulsant and aphrodisiac
56.	*Piper methysticum* Family: Piperaceae	Kava kava	Analgesic, anti-depression
57.	*Piper tuberculatum* Family: piperaceae	Pimenta longa	Anti-nociceptive, anti-depressant and anti-platelet
58.	*Protium heptaphyllum* Family: Burseraceae	Breu	Gastro-protective, anti-inflammatory and analgesic
59.	*Rhodiola rosea* Family: Crassulaceae	Golden root	Anti-depression, anti-anxiety and treat insomnia
60.	*Rollinia mucosa* Family: Annonaceae	Biriba	Anti-platelet, anti-tumour and anti-fungal
61.	Rubus brasiliensis Family: Roseceae	Amorinha,	Hypnotic, anti-convulsant and muscle relaxant
62.	*Salvia elegans* Family: Lamiaceae	Pineapple sage	Memory enhancer, anti-hypertensive and anti-depressant
63.	*Salvia officinalis* Family: Lamiaceae	Garden sage	Memory enhancer, anti-diarrhoeal, anti-spasmodic and anti-diabetic
64.	*Salvia reuterana* Family: lamiacaea	Maryam goli esfahani	Hypnotic, neuroprotective, anti-microbial and anti-diabetic
65.	Scutellaria baicalensis Family: lamicaeae	Baikal skullcap	Myocardial ischaemia and anti-convulsant
66.	*Scutellaria Lateriflora* Family: Lamiaceae	Blue skullcap	Anti-anxiety and anti-microbial
67.	*Securidaca longepedunculata* Family: Polygalaceae	Violet tree	Analgesic, anti-inflammatory, anti-microbial and hypoglycaemic
68.	*Sesamum indicum* Family: Pedaliaceae	Sesame	Hepatoprotective, anti-convulsant and wound healing
69.	*Sesbania grandiflora* Family: Fabaceae	Humming-bird tree	Anti-inflammatory, analgesic, anti-convulsant anti-microbial activity
70.	*Sphaeranthus indicus* Family: Compositae	East indian globe thistle	Analgesic, anti-pyretic, anti-diabetic and anti-hyperlipidaemic
71.	*Stachys lavandulifolia* Family: lamiaceae	Chaie koohi	Anti-ulcer, spasmolytic and abortifacient effect
72.	*Tamarindus indica* Family Caesalpiniaceae	Tamarind	Analgesic, anti-pyretic, anti-inflammatory, anti-oxidant anti-emetic, anti-histaminic, and anti-microbial,
73.	*Tilia americana* Family: Tiliaceae	Basswood	Anti-nociceptive, sedative and anti-convulsant
74.	Tilia tomentosa Moench Family: malvaceae	Silver lime	Anti-nociceptive and anti-inflammatory
75.	Tragia involucrate Family: Euphorbiaceae	Indian stinging nettle	Anti-diabetic, anti-hyperlipidaemic and anti-inflammatory
76.	*Turnera aphrodisiaca* Family: Turneraceae	Damiana	Anti-convulsant, anti-depressant, and analgesic
77.	*Uncaria rhynchophylla* Family: Rubiaceae	Cat's claw	Anti-spasmodic, hypotension and sedation
78.	*Valeriana edulis* Family: valerianaceae	Mexican valerian	anti-convulsant and vaso-relaxant
79.	*Valeriana officinalis* Family: Caprifoliaceae	All-heal	Antidepressant, anti-arrhythmic and sleep-enhancer
80.	Withania somnifera Family: solanaceae	Ashwagandha	Anti-oxidants, anti-stress, anti-aging and anti-inflammatory
81.	*Zingiber officinale* Family: zingiberaceae	Ginger	Anti-diarrhoeal, analgesic and anti-inflammatory
82.	*Ziziphus zizyphus* Family: Rhamnaceae	Chinese date	Hypoglycaemic, anti-pyretic, anti-oxidant and wound healing

CONCLUSION

Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine. Today days, there has been growing interest in the therapeutic use of plants because of their safety, economical & effective use. In this review, several plants have been mentioned, which are previously explored by the various researchers for their anti-anxiety activity using animal models, but very few controlled clinical studies has been conducted. Clinical studies have some practical problems like small number of subjects and lack of placebo. Only few plant such as

brahmi, gingko and kava-kava, showed promising results with extensive clinical significance when compared with benzodiazepines, buspirone and anti-depressants. In this review, we collect the information of anxiolytic potential plants, their biological source, common name and other biological activities, which may helpful for researchers to develop new anti-anxiety herbal formulations. It is necessary to isolate phyto-constituents from these reported anxiolytic plants with demonstrable anxiolytic effects in animal models may deserve further evaluation in clinical studies.

Acknowledgement
The authors are grateful to the authors/editors of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

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