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TRADITIONAL PLANTS HAVING ANTIDEPRESSANT PROPERTY: A REVIEW

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ABSTRACT

Depression is an etiologically heterogeneous group of brain disorders characterized by a wide range of symptoms that reflect alterations in cognitive, psychomotor and emotional processes Depression is a common mental disorder that is accompanied with decreased energy, loss of pleasure or interest, guilt feeling, disturbed sleep, unable to concentrate, disturbed sleep, low self worth and depressed mood. The reasons for the disease include stimulation of MAO-A, inhibition of NA and 5-HT.There are plenty of synthetic drugs used to treat depression but not enough blissful for patients, moreover, these synthetic drugs have potential side effects. Natural medicinal plants may be important sources of novel antidepressant drugs and the usage of plant extracts may be proven better in the management of stress and depression. The objective of this review is to enlist medicinal herbs which have antidepressant action using various rodent models of depression.

KEYWORDS: Depression, psychomotor, stress.

INTRODUCTION

Depression is a chronic illness that affects people of all ages. Depression is one of the most serious mood disorders and affects up to 20% of the global population.[1-3] The World Health Organization predicts that major depression will be the second leading cause of global disability burden by 2020.[4] Depression is more common in women than men.[5] At its worst, it can lead to suicide. Due to suicide almost 1 million lives are lost annually, which counts to

3000 suicide deaths every day. Today, 350 million people is estimated to be affected by depression. According to the World Mental health survey which is conducted in 17 countries, it is found that on an average about 1 in 20 people are having an episode of depression in the previous year.[6] Suicide is the major consequence in most of the depressive illnesses. About 60% deaths are due to depression and related disorders.[7] Depressionis induce by chronic stress and is one of the main triggers even though the mechanism of provoking depression is not clearly established.[8] Mental depression is mainly of two types, specifically unipolar depression and bipolar depression. In unipolar depression, mood swings are constantly in the identical track and is conjoint (about 75% of cases) non familial, evidently accompanying with traumatic life events and complemented by indicators of anxiety and agitation. The following type is bipolar depression (about 25% of cases) occasionally also called as endogenous depression, displays a familiarized pattern, dissimilar to exterior stresses and frequently seems in premature grown-up life, results in vacillating depression and mania over a period of a few weeks.[9]

Although a number of synthetic drugs are being used as the standard treatment for clinically depressed patients, they have adverse effects that can compromise the therapeutic treatment, these common adverse effect include dry mouth, fatigue, gastrointestinal or respiratory problems, anxiety, agitation, drowsiness, and cardiac arrhythmias. Several drug-drug interactions can also occur. These conditions create an opportunity of alternative treatment for depression by the use of medicinal plants, the current armamentarium of therapy is often inadequate, with unsatisfactory results in about one-third of all subjects treated.[10] This provides impetus to the search of newer and more effective antidepressants. Limitations to the use of available synthetic drugs open a way for alternative treatments for depression. Plants have always been a source of drugs and herbal medicines are one of the ancient therapies that have stood the test of time. Therefore, objective of the present review is to explore or enlist some of tradition medicinal plant or plant based formulation and their active phytoconstituents for their anti-depressant like activity using different rodent models of depression.

Plants as antidepressants

A large number of the plants are claimed to possess the antidepressant properties in the traditional system and are also used extensively by people worldwide. It is now believed that nature has given the cure of every disease through herbal medicine or management. Plants

have been known to relieve various diseases in Ayurveda. Consequently, the researchers today are emphasizing on evaluation and characterization of various plants and plant constituents against a number of diseases based on their traditional claims of the plants given in Ayurveda. Several reviews have been published recently that highlight the scientific evidence supporting the antidepressant properties of numerous medicinal plants. Animal behavioural studies (e.g. forced swim test, tail suspension test), brain neurotransmitter quantification and pharmacological studies involving the serotonergic system have been routinely employed to investigate the antidepressant properties of the plants.[11-14]

The plants that have been proved to possess antidepressant properties are listed below:

Aniba riparia

Aniba riparia (Nees) belongs to the family Lauraceae contains more phyto active constitutes riparinIII,showed anti-depressant like activity at the dose of 25 and 50 mg/kg, i.p., in mice when tested in Tail Suspension Test (TST) and FST.[15]

Amaranthus spinosus

Amaranthus spinosus Linn., (Amaranthaceae), In Indian traditional system of medicine (Ayurveda) the plant is used as laxative, antipyretic, antileprotic, diuretic, digestive, antidiabetic, bronchitis, antisnakevenum, blood diseases, piles and antigonorrheal. Tribal of Kerala, India used juice to prevent swelling around stomach while to cure jaundice the leaves are boiled without salt and consumed for 23 days. Methanolic extract of Amaranthusspinosus (MEAS) was investigated for antidepressant activity by using Forced swimmingtest (FST) and Tail suspension test (TST) models and shows antidepressant activity.[16]

Aegle marmelos

Aegle marmelos (AM), a highly reputed Ayurvedic medicinal tree commonly known as the bael fruit tree is found all over India. The tree is endowed with various medicinal properties. Several studies on different parts of AM showed that the plant possess antidiabetic[17], anticancer[18], radio protective[19], antifungal[20], antimicrobial[21], antimicro filarial[22], anti-inflammatory, antipyretic and analgesic activities.[23] Methanol leaf extract of *Aeglemarmelos* showed significant anxiolytic and antidepressant activities possibly by increasing monoamines level at post synaptic sites. Hence *Aegle marmelos* may be served as a potential resource for natural psychotherapeutic agent against stress related disorders such as anxiety and depression.[24]

Bacopa monniei

Bacopamonnieri(Family Scrophulariaceae) and is a small creeping herb found throughout India in marshy grounds. The stem and leaves are used for several medicinal purposes. Traditionally it has been used in Ayurveda as a rasayana (medhya-rasayana and aindra-rasayana) to rejuvenate the brain and mental health and promote intellect, memory, and longevity.[25] It showed nootropic and cholinergic properties and has therefore attracted attention for its potential to treat neurodegenerative disorders.[26-34] Several studies have also demonstrated the anti-depressant activity of *B. monnieri*at the dose of 20 and 40 mg/kg in the forced swim, tail suspension, chronic unpredictable stress, and learned helplessness models using mice and rats Due to presence of sapononins - bacopasides VI-VIII, bacopaside I, bacopaside II, and bacopasaponsin C in *B. monnieri.*[34-37] Recent clinical study have proved a polyherbal formulation consisting of *B. monnieri*, *D. bulbifera*, and *H. rhamnoides* was also found to improve cognitive performance and lower depression scores in both demented and non-demented elderly.[38]

Chamaemelun nobile

C. nobile, chamomile in English language and *Babouneh* in Persian language, is from Asteraceae/Compositaefamily. This plant is native to different Mediterranean regions but now-a-days, exhibits a wide pattern ofdistribution in Europe and temperate areas of Asia and even the Americas. Diuretic, perspiratory, gastrotonic, carminative, stomachic, digestive, anti-inflammatory, antispasmodic, soothing, and antibacterial propertieshave already been reported for.[39] An experimental study demonstrated antidepressant effects of *C. nobile* extract on progesterone-induced major depressive disorder.Although *C. nobile* extract decreased postpartum depression indices significantly in rats, it exerted no effect onoxidative stress indices. *C. nobile* antidepressant effects can be related to the compounds of this plant.[40]

Dacus carota

The roots of *Dacus Carota(*DC) were selected for evaluating its antidepressant activity due to its traditional use in the management of diarrhoea, acidity, heartburn and ulcers. The plant was reported topossess medicinal values such as antifungal, antibacterial, enzyme protective, hepatoprotective activities. It is a remedy for fever, gonorrhoea, anorexia, dysentery, sores and skin diseases. The presentstudy has been undertaken to investigate the effect of Ethanolic

Extract of *Dacuscarota* (EEDC) on depression in mice. The result of the present study shows significant antidepressant activity.[41].

Epimedium brevicornum

In traditional Chinese medicine, *E. brevicornum* is used to reinforce kidneys and enhance the body's forces. This plant has a wide-spectrum of biological and pharmacological actions and contributes to regulating cardiovascular system, circulation, and reproductive system. *E. brevicornum* can exert estrogenic effects and is used to treat menopause symptoms.[42] A number of studies have confirmed the antidepressant effects of *E. Brevicornum* extract.[43] *E. brevicornum* extract seems to induce antidepressant effect through suppressing MAOA and monoamine oxidase B (MAOB) and reducing serum MDA.[44]

Foeniculum vulgare

Foeniculum Vulgare(Fennel) Fruit is known as "Saunf" in hindi and "Madhurika" in Sanskrit. *Foeniculum vulgare* has been scientifically proved to possess various pharmacological activities, which includeantidiabetic, antioxidant, hepatoprotective, antifungal, antimicrobial, antithrombotic, antispasmodic, antiosteoporotic and toxicology. *Foeniculum vulgare* is monoamine inhibitor and the previous evidences indicate that monoamine inhibitors increase the level of norepinephrine, serotonin and dopamine in brain. The present study was undertaken to investigate the effects of methanolic extract of *Foeniculum vulgare*fruit on depression using force swim test in rats, potentiation of norepinephrine toxicity in mice and haloperidol induce catalepsy in mice and proves that the methanolic extract of *Foeniculum vulgare* possess significant antidepressant activity due to its reduction in the immobility period in FST and reduction in the duration of catalepsy in haloperidol induce catalepsy.[45]

Ginkgo biloba

Ginkgo biloba Linn., belongs to the family Ginkgoceae and is native of China. It is occasionally cultivated in Indian gardens and especially, found in Himachal Pradesh. Its extract (14 mg/ kg, p.o.) restored restraint stress-induced elevation in whole brain levels of norepinephrine, dopamine and serotonin and improving mood in healthy older volunteers.[46,47] Recent study have proved a combination with extract of *G. biloba* with Venlafaxine enhanced the protection of neurons and decreased damage to the brain[48]

Hypericum perforatum

*Hypericum perforatum*is also known as St John'aWort belongs to the family Hypericaceae and a well-known plant with antidepressant properties that have been demonstrated through several clinical trials.[49-52] St John's Wort extract WS 5570 is marketed in Germany for the acute treatment of mild to moderate major depression.[53] Although the precise mechanism of action of this popular medicinal plant is unknown, *in vitro* and *in vivo* studies have demonstrated that preparations from this plant enhances brain serotonin levels, inhibit serotonin (re)uptake, and up-regulate serotonin 5-HT2 receptors.[54-58]

Momordica charantia

This plant is known as bitter melon, bitter gourd, balsam pear, karela, and pare. It grows in tropical areas of the Amazon, East Africa, Asia, India, South Africa, and the Caribbean and is used traditionally as both food and medicine. Its phytochemicals are alkaloids, flavonoids, glycosides, triterpenoids, steroids, phenols, tannins, oils and fats[59,60] M. charantia has also been already documented as antidepressant and antianxiety herb. Yet, very less data available on systematic biological investigation about leaves, seeds and root[61,62] of this plant and fruit has never been subjected to systematic biological investigation. The antidepressant activity of unripe fruit along with leaves of M. charantia is evaluated using stress induced depression models like FST and TST.[63,64]

Nardostachys jatamansi

The antidepressant effect of ethanol root extract of *N. jatamansi* in electronbeam irradiated mice, has shown a significant reduction in the durationof immobility (in seconds) in Forced Swimming Test and Tail Suspension Test.[65]

Passiflora foetida

Passiflora foetida (*Passifloraceae*), popularly known as stinking passion flower, is an herbaceous climber that has been widely used in Mexican traditional medicine for the treatment of different central nervous system (CNS) disorders. Chemical constituents in *Passiflorafoetida*include hydrocyanic acid, groups of flavonoids and Harman alkaloids. Some reports have pointed out the harman alkaloids as the bioactive constituents of Passifloraincarnata Linn, one of the species of *Passiflora* that have been extensively studied chemically and biologically. It has found to possess antidepressant activity.[66]

Schinus molle

S. molle, from family Anacardiaceae, is native to South America but has been introduced to most tropical and subtropical regions across the world. This plant has been reported to exert certain pharmacological properties including anti-inflammatory, antitumor, antifungal, anticonvulsant, and analgesic Injection with *n*-hexane *S. molle* extract (3-600 mg/kg) significantly decreased the immobility duration in tail suspension test in mice with an efficacy comparable to that of fluoxetine (10 mg/kg).[67]

Tecoma stans

Flowers of *Tecoma Stans* Linn popularly known as "yellow bell flowers" contain flavonoids. Leaves of Tecoma Stan contain the alkaloids tecomin and tecostamine are potent hypoglycemic agent when given intravenously. Anthranilic acid is responsible for the ant diabetic activity. Roots are powerful diuretic and vermifuge. Tecoma is not a toxic because this plant is used in Latin America as a remedy for diabetes and moreover for feeding cattle and goats in Mexico.66Flavonoids have been established to have antidepressant activity.[68]

Urtica dioica

The present study indicates that Urtica dioica produces a specific antidepressant-like effect in animal models predictive of antidepressant properties, FST and TST. Moreover, the effect of the acute or repeated administration of this extract was similar to the action produced by the classical antidepressant fluoxetine and haloperidol.[69]

Withania somnifera

W. somnifera also known as Indian ginseng is widely used as a rasayana (rejuvenator) to promote physical and mental health and healthy ageing.[70,71] and also possess as an anti-cancer, neuroprotective, anti-epileptic, spermatogenic, hepatoprotective, anti-microbial, anti-oxidant, anti-inflammatory, and anti-arthritic activities.[72,73] Recently, it has demonstrated as anti-depressant, anxiolytic, and adaptogenic properties in a range of rodent behavioural tests such as the open field test, forced swim test, tail suspension test and learned helplessness test etc.[74,75]

***Zingiber officinale*(*Sunthi*)**

Zingiber officinale, traditionally referred to as *Sunthi* in Ayurveda and commonly known as ginger is a member of the Zingiberaceae family. It is a perennial plant with fleshy rhizomes which has several culinary and medicinal applications. In Ayurveda, *Z. officinale* has been

used to treat digestive disorders and arthritis.[76] *Z. officinale* and its constituents also possess anti-oxidant, anti-inflammatory, anti-microbial, anti-cancer, anti-diabetic, and hepato-protective properties[77,78] Recent studies have reported on the anti-depressant properties of *Z. officinale* which should encourage further studies. Oral administration of *Zingiber officinale* rhizome hydro-alcoholic extract in rats caused a decrease in the duration of immobility in the forced swim and tail suspension tests thereby demonstrating the anti-depressant activity of this plant.[79]

CONCLUSION

In this review, the collection of plants having antidepressant activity were jotted down from various journals and can be concluded that there are still so many plants which needs to be explored to study their therapeutic value, as they may be used as herbal medications since they are free from side effects and frequent toxicity unlike the synthetic medicines. Hence this review is an initiation to provide wide option of herbal source for the treatment of depression.

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