



Antidepressant Herbal Plants: An Updated Review

Chander Sheikhar *, Ritu Rani , Ajeet Pal Singh , Amar Pal Singh

Department of Pharmacology, St. Soldier Institute of Pharmacy, Lidhran Campus, Behind NIT (R.E.C.), Jalandhar –Amritsar by pass, NH-1, Jalandhar - 144011, Punjab, India.

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*Address for Correspondence:

Chander Sheikhar, Department of Pharmacology, St. Soldier Institute of Pharmacy, Lidhran Campus, Behind NIT (R.E.C.), Jalandhar –Amritsar by pass, NH-1, Jalandhar -144011, Punjab, India.

Abstract

The symptoms of this illness include mood swings, protracted melancholy, disinterest, and diminished cognitive performance. These symptoms give the patient discomfort and have a substantial negative impact on their capacity to function and lead fulfilling personal, social, and professional lives. Depression treatment has to be comprehensive and involve medicine. For several centuries, herbal chemicals have been the subject of scientific inquiry, and ongoing studies are being conducted to explore their possible medical benefits. Herbs used in traditional medicine have been shown to be highly beneficial in lowering depression and its symptoms as well as enhancing patient function. Plants are used in biology and medicine in a variety of ways. They are an excellent resource for the creation of innovative drugs due to their high levels of safety, accessibility, availability, tolerance, and low levels of toxicity. Depression is caused by a multitude of variables, such as inflammation, brain-derived neurotrophic factor (BDNF), hypothalamic-pituitary-adrenal (HPA) axis, and monoamine neurotransmitters (dopamine, serotonin (5-HT), noradrenaline, and 5-HT). Herbal medicines have gained a lot of attention lately since they are less costly and have less adverse effects than traditional depression treatments. Recent years have seen a significant amount of study on the possible application of sedative and antidepressant plants. The primary emphasis of this review has been herbal medications with antidepressant properties.

Keywords: Depression, herbal medications. Herb, antidepressant plants

INTRODUCTION

Depression has a significant impact on a person's ability to operate on an individual, biological, and societal level. Depression is characterized by extreme sadness, emptiness, grief, hopelessness, and despair.¹ Although hereditary and environmental variables interact to generate depression, its precise etiology and pathogenic processes are still unknown.² The World Health Organization (WHO) states that depression is one of the main factors contributing to the overall burden of illness and a significant cause of disability.³ Adrenocorticotrophic hormone (ACTH), cortisol abnormalities, and corticotropin-releasing hormone have all been linked to the development of postpartum depression, according to some research.⁴

Medicinal herbs have been utilized in traditional and folk medicine for thousands of years, and their value in treating mild to moderate illnesses is increasing.⁵ The illness is a substantial contribution to the overall global burden of disease and one of the primary causes of disability in the globe. Depression affects more women than males.⁶ Plants serve a wide range of biological and medical purposes. They are an excellent source for developing new drugs because of their high levels of safety, availability, accessibility, tolerance, and low levels of toxicity.⁷

In addition to movement symptoms, Parkinson's disease patients may also have non-motor symptoms such as anxiety, dementia, exhaustion, sadness, and trouble sleeping. Neuropathological hallmarks of Parkinson's disease include the loss of dopamine neurons in the substantia nigra that contain neuromelanin and the development of Lewy bodies in the cytoplasm of cells.⁴ SSRIs, tricyclic antidepressants (TCAs), and monoamine oxidase inhibitors are common therapies for depression. These medications have short half lives—usually lasting no longer than 12 weeks—and their effects start to show within a few days.³ Empirical research indicates that the health benefits of plants can be attributed to their antioxidant qualities and their impact on cellular metabolism.³ In addition to altering receptors, natural compounds can also impact the size, distribution, and sizing of neurotransmitters as well as immune system functions.^{8,9} The tissues of medicinal plants, sometimes known as "herbs," contain a variety of pharmacologically active substances, including glucosides, alkaloids, fatty oils, essential oils, mucilage, tannins, gums, flavonoids, iridoids, bitters, and saponins, among others that are not easily identified as distinct substances.¹ Natural products have the ability to control neurotransmission through a number of mechanisms, such as altering receptors, producing and transporting neurotransmitters, or controlling immunological responses.³ When compared to synthetic antidepressants, herbal medications have less

adverse effects.² The majority of herbal remedies used in the phytopharmacology of depression are dietary supplements or over-the-counter (OTC) preparations, which are thought to be safe and cause fewer adverse drug reactions (ADRs) than traditional medications.¹ These herbal remedies, which include Western herbalism, TCM, and Ayurvedic medicine, have therapeutic benefits on individuals with mild-to-moderate depression (both as supplemental and monotherapy). These herbal remedies' effectiveness and safety have been shown in very limited patient populations. Depression is exacerbated in large part by inflammation. Furthermore, inflammation can both contribute to and be a physical manifestation of depression. Relative improvement in depressed symptoms is typically the only outcome of therapeutic therapy for depression. Newer and more effective research on major depressive disorder therapies is desperately needed overall. Even while neurological, metabolic, and behavioral illnesses including depression, dementia, and metabolic disorders are associated with inflammation, these conditions also lead to increased inflammation.³ For millennia, individuals have attempted to cure depression with natural therapies that are part of conventional medicine. Certain medicinal plants have been utilized for a wide range of ailments in numerous cultures and geographical areas. Roughly 60% of the more than 300,000 seed plants have reportedly been employed for their therapeutic qualities. According to the samples of preparations given there, St. John's wort and saffron crocus are the most often used antidepressant preparations in Poland. Other possible additions include amino acids that are sources of monoamines, lemon balm, or B vitamins.¹ Therefore, the goal of this research is to investigate the potential use of natural remedies in the treatment of depression.

HERBAL PLANTS

Lemon Balm

It is usually well accepted, has no significant adverse effects, and headache, vomiting, stomach discomfort, and nausea have very rarely been recorded.¹ Another well-liked herb with a variety of medicinal uses is lemon balm, which has antibacterial, antidepressant, and spasmodic qualities. This healing herb encourages sleep while lowering tension and anxiety. Lemon balm also possesses strong antioxidant and anti-inflammatory qualities. Remarkably, the essential oils derived from lemon balm are likewise abundant in phenolic antioxidants, primarily citronellal and neral, and their potency is equivalent to that of synthetic antioxidants like butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT).^{1,10}

Murraya paniculata

The herb contains several health benefits, including those related to diabetes, obesity, antimicrobial, anti-implantation, anti-oxidative, cytotoxic, anti-diarrhea, antidepressant, and anxiety reduction. Additionally noted were the anti-depressant and anti-anxiety qualities of several MP leaf solvent extracts. Previous research showed that the extract reduced mice's immobility in the anti-depression experiment and increased the number of

animals joining the anti-anxiety model. Folk medicine has historically made use of this herb. Following an acute oral dosage of the extract, there were no fatalities or cases of CNS or ANS toxicity.⁵

Ginkgo

Its benefits include hepatoprotective, anti-aging, anti-cancer, anti-dementia, antidiabetic, anti-obesity, antilipidemic, antibacterial, and antiplatelet properties.¹ Another experimental in vitro investigation used ginkgo extract to variably regulate pro-inflammatory cytokines (TNF-, IL-6, and IL-1) and dramatically suppress the production of prostaglandin E2 (PGE2) in lipopolysaccharide (LPS) treated cultured primary rat microglia. Consequently, it may be said that ginkgo exhibited anti-inflammatory properties.¹¹

Berberine

Berberine (BBR) is an isoquinoline alkaloid that is commonly used in traditional Chinese medicine. It is extracted from plants and has a wide range of medicinal properties, including anti-inflammatory, anti-fibrotic, antidiabetic, anti-diarrheal, anti-obesity, antihyperlipidemic, antihypertensive, antiarrhythmic, antidepressant, and anxiolytic effects. By blocking MAO activity, BBR lessens the symptoms of depression. By activating 5-HT1A receptors and inhibiting postsynaptic 5-HT2 and 5-HT1A receptors, BBR (100 mg/kg) has a good anxiolytic effect. This may be related to increased brain stem monoamine synthesis and decreased serotonergic system activity.^{7,12} The pro-oxidant enzymes lipoxygenase and xanthine oxygenase, which are involved in the synthesis of reactive oxygen species (ROS), can be inhibited by berberine.³

Korean Ginseng

Preparations made from this plant can be used internally to reduce the anti-inflammatory effects of oxidative stress, which is linked to aging, and to improve overall health. The bioactive compounds in Korean ginseng lessen the impact of many ailments, primarily by inhibiting the enzymes COX-2 and 5-lipoxygenase (5-LOX).^{1,13}

Hypericum Perforatum L.

Often referred to as St. John's wort (SJW), is a well-researched medicinal herb used to treat mild-to-moderate major depressive symptoms. These antidepressant effects are attributed to polyphenols, flavonoids, and the two major constituents, hypericin and hyperforin. According to research by Kasper et al., hypericum can effectively prevent recurrent depression over the long run. Hypericum has little side effects, and the percentage of participants removed from clinical studies varied from 0% to 5.7%, which did not differ substantially from a placebo.²

Lavender

It is applied to depression, anxiety, sleeplessness, and restlessness. Animal research that examined inflammation brought on by carrageenan and croton oil also demonstrated the anti-inflammatory properties of lavender oil. Increased production of cytokines,

prostaglandins, and leukotrienes is seen in this type of inflammation.¹⁴ The study validated lavender aromatherapy's efficacy in lowering anxiety and depression in patients with acute coronary syndrome (ACS) and supports intensive care nurses' use of lavender oil aromatherapy as a non-pharmacological, economical intervention to ease psychological stress and improve patient satisfaction while patients are hospitalized in cardiac care units.¹⁵ According to the European Medicines Agency, lavender essential oil includes fat-soluble components including linalool and linalyl acetate, which have important therapeutic benefits in a range of neurological illnesses, notably depression, stress, and anxiety. For mild-to-moderate depression, lavender tincture can be used as an adjunctive medicine.²

Apigenin

Numerous investigations have demonstrated that apigenin elicits antidepressant effects by stimulating various anti-inflammatory pathways, such as phosphoinositide 3-kinase-protein kinase B/Akt (PI3K/Akt) and p38 mitogen activated protein kinases (MAPK), as well as the overexpression of γ -receptors triggered by peroxisomes and serum BDNF expression levels. Consequently, their antidepressant effects have been highlighted because of their involvement in the regulation of BDNF by corticosterone and apigenin.³

Magnolia Bark

It demonstrates a potent anti-inflammatory impact as well. For thousands of years, Chinese and Japanese physicians have utilized this medicinal herb to treat gastrointestinal issues, headaches, anxiety, asthma, and depression. Magnolol and honokiol are the main anti-inflammatory compounds.¹⁶

Piperine

Additionally, studies have indicated that piperine functions as an antidepressant by blocking MAO activity and raising the amounts of monoamine neurotransmitters in mice's brains. A common seasoning for savory foods is piperine, a primary alkaloid found in long pepper (*Piper longum* L) and black pepper (*Piper nigrum* L). Piperine's anti-inflammatory and neuroprotective qualities aid in preventing brain ischemia. Piperine's antidepressant benefits are a result of its antioxidant, anti-inflammatory, and neuroprotective properties working together.³

Mimosa Tree

It has therapeutic properties that include antidepressant, antioxidant, hepatoprotective, antibacterial, anticancer, antiallergic, antinociceptive, and anti-inflammatory properties. Mimosa trees, like the other medicinal plants previously mentioned, demonstrated anti-inflammatory properties in rat models of inflammation and paw oedema produced by carrageenan, dextran, and cotton pellets.¹

Genistein

Dietary isoflavone genistein, which is mostly found in soy beans, has anti-cancer, anti-osteoporosis, anti-cardiovascular, and anti-depressant properties. Nevertheless, it is unknown how genistein works in

depression. Recently, there has been consideration of the impact of microRNA on the etiology of depression and the efficacy of depression therapy.³

Saffron Crocus

This plant could be used to treat age-related macular degeneration and cancer. Its effectiveness as a substitute treatment for mild to severe depression is well-established, nonetheless. It is most likely crocin, crocetin, and safranal that give saffron crocus its purported anti-inflammatory properties. These derivatives' molecular processes entail a reduction in blood levels of TNF, IFN, and the NF- κ B p65 subunit as well as many interleukins, including IL-1, IL-6, IL-12, and IL-17A. According to some experimental research, saffron crocus helps to preserve neurons. By reducing the generation of free radicals and boosting antioxidant activities in a way that is dependent on the extracellular signal-related kinases 1 and 2 (ERK1/2) pathway, the chemicals found in saffron crocus reduce CNS inflammation.^{1,17} Adults with MDD who take supplements containing saffron report less symptoms of depression.¹⁸

Baicalin

Baicalin has the potential to function as a neuroprotective and antidepressant, as well as an efficient inhibitor of neuroinflammation and oxidative stress. Baicalin can therefore effectively inhibit oxidative stress and neuroinflammation in addition to acting as an antidepressant and neuroprotective agent.³

Curcumin

The polyphenolic chemical curcumin is obtained from the *Longa curcuma* plant. Curcumin can lessen depression by increasing the concentration of monoamines that are accessible to interact with receptors, such as tricyclics, according to research conducted in vitro and in vivo. Curcumin suppresses transcription signaling pathways including NF- κ B, which is one of its effective ways to lessen depression symptoms. The genesis of inflammation and the production of proinflammatory cytokines like IL-6 and IL-1b are significantly influenced by this process.³

Purslane (*Portulaca oleracea* L.)

It belongs to the family Juss Portulacaceae. These Latin words are combined to give this plant its name, "portulaca," which refers to the milky liquid it contains. *P. oleracea* reduces ACTH levels to provide its antidepressant effects. To validate its anti-depressive qualities and underlying processes, additional research is necessary as this topic of study has not received much attention. It has been used to treat liver problems, gut problems, burns, headaches, arthritis, and shortness of breath. It has also been used as an antiseptic, vermifuge, and febrifuge. It is considered to have antidepressant properties. Compounds with antidepressant properties can make up as much as 16% of the plant's dry weight.⁴

Murraya paniculata

Murraya paniculata (MP) is a traditional medicinal plant belonging to the Rutaceae family. It is also known by the names honey bush, orange jasmine, and kamini. Limiting the spread of *Diaphorina citri* into commercial citrus

orchards is a crucial step towards improving the management of huanglongbing. This plant is used to treat rheumatism, bruising, headaches, gastralgia, stomachaches, skin irritation, and swelling. It's also used as a therapy for snake bites and to increase menstruation flow. Previous research showed that the extract reduced mice's immobility in the anti-depression experiment and increased the number of animals joining the anti-anxiety model.⁵

CONCLUSION

Exploring traditional Chinese and Indian medicine systems might be a viable avenue in the hunt for novel plants with antidepressant properties. There is evidence that many herbs that are considered strange to Europeans and have been used extensively for millennia in East Asian traditional folk medicine (China, Japan) may also contain antidepressant properties. Even though a number of therapies have been suggested thus far, they are linked to detrimental side effects and unsatisfactory treatment results. Research points to the possibility of using more natural substances as a substitute tactic to postpone the onset and worsening of depression and symptoms similar to it. It's also important to note that more research has to be done on herbal medicines because there are still numerous questions about their efficacy and safety.

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