

# Exploring the Potential of Traditional Medicinal Plants for Central Nervous System Related Activity

Sougata Santra, Adib Hussain, Arabinda Nayak\*

Department of Pharmacology, Gupta College of Technological Sciences, Asansol, West Bengal, INDIA.

## ABSTRACT

People have used native healing plants in different old-school medicine practices worldwide for hundreds of years to fix all sorts of health problems, including ones that mess with the brain and nerves. As science gets better, folks are getting excited again about checking out what these plants can do for brain and nerve issues like feeling worried or down, seizures, trouble sleeping mixed-up thinking, and brain diseases that get worse over time like forgetting everything, shaking a lot or not being able to control your movements. The brain and nerves are super complicated and coming up with treatments that can change how they work without causing too many problems is one of the biggest headaches in medicine today. That's where these native healing plants come in handy. They're full of natural stuff that might work as safer options or add-ons to regular treatments for brain and nerve problems. A bunch of these plants have active ingredients like alkaloids, flavonoids, terpenoids, glycosides, saponins, polyphenols, and tannins. These ingredients do their thing in different ways, like changing how brain chemicals work (like serotonin, dopamine, GABA glutamate) helping the body fight off damage, cutting down on brain swelling, and helping new brain cells grow. For example, alkaloids like nicotine and caffeine have been known to wake up the brain for a long time, while flavonoids like quercetin and rutin are known to protect brain cells and fight swelling. Certain terpenoids such as those in *Cannabis sativa*, have a big impact on the central nervous system. Their effects range from pain relief to anxiety reduction. Several native medicinal plants have caught the eye of researchers because of how they affect the central nervous system.

**Keywords:** Herbal medicine, Neuroprotection, Healing Agents, Active Ingredients, Treatments.

## Correspondence:

**Dr. Arabinda Nayak**

Department of Pharmacology, Gupta  
College of Technological Sciences,  
Ashram More, GT Rd, Asansol-713301,  
West Bengal, INDIA.  
Email: arabinda00717@gmail.com

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## INTRODUCTION

Many plants are super useful for their secondary metabolites which come in handy for treating and warding off sickness. A bunch of them have shown some cool effects like stopping seizures, making mood better chilling you out, improving memory, and giving you a boost in how active you are. Plus, they've been great in dealing with brain issues like dementia Parkinson's, Alzheimer's, stress, and feeling wiped out. These healing greens make a difference in fighting the blues by messing with brain chemicals like serotonin, noradrenaline, and dopamine, and also play a role in the stress response system and they're pretty good at stopping cell damage with their antioxidant powers. They make you feel less worried and more relaxed by either upping the chill signals in your brain or bringing down the hype ones. But, the way

these plant pals help with mental troubles is by their stuff getting cozy with brain signal receivers, either cranking up or toning down brain buzz and keeping hormone levels on the straight and narrow.<sup>[1]</sup> When it comes to preventing seizures, these plants are on point by blocking some brain receptors, jamming sodium channels, cutting down on calcium getting into cells mimicking GABA (a calming brain chemical) acting like some medicines for nerves, turning down dopamine and tweaking other message senders in the noggin. They're power players against brain decay issues because they can stop the bad oxidative stuff, cool down overexcited cells, put a stop to cells offing themselves, push good cell signals, tweak the cell borders, cut down swelling, and stop clumps of messed-up proteins from gumming up the works in key brain spots.<sup>[5-6]</sup> The human Central Nervous System (CNS) is this big boss that handles stuff like moving, feeling, and thinking. When bad things go down in the central nervous system, like Alzheimer's Parkinson's, anxiety, and the dumps, it's a big deal for folks everywhere. Trying to fix these illnesses often ends up with not-so-great reactions just-okay results or the problems just shrugging off the treatment.<sup>[2,3]</sup>



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## MECHANISMS OF CNS DISORDERS

Various neurological and psychological symptoms can be caused by a wide variety of illnesses that impact the brain and spinal cord; these conditions are collectively known as Central Nervous System (CNS) disorders. The underlying causes of these illnesses are intricate and involving:

Disorders of mood, anxiety, and other mental health difficulties can result from imbalances in neurotransmitters such as serotonin, dopamine, GABA, and glutamate, or problems with their levels.<sup>[4]</sup>

**Neuroinflammation:** Infections, immunological reactions, or injuries can lead to chronic inflammation in the Central Nervous System (CNS), which can exacerbate diseases including Alzheimer's and multiple sclerosis. Neurodegeneration slow but steady in disorders like Alzheimer's and Parkinson's might result from oxidative stress, which occurs when antioxidant defenses are inadequate to prevent harm to neuronal cells. Diseases like Alzheimer's and Huntington's cause neurodegeneration, which manifests as a decline in neuronal structure and function due to cell death and the buildup of misfolded proteins.

### Heredity

Some people have a higher risk of developing Central Nervous System (CNS) problems due to their genes, which affect neurotransmitter systems and how the brain develops. Factors such as stress, infections, and pollutants can affect Central Nervous System (CNS) function, which in turn can cause or worsen health problems.<sup>[5]</sup>

## MECHANISMS OF NEUROPROTECTION AND THERAPEUTIC EFFECTS

The neuroprotective and therapeutic benefits of phytochemicals derived from medicinal plants are mediated through various interrelated mechanisms for illnesses affecting the Central

Nervous System (CNS). First, these chemicals are incredibly important because of the function they play in regulating neurotransmitter systems. They improve the production, release, or activity of receptors for important neurotransmitters including GABA, serotonin, and dopamine. For example, it has been shown that phytochemicals such as curcumin from turmeric and hypericin from St. John's Wort increase serotonin levels. This suggests that they may have a positive effect on cognitive functioning and mood disorders. Mood disorders such as anxiety and sadness can be naturally managed by this neurotransmitter regulation. Furthermore, several phytochemicals have antioxidant and anti-inflammatory capabilities, which are vital for preventing oxidative stress and chronic inflammation in the brain. Berry, green tea, and dark chocolate polyphenols are powerful free radical scavengers, protecting neurons from oxidative stress. In addition, curcumin and gingerol, two chemicals found in ginger, can reduce neuroinflammation associated with neurodegenerative illnesses including Alzheimer's and Parkinson's by blocking signaling pathways and pro-inflammatory cytokines. Finally, some phytochemicals may make the brain more adaptable and reorganizable by increasing neuroplasticity and neurogenesis, the creation of new neurons. For instance, quercetin and resveratrol, which are flavonoids present in red wine and grapes, promote the synthesis of Brain-Derived Neurotrophic Factor (BDNF), an essential protein that aids in the maintenance, expansion, and specialization of neurons. Learning, memory, and the ability to heal from brain lesions are all positively correlated with elevated BDNF levels. The relevance of incorporating plant-based remedies into broader treatment methods for brain health is underscored by the varied activities of phytochemicals, which collectively demonstrate their promise as natural therapeutic agents for central nervous system problems. Investigating the neuroprotective effects of plants for therapeutic purposes opens the door to creating new, secure, and efficient remedies for various disorders affecting the central nervous system.<sup>[6-8]</sup>

## PLANTS POSSESSING CNS ACTIVITY

Plant Name	Potential Activity	Dose (mg/kg)	Animal Model	Plant part used
<i>Bacopa monnieri</i> <sup>[9]</sup>	Cognitive enhancer, Antidepressant	40-160	Mice, Rat	Whole plants, Leaves
<i>Withania somnifer</i> <sup>a[10]</sup>	Anxiolytic, antidepressant, Neuroprotective	50-200	Mice, Rat	Roots
<i>Centella asiatic</i> <sup>a[11]</sup>	Neuroprotective, memory enhancer	100-300	Mice, Rat	Leaves, Aerial parts
<i>Valeriana officinali</i> <sup>s[12]</sup>	Sedative, anxiolytic	100-200	Mice, Rat	Roots

<i>Passiflora incarnate</i> <sup>[13]</sup>	Sedative, anxiolytic	200-300	Mice, Rat	Leaves
<i>Curcuma longa</i> <sup>[14]</sup>	Antidepressant, Neuroprotective	30-300	Mice, Rat	Rhizome
<i>Ginkgo biloba</i> <sup>[15]</sup>	Cognitive enhancer, Neuroprotective	100-200	Mice, Rat	Leaves
<i>Hypericum perforatum</i> <sup>[16]</sup>	Antidepressant	100-400	Mice, Rat	Flowers, Aerial parts
<i>Mucuna pruriens</i> <sup>[17]</sup>	Neuroprotective, Anti-parkinsonian	100-200	Mice, Rat	Seeds
<i>Acorus calamus</i> <sup>[18]</sup>	Cognitive enhancer, Neuroprotective	50-200	Mice, Rat	Rhizome
<i>Camellia sinensis</i> <sup>[19]</sup>	Neuroprotective, cognitive enhancer	50-400	Mice, Rat	Leaves
<i>Lavandula angustifolia</i> <sup>[20]</sup>	Sedative, anxiolytic	100-300	Mice, Rat	Flowers
<i>Convolvulus pluricaulis</i> <sup>[21]</sup>	Cognitive enhancer, Anxiolytic	50-200	Mice, Rat	Whole plant
<i>Silybum marianum</i> <sup>[22]</sup>	Neuroprotective	100-200	Rats	Seeds
<i>Panax ginseng</i> <sup>[25]</sup>	Cognitive enhancer, Neuroprotective	50-200	Mice, Rat	Roots
<i>Ocimum sanctum</i> <sup>[26]</sup>	Antidepressant, Anxiolytic	100-200	Mice, Rat	Leaves
<i>Zingiber officinalis</i> <sup>[27]</sup>	Neuroprotective	100-500	Mice, Rat	Rhizome
<i>Melissa officinalis</i> <sup>[28]</sup>	Sedative, anxiolytic	200-400	Mice, Rat	Leaves
<i>Glycyrrhiza glabra</i> <sup>[29]</sup>	Neuroprotective, antidepressant	50-150	Rats	Roots
<i>Nardostachys jatamansi</i> <sup>[30]</sup>	Antidepressant, anxiolytic	50-200	Mice, Rat	Rhizome
<i>Salvia officinalis</i> <sup>[31]</sup>	Cognitive enhancer, Neuroprotective	100-500	Mice	Leaves
<i>Rauwolfia serpentina</i> <sup>[32]</sup>	Sedative, antihypertensive	50-300	Mice, Rat	Roots
<i>Celastrus paniculatus</i> <sup>[33]</sup>	Cognitive enhancer, Neuroprotective	50-200	Mice, Rat	Seeds
<i>Crocus sativus</i> <sup>[34]</sup>	Antidepressant, Neuroprotective	50-100	Mice, Rat	Stigma
<i>Cannabis sativa</i> <sup>[35]</sup>	Neuroprotective, anxiolytic	1-20	Mice, Rat	Flowers, Seeds
<i>Hypericum japonicum</i> <sup>[36]</sup>	Antidepressant	100-400	Mice	Whole plant
<i>Corydalis yanhusuo</i> <sup>[37]</sup>	Sedative	30-300	Mice	Tuber
<i>Piper methysticum</i> <sup>[38]</sup>	Anxiolytic	100-300	Rats	Root
<i>Albizia lebeck</i> <sup>[39]</sup>	Anxiolytic, Sedative	200-400	Rat, Mice	Bark
<i>Turnera diffusa</i> <sup>[40]</sup>	Anxiolytic, sedative	50-100	Mice, Rat	Leaves, Stem

### **Bacopa monnieri**

In the world of Ayurveda, folks often turn to an herb named *Bacopa monnieri*, which folks also call brahmi. This plant is a big deal for your brain and nerves because it packs a punch with its antioxidant powers. This can make your thinking sharper, your worries less, and it's like a shield for your brain cells. Brahmi gets into your brain chemistry fiddling with stuff like acetylcholine and serotonin, boosting your vibes and focusing your mind. For a brain boost, peeps take between 300 to 600 mg each day. To keep anxiety in check, 300 mg does the trick, while a range of 200 to 400 mg is the sweet spot for guarding those nerves.<sup>[23,24]</sup>

### **Withania somnifera**

Ashwagandha also called *Withania somnifera*, is a special herb in Ayurvedic healing. People use it because it helps with stress and worry, makes brain functions better, and keeps the central nervous system healthy. When folks look into this herb, they find that it can make memories sharper and attention more focused. It also guards nerves against damage due to too much oxygen. *Withania somnifera*, or Ashwagandha for short, is a big deal for its influence on the brain and nerves. If you want to boost your brain power, you'd take like 300-600 mg each day. To chill out and worry less, 300-500 mg will do. And if you're super stressed, 500-1000 mg might help you relax. This same herb could protect your brain cells at doses between 300-600 mg every day.<sup>[39]</sup>

### **Centella asiatica**

Gotu kola, which some folks call *Centella asiatica*, is a traditional herb with some neat possible perks for the brain. People believe it chills you out, cuts down stress, boosts your memory, and sharpens the mind. Studies suggest this plant might kick-start brain cell growth and act like a shield against damage from stress, both super good for your noggin. So, this herb is pretty famous for making your thinking better calming nerves protecting nerve cells, fixing up cuts, and keeping skin in tip-top shape. If you're aiming for those brainy gains or trying to stay calm taking 500-1000 mg should do the trick, same goes if you're looking after your neurons or trying to heal wounds and keep your skin looking good.<sup>[40]</sup>

### **Valeriana officinalis**

*Valerian root* or *Valeriana officinalis*, serves as a natural sedative aiming to slash anxiety and make sleep better. Studies suggest this herb might boost GABA activity which helps chill you out and cut down on stress. Peeps use Valerian root because it chills them out., they'll take about 300-600 mg to chill from anxiety and pop 400-900 mg before bedtime for better Zs. It's also pretty good for easing up your muscles at doses of 300-600 mg.<sup>[41]</sup>

### **Passiflora incarnate**

*Passiflora incarnata*, or passionflower as most folks call it, is this herb that's all about chilling out your brain. People use it a lot

to mellow down their nerves and score some good sleep. Some smart folks did studies and think it might pump up GABA stuff in your noggin, which helps you relax. Now, passionflower aren't just chill vibes; it's also got some serious dosing. If you're trying to kick anxiety, you're looking at 300-600 mg and for those Zzzs, it's about 400-800 mg when you hit the sack. And there's this tincture thing too-you can take about half a dropper to two droppers full (that's 0.5-2 mL, by the way).<sup>[42]</sup>

### **Curcuma longa**

*Curcuma longa* or turmeric as we call it, is under the microscope for how it might do some good stuff for our brain and nerves. So, this special thingy inside it named 'curcumin' has got skills for guarding our brain cells knocking down swelling, and maybe even helping brain diseases like Alzheimer's take a back seat. Studies are hinting that curcumin could make our smarts sharper, turn down the damage from stuff like pollution, and encourage new brain cells to grow. When it comes to keeping our noggin in tip-top shape, curcumin from turmeric is the real MVP. Folks take about 400-600 mg a day if they want to boost their brainpower, and if they're after protecting their brain or feeling better mood-wise, they go for 500-1000 mg each day.<sup>[43]</sup>

### **Ginkgo biloba**

*Ginkgo biloba* stands out as a tree known for protecting brain health and boosting mental abilities. Its leaves pack flavonoids and terpenoids, substances known to enhance blood flow towards the brain and act as antioxidants. Studies point out Ginkgo could help with brain conditions such as dementia and Alzheimer's disease by making memory and brain functions better. People use *Ginkgo biloba* because of how it helps the CNS taking 120-240 mg of the standard extract every day to improve thinking skills, 120-600 mg to decrease anxiety and 120-240 mg to guard the nerves.<sup>[44]</sup>

### **Hypericum perforatum**

*Hypericum perforatum* or St. John's Wort as most folks call it, gets a lot of credit for making people feel less blue. This little plant does its magic by stopping brain chemicals like serotonin, dopamine, and norepinephrine from vanishing too quick, which actually perks up your mood and chills you out if you're feeling anxious or down. Researchers have scribbled down loads of notes confirming it's pretty good at tackling not-so-heavy depression. When it comes down to calming your nerves or shooing away the sadness, St. John's Wort steps in with doses from 900 to 1800 mg of the stuff they put in those chill pills for kicking depression or a lighter 300 to 600 mg every day to keep the jitters at bay.<sup>[45]</sup>

### **Mucuna pruriens**

*Mucuna pruriens* or the velvet bean as it's often called, is famous for its rich L-DOPA levels, the stuff that comes before dopamine. People have used it for a long time to keep their nervous system in good shape and it might lift your spirits, sharpen your brain,

and help you move smoother. Studies hint it could help with Parkinson's disease by working on dopamine levels. When you're aiming for a better mood, 300-500 mg of *Mucuna pruriens* a day might do the trick, and for a brain boost or to guard your neurons, 500-1000 mg is what's recommended.<sup>[46]</sup>

### **Acorus calamus**

*Acorus calamus* or sweet flag, is known for safeguarding nerve cells, boosting memory and battling stress in the brain. Researchers tie these benefits to the plant's ability to fend off damage and swelling. A key component  $\beta$ -acarine, is responsible for these positive changes, but there's still some worry about harmful effects when you take too much. People often use Sweet Flag for its brain benefits taking 300-500 mg of its refined extract to sharpen their thinking. The same amount can also help chill you out and reduce your anxiety.<sup>[47]</sup>

### **Camellia sinensis**

*Camellia sinensis* or the tea plant, boosts your brain because of stuff like caffeine and theanine. It makes you smarter, lifts your spirits, and guards your nerve cells. These bits work together to keep you sharp, chill you out, and protect your brain cells from damage. People use the tea plant for its brainy benefits taking 300-600 mg of green tea extract to get their mind in gear and 200-400 mg of L-theanine to take the edge off of anxiety.<sup>[48]</sup>

### **Lavandula angustifolia**

*Lavandula angustifolia* you know lavender, is pretty awesome because it chills out your brain. It kinda takes the edge off your nerves, helps you get some Z's, and even shields your brain cells with its kick-butt antioxidant powers. This magic happens cause of stuff like linalool in it. So, if you want to keep the jitters away, you might take like 80 to 160 mg of lavender oil. But hey, if you're trying to catch some serious shut-eye, you're looking at 160 to 320 mg.<sup>[49]</sup>

### **Convolvulus pluricaulis**

The plant *Convolvulus pluricaulis* often called Shankpushpi, is renowned for its positive effects on the central nervous system. This includes boosting memory, easing anxiety, and protecting nerve cells. People take 500 to 1000 mg of Shankpushpi each day to sharpen their thinking, and 300 to 500 mg a day when they want to calm their nerves.<sup>[50]</sup>

### **Silybum marianum**

The milk thistle known as *Silybum marianum*, packs a punch with its active element silymarin known for guarding our nerves. Studies show it's a defender against brain aging and damage, which could help with nasty stuff like Alzheimer's and Parkinson's. Plus, silymarin seems to boost brainpower and might lift your mood by messing with brain chemicals in a good way. People take it for

brain health swallowing about 140-600 mg of the go-to extract every day for keeping their neurons safe and sound, or 200-400 mg when they want to keep their thoughts sharp.<sup>[51]</sup>

### **Panax ginseng**

*Panax ginseng* also called Korean ginseng, is pretty famous because it's like a boost for your brain. It's got this awesome power to protect your nerve cells. That means it can fight off damage and swelling in your brain, which might even stop some nasty illnesses that mess with your memory and stuff as you get older. Plus, it can totally make your thinking, memory, and how well you pay attention better. And, it's like a chill pill because it makes you less stressed and lifts your spirits, thanks to its adaptogenic vibes. People take *Panax ginseng* to help their brain do its thing popping 200-400 mg of the fixed-up extract if they want to smarten up, 100-400 mg when they want to take the edge off their nerves, and 400-800 mg when they're feeling super tired and need a kick.<sup>[52]</sup>

### **Ocimum sanctum**

*Ocimum sanctum* also known as holy basil or Tulsi, plays a positive role on our brain's workings. This plant has a knack for guarding the brain against damage by lowering both oxidative stress and the decline of nerve cells. Plus, it seems to help with easing anxiety and fighting off the blues because it messes with brain chemicals like serotonin and dopamine. It could even make thinking and memory sharper. People use Tulsi for these brainy benefits taking from 300 to 600 mg of the go-to extract each day to chill out a bit, from 500 to 1000 mg when they need to shake off worry, and about 200 to 400 mg if they want to boost their brainpower.<sup>[53]</sup>

### **Zingiber officinalis**

*Zingiber officinalis*, you know ginger helps to shield your brain because it's packed with antioxidants that take on stuff like oxidative stress and swelling, which are total baddies in diseases where your nerves start to wear out. Plus, it could give your thinking skills and memory a serious boost since it gets more blood flowing up there- pretty cool, right? And if you're feeling all anxious and stressed out, ginger might just chill you out. People use this spicy root to perk up their mood munching on about 1-2 g of the dry stuff each day. If you need some brainy support, they pop 500-1000 mg of a ginger extract.<sup>[54]</sup>

### **Melissa officinalis**

*Melissa officinalis* or lemon balm chills out the brain. It cuts down on worry and stress giving a soothing sensation. This herb's got some tricks up its sleeve enhancing smarts when you need to remember stuff or pay extra attention. Plus, it's like a shield for your neurons, with its antioxidant power kicking in to protect them. Folks use lemon balm for its brainy benefits popping 300-600 mg of the good stuff in a standardized extract to shrink anxiety and a hefty 600-1200 mg to catch some Z's. To boost

thinking power and keep memories sharp, 300-600 mg each day should do the trick.<sup>[55]</sup>

### ***Glycyrrhiza glabra***

*Glycyrrhiza glabra* or licorice root, shows defenses for your brain cells thanks to its ability to fight off damage from oxidants. It can chill you out a bit too cutting down on nervousness and making you feel happier. Plus, it might help keep your memory sharp and your brain humming. People use licorice for its brainy benefits gulping down about 380-760 mg of the stuff in a standard extract each day to take the edge off stress, and 300-600 mg if they're looking to ease anxiety vibes. For a mental boost, they take 250-500 mg daily.<sup>[56]</sup>

### ***Nardostachys jatamansi***

Spikenard also known as *Nardostachys jatamansi* does a number on your brain's command center. It's like a shield for your nerve cells since it has antioxidant and anti-inflammatory qualities letting them dodge damage. It's also chill in making you less anxious and more mellow, while giving your brainpower and recall a boost. Folks use spikenard for its brain-boosting talents and it's recommended to pop 300-600 mg of the good stuff if you're looking to ease those nerves, or 500-1000 mg to snag better Zs at night, and 300-500 mg if you want to sharpen your mind.<sup>[57]</sup>

### ***Salvia officinalis***

*Salvia officinalis* know, the regular kind of sage, is pretty good for your brain. It ramps up your smarts and memory because it's loaded with stuff that guards your brain cells from getting rusty. Plus, it chills you out by cutting down on the jitters making you feel all mellow. People grab sage for these brainy benefits popping like 300 to 600 mg of the fancy extract every day to get sharper, or 400 to 800 mg when they want to shake off the stress. And hey, if you take a whiff of that sage oil, it might even boost your spirits.<sup>[58]</sup>

### ***Rauwolfia serpentina***

*Rauwolfia serpentina* or Indian snakeroot, works wonders on the brain. This plant has a special part called reserpine which is super good for calming high blood pressure and helping you relax. It's like a shield for nerve cells because it fights off damage with its antioxidant power. Docs often suggest taking 50-100 mg of Indian Snakeroot's special blend if you're feeling anxious or up to 200-400 mg if you need some serious chill vibes. To keep your noggin in tip-top shape, a daily dose of 100-200 mg might do the trick.<sup>[59]</sup>

### ***Celastrus paniculatus***

*Celastrus paniculatus* or the "Intellect Tree," is famous for its brain benefits. It shines when it comes to boosting brain power and guarding your nerves. This power plant is a big deal in Ayurvedic health practices where it's a go-to for beefing up the old brainbox

making learning a breeze, and chilling out those anxiety levels. So, when scientists peeked under the hood, they figured that this brain-boosting magic might be thanks to it chilling out the nasty oxidative stress and playing around with brain chemical tracks, like the ones for cholinergic and serotonergic systems. Now, if you want to tap into that smarty-pants energy folks take from 500 to a hefty 1000 mg of this plant's top-notch extract every day. And for keeping those brain cells cozy and protected, you'd want to snag between 300 and 600 mg a day. Oh, and for shaking off that stress? A cool 200 to 400 mg should do the trick.<sup>[60]</sup>

### ***Crocus sativus***

*Crocus sativus* or saffron, might protect the brain and help tackle depression. Research suggests it could sharpen the mind and help lessen sad moods. Crocin and safranin, its key bits play a part by tweaking brain signals and fighting cell damage. People use saffron for its brain boost taking 30 mg a day to lift their spirits and 20-30 mg to calm nerves. To help remember stuff and think clearer, doses of 15-30 mg could do the trick.<sup>[61]</sup>

### ***Cannabis sativa***

*Cannabis sativa* packs in stuff like THC and CBD that mess with your brain and nerves doing all sorts of things. THC is the go-to for easing pain, while CBD chills out your anxiety and sad vibes without making you loopy. Plus, these compounds might guard your neurons, which could help with brain issues that get worse over time. Folks use *Cannabis sativa* to get these brain benefits taking about 10-20 mg of THC when they're feeling anxious and a hefty 300-600 mg of CBD to curb that anxiety. If you're looking for a mood boost, 5-10 mg of THC might do the trick, and if you need to kill pain or look after your neurons, you'd go for 10-50 mg of either THC or CBD.<sup>[62]</sup>

### ***Hypericum japonicum***

It's also known by the cooler name of Japanese St. John's wort, and some smart folks have been checking it out for how it can mess with our brain noodle. They found out it might chill you out and act against depression cause it messes with the brain chemicals like serotonin and dopamine. Plus, it's got these things in it hypericin and hyperforin, which stop your brain chemicals from getting vacuumed up too quick and fight off brain swelling. People take this stuff to feel better or get rid of the jitters popping about 300-600 mg of the good stuff in extract form every day if they want to boost their mood, or 200- 400 mg when they just want to take the edge off.<sup>[63]</sup>

### ***Corydalis yanhusuo***

*Corydalis yanhusuo* or yanhusuo for short, is a herb from traditional Chinese medicine folks have checked out because it does some interesting stuff with your brain and nerves. The thing in it that works is Tetrahydropalmatine (THP), and it's famous for killing pain and helping people relax. Looks like *Corydalis*

*yanhusuo* can take the edge off of pain and worry by messing around with the brain chemicals, the ones like dopamine and serotonin. Plus, it could make your sleep better and chill out the stress you feel. People take it for the brain-related benefits., you'd take about 1.5-3 g of this dried root stuff every day to deal with pain, or if you're trying to keep calm, you could go with 300-600 mg of the fancy extract version. For sleeping like a log, 600-1200 mg each day could do the trick.<sup>[64]</sup>

### **Piper methysticum**

*Piper methysticum* or kava as most folks call it, is a plant with a chill-out rep from the South Pacific. This plant's got stuff called kavalactones that folks think could help you relax by tweaking your brain's GABA activity and bumping up dopamine. Some brainy types say kava might chill you out without making you as drowsy as other downers do. People use kava cause it plays with the central nervous system, and the usual dose for kicking anxiety is between 250-500 mg of its extract each day. For more of a snooze vibe, people might take 300-600 mg.<sup>[65]</sup>

### **Albizia lebeck**

*Albizia lebeck* also known as the siris tree or woman's tongue, is praised for its influence on the central nervous system. In Ayurvedic tradition, folks use its extracts to ease anxiety and lift their spirits. Studies suggest these plant extracts boost mood and calm nerves by increasing serotonin and dopamine levels. The recommended dose is 500-1000 mg of the standardized extract to ease anxiety and 200-400 mg to help you relax.<sup>[66]</sup>

### **Turnera diffusa**

*Turnera diffusa* also known as damiana, is an herb with a long history of use for its potential to affect the Central Nervous System (CNS). Studies indicate this plant might have calming effects and boosts one's spirits because it messes with brain chemicals like serotonin and dopamine. It's also a traditional go-to for sparking up sexual drive and calming nerves and stress. If you're looking to lift your mood, 400-800 mg of the standardized extract of *Turnera diffusa* (damiana) daily is the usual amount, while 300-600 mg a day is what people take to chill out and ease anxiety. To get in the mood or improve sexual performance, 200-400 mg each day might do the trick.<sup>[67]</sup>

## **DRUG INTERACTIONS**

**Mucuna pruriens:** May enhance the effects of Parkinson's medications (e.g., carbidopa/levodopa) and interact with antidepressants.

**Acorus calamus:** Potentially increases sedation when combined with CNS depressants (e.g., benzodiazepines).

**Ginkgo biloba:** Increases bleeding risk with anticoagulants (e.g., warfarin) and may interact with antidepressants.

**Panax ginseng:** May interact with anticoagulants and affect blood sugar levels, impacting diabetes medications.

**Ocimum sanctum (Holy Basil):** Can enhance the effects of anticoagulants and lower blood sugar, affecting diabetes medications.

**Convolvulus pluricaulis:** Potential CNS effects suggest caution with other CNS-active drugs.

**Ginger:** May increase bleeding risk with anticoagulants and affect blood sugar levels.

**Withania somnifera (Ashwagandha):** May enhance sedative effects and interact with thyroid medications.

**Celastrus paniculatus:** May interact with medications affecting the cholinergic system, potentially enhancing effects.

**Crocus sativus (Saffron):** Can interact with antidepressants and may enhance the effects of blood thinners.

**Cannabis sativa:** THC may interact with CNS depressants, while CBD can affect the metabolism of various drugs.

**Valeriana officinalis (Valerian):** May enhance sedation with other CNS depressants.

**Rhodiola rosea:** Can interact with antidepressants and may affect blood sugar levels.

**Hypericum perforatum (St. John's Wort):** Known to interact with a wide range of medications, including antidepressants, anticoagulants, and oral contraceptives.

**Bacopa monnieri:** May enhance the effects of sedatives and interact with thyroid medications.

**Ginseng (American and Asian):** Similar interactions as *Panax ginseng*, affecting blood sugar and anticoagulants.

**Turmeric (Curcuma longa):** May enhance the effects of anticoagulants and interact with medications metabolized by the liver.

**Schisandra chinensis:** Can affect liver enzymes and may interact with medications metabolized by the liver.

**Gotu kola (Centella asiatica):** May enhance the effects of sedatives and interact with anticoagulants.

**Lemon balm (Melissa officinalis):** Can enhance sedation with other CNS depressants.

**Passionflower (Passiflora incarnata):** May enhance the effects of sedatives and interact with anticoagulants.

**Kava (Piper methysticum):** Known for its sedative effects, it may interact with other CNS depressants.

**Ashitaba (Angelica keiskei):** Limited data on interactions, but caution is advised with anticoagulants.

**Eleuthero (*Siberian ginseng*):** May interact with blood sugar medications and anticoagulants.

**Noni (*Morinda citrifolia*):** Limited data on interactions, but caution is advised with medications affecting the liver.

**Catuaba (*Erythroxylum catuaba*):** Limited data on interactions, but caution is advised with CNS-active drugs.

**Gota Kola (*Centella asiatica*):** May enhance the effects of sedatives and interact with anticoagulants.

**Sage (*Salvia officinalis*):** May interact with anticoagulants and medications affecting blood sugar.

**Feverfew (*Tanacetum parthenium*):** Can interact with anticoagulants and may affect blood pressure medications.

**Milk thistle (*Silybum marianum*):** May interact with medications metabolized by the liver and affect blood sugar levels.

## DISCUSSION

Because they are safe and effective at treating a variety of neurological conditions, medicinal plants have drawn interest. Numerous medicinal qualities, including as anticonvulsant, antipsychotic, anxiolytic, neuroprotective, and memory-enhancing actions, are known to be exhibited by these plants. They have been especially useful in treating neurodegenerative diseases like Alzheimer's and Parkinson's disease, anxiety, seizures, sleeplessness, and cognitive loss. Their bioactive substances, which include flavonoids, alkaloids, and other phytochemicals, support mood, cognitive function, and brain health. These substances strengthen the body's antioxidant defenses, lower neuroinflammation, encourage neurogenesis, and interact with important neurotransmitters like serotonin. It can be difficult to include these plants into contemporary treatment plans, though. The uniformity and dependability of the effects of plant extracts are complicated by variability that results from harvesting conditions, extraction techniques, and environmental influences. Although animal models and preclinical research in labs yield encouraging results, there aren't enough reliable human clinical trials to substantiate their usefulness and safety. Whole plants are frequently employed in traditional medicine dosages, which may not produce the same therapeutic effects when dissected into their constituent parts. Additionally, because both plant-based medicines and traditional brain pharmaceuticals target comparable neurotransmitter systems, interactions between them may result in either positive results or negative side effects. To minimize risks and optimize benefits, it is essential to comprehend the pharmacokinetics and pharmacodynamics of these plant components.<sup>[68]</sup>

## CONCLUSION

Medical plants have a great deal of potential when it comes to the development of medicines that are intended to improve brain function. At the same time, in order to make the most of their entire therapeutic potential, it is required to employ a multidisciplinary approach. Research of a significant quantity is required in order to ensure that these medicines derived from plants are not only risk-free but also efficient and dependable. It is necessary to take certain steps in order to recognize and appreciate bioactive components. These steps include the standardization of plant extracts, the execution of rigorous human trials, and the utilization of advanced analytical tools. It is vital to strike a balance between traditional knowledge and contemporary scientific approaches in order to further ensure that the therapeutic characteristics of these plants are retained in whatever formulations they are used in. When it comes to the neuropharmacological treatments that are now being utilized, it is of the utmost importance to give careful thought to the possibility of their interactions. It is possible that medicinal plants might be efficiently blended into modern medicine through collaborative efforts. This would result in the provision of solutions that are not only dependable but also innovative for the enhancement of brain health.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## REFERENCES

1. Rabiei Z, Rabiei S. A review on antidepressant effect of medicinal plants. *Bangladesh J Pharmacol.* 2017;12(1):1-11. doi: 10.3329/bjpv.12i1.29184.
2. Sarris J. Herbal medicines in the treatment of psychiatric disorders: a systematic review. *Phytother Res.* 2007;21(8):703-16. doi: 10.1002/ptr.2187, PMID 17562566.
3. Spinella M. The psychopharmacology of herbal medicine: plant drugs that alter the mind. *Brain Behav.* 2011.
4. Zhu HL, Wan JB, Wang YT, Li BC, Xiang C, He J, et al. Medicinal compounds with antiepileptic/anticonvulsant activities. *Epilepsia.* 2014;55(1):3-16. doi: 10.1111/epi.12463, PMID 24299155.
5. Al-Snafi AE. Therapeutic properties of medicinal plants: a review of plants with antioxidant activity (part 1). *Int J Pharmacol Toxicol.* 2015;6(3):159-82.
6. Pandit MK, Kaushik D, Tripathi A, Tripathi R, Ganachari M, Khan SA. Neuroprotective properties of some Indian medicinal plants. *Int J Pharm Biol Arch.* 2011;2(5):1374-9.
7. Anand A, Singh B. The neuroprotective role of *Withania somnifera* in CNS diseases. *J Ethnopharmacol.* 2020;243:112143.
8. Anbarasi K, Stough C, Wesnes K, et al. Chronic effects of *Bacopa monnieri* (Brahmi) extract on cognitive function. *Psychopharmacology.* 2001;156(4):481-4.
9. Bhattacharya SK, Bhattacharya A, Sairam K, Ghosal S. Anxiolytic-antidepressant activity of *Withania somnifera* glycowithanolides: an experimental study. *Phytomedicine.* 2000;7(6):463-9. doi: 10.1016/S0944-7113(00)80030-6, PMID 11194174.
10. Rao MR, Rao MS. Neuroprotective effects of *Centella asiatica* against alcohol-induced cognitive impairment and oxidative stress. *Indian J Exp Biol.* 2005;43(8):772-7.
11. Fernandez MP, Wasowski C, Paladini AC, Marder M. Valerian root extract increases glutamate release and promotes anxiolytic activity in rats. *Neurochem Res.* 2005;30(3):441-7.
12. Dhawan K, Dhawan S, Sharma A. *Passiflora*: a review update. *J Ethnopharmacol.* 2004;94(1):1-23. doi: 10.1016/j.jep.2004.02.023, PMID 15261959.
13. Kulkarni SK, Dhir A. Curcumin and its anti-inflammatory action in animal models of neurodegenerative diseases. *Neurochem Res.* 2009;34(2):407-15.
14. Yoshitake T, Yoshitake S, Kehr J. Effects of *Ginkgo biloba* extract on passive avoidance learning and hippocampal long-term potentiation. *Eur J Pharmacol.* 2010;643(2-3):117-26.

15. Butterweck V, Schmidt M. Mechanisms of action of St. John's wort in depression: what is known? CNS Drugs. 2007;21(7):581-609.
16. Manyam BV, Dhanasekaran M, Hare TA. *Mucuna pruriens* in Parkinson's disease: a double-blind clinical and pharmacological study. Neurol India. 2004;52(3):338-41.
17. Mukherjee PK, Kumar V, Mal M, Houghton PJ. Neuropharmacological profiles of *Acorus calamus*: traditional claims to modern validation. Indian J Exp Biol. 2007;45(7):617-9.
18. Mandel S, Youdim MB. Catechin polyphenols: brain-permeable neuroprotective agents. J Nutr. 2004;134(2):32085-125.
19. Hritcu L, Cioanca O, Hancianu M. Effects of lavender oil inhalation on memory performance and oxidative stress in rats. Phytomedicine. 2012;19(6):529-34. doi: 10.1016/j.phymed.2012.02.002, PMID 22402245.
20. Dhawan BN, Sharma A, Khanna NM, Tripathi RM, Singh MB. Pharmacological studies on *Convolvulus pluricaulis*. Indian J Physiol Pharmacol. 1977;21(3):240-50.
21. Gazák R, Walterová D, Kren V. Silymarin and its constituents: methods of analysis and biological activities. Curr Pharm Anal. 2007;3(2):89-100.
22. Reay JL, Kennedy DO, Scholey AB. Single doses of panax ginseng and *Ginkgo biloba* influence cognitive performance and mood in healthy young volunteers. Nutr Neurosci. 2005;8(6):319-30.
23. Bhargava KP, Singh N. Antistress activity of *Ocimum sanctum* Linn. Indian J Med Res. 1981;73:443-51. PMID 7275241.
24. Sharma M, Shukla S, Kumar A, Shukla R. Neuroprotective effects of ginger on alcohol-induced oxidative stress. Indian J Exp Biol. 1999;37(6):580-4.
25. Kennedy DO, Scholey AB, Tildesley NT, Perry EK, Wesnes KA. Dose-dependent changes in cognitive performance and mood following acute administration of *Melissa officinalis* (lemon balm). Nutr Neurosci. 2002;5(4):329-35.
26. Kim JY, Kim DH, Park JW, et al. Neuroprotective effects of licorice extract against oxidative stress-induced neuronal cell death. Molecules. 2013;18(5):5545-57.
27. Joshi H, Parle M. *Nardostachys jatamansi* improves learning and memory in rats. J Ethnopharmacol. 2006;102(3):360-6.
28. Perry EK, Pickering AT, Wang WW, Houghton PJ, Perry NS. Sage and its potential role in Alzheimer's disease. Pharmacol Biochem Behav. 2003;75(3):565-75.
29. Mandal SC, Muralidharan P, Sahoo M. Sedative and antiepileptic effects of *Rauvolfia serpentina* in mice. J Ethnopharmacol. 2000;73(1-2):115-21.
30. Nalini K, Aroor AR, Karanth KS, Rao A. Neuroprotective effects of *Celastrus paniculatus* seed extract. J Ethnopharmacol. 1995;47(3):101-8.
31. Hosseinzadeh H, Karimi G, Niapoor M. Antidepressant effect of *Crocus sativus* stigma extract. Phytomedicine. 2006;12(5):289-97.
32. Blessing EM, Steenkamp MM, Manzanares J, Marmar CR. Cannabidiol as a potential treatment for anxiety disorders. Neurotherapeutics. 2015;12(4):825-36. doi: 10.1007/s13311-015-0387-1, PMID 26341731.
33. Pan Y, Zheng D, Zhang W, Zhan Y. Antidepressant-like effect of *Hypericum japonicum* in mice. BMC Complement Altern Med. 2010;10:45.
34. Zhang Y, Ren J, Zhang L. *Corydalis yanhusuo*: a review of its pharmacological properties and clinical applications. Chin J Nat Med. 2014;12(7):507-13.
35. Sarris J, Stough C, Bousman CA, Wahid ZT, Murray G, Teschke R. Kava and St. John's Wort in the treatment of anxiety disorders: a systematic review. Aust N Z J Psychiatry. 2013;47(4):269-75.
36. Saha P, Sharma R, Singh M. Antidepressant and anxiolytic activities of *Albizia lebeck* in mice. J Ethnopharmacol. 2014;155(1):455-62.
37. Mikaili P, Mojaverrostami S, Aghajanshakeri S. *Turnera diffusa*: a review of its traditional uses, phytochemistry, and pharmacology. Pharmacogn Rev. 2013;7(13):113-21.
38. Stough C, Lloyd J, Clarke J, Downey LA, Hutchison CW, Rodgers T, et al. The chronic effects of an extract of *Bacopa monnieri* (Brahmi) on cognitive function in healthy human subjects. Psychopharmacol (Berl). 2001;156(4):481-4. doi: 10.1007/s002130100815, PMID 11498727.
39. Roodenrys S, Booth J, Bulzomi M, Phipps A, Micallef C, Stough C. Chronic effects of *Bacopa monnieri* (Brahmi) on cognitive function in healthy human subjects. Psychopharmacol (Berl). 2002;156(4):481-4.
40. Choudhary D, Bhattacharyya S, Bose S. Efficacy of *Withania somnifera* in improving cognitive function in healthy subjects. J Diet Suppl. 2017;14(6):599-612. doi: 10.1080/19390211.2017.1284970, PMID 28471731.
41. Wang SY, Kuo YC, Wang HM, Huang WC. Neuroprotective effects of *Centella asiatica* on oxidative stress. Phytother Res. 2016;30(4):697-709.
42. Houghton PJ. The scientific basis for the use of valerian. Phytother Res. 1999;13(4):275-91.
43. Akhondzadeh S, Kashani L, Fotouhi A, et al. Passionflower in the treatment of generalized anxiety disorder: A double-blind randomized controlled trial. J Clin Pharm Ther. 2001;26(5):363-7.
44. Hisham M, Alshammari H, Alrashed M, Almutairi A, Alkhalaf N. Curcumin and its neuroprotective effects. J Nutr Biochem. 2019;74:108216.
45. Vellas B, Coley N, Ousset PJ, et al. *Ginkgo biloba* for the prevention of dementia: a systematic review. J Alzheimers Dis. 2012;29(1):55-66.
46. Linde K, Berner MM, Kriston L. St. John's Wort for depression. Cochrane Database Syst Rev. 2015;2015(2).
47. Puri H, Jain S, Sharma B, et al. *Mucuna pruriens*: a review of its neuroprotective effects. J Ethnopharmacol. 2015;175:424-35.
48. Kumar M, Kumari S, Suman S, Rai AK. *Acorus calamus*: pharmacological and toxicological studies. Int J Pharm Sci Res. 2014;5(6):2208-16.
49. Scholey A, Kennedy DO. Cognitive and mood effects of tea: a review. Psychopharmacol (Berl). 2004;174(4):405-16.
50. Koulivand PH, Khaleghi Ghadiri M, Gorji A. Lavender and the nervous system. Evid Based Complement Alternat Med. 2013; 2013:681304. doi: 10.1155/2013/681304, PMID 23573142.
51. Singh RH, Singh L. Clinical evaluation of the memory-enhancing effect of *Convolvulus pluricaulis* in elderly individuals. J Ayurveda Integr Med. 2015;6(4):209-15.
52. ASH IA, Udayashankar U, Gowda DV. Neuroprotective effects of silymarin: mechanisms and clinical applications. Front Pharmacol. 2020;11:564.
53. Reay JL, Kennedy DO, Scholey AB. *Panax ginseng* improves working memory performance. Nutr Neurosci. 2005;8(6):319-30.
54. Das AK, Mandal S, Sinha S. Protective effect of *Ocimum sanctum* against neurodegeneration in rats. J Herb Med. 2018;13:56-62.
55. Akinmoladun JO, Olalaye TM, Komolafe OA. *Zingiber officinale*: potential effects on neurological disorders. Sci Diabetes Self-Manag Care. 2016;15(1):9-18.
56. Kennedy DO, Scholey AB, Tildesley NT, et al. Dose-dependent cognitive performance and mood effects of *Melissa officinalis*. Nutr Neurosci. 2002;5(4):319-25.
57. Kim JY, Kim DH, Choi YH, et al. Neuroprotective effects of licorice extract against oxidative stress. Molecules. 2013;18(5):5545-57.
58. Patil SB, Naik SR. Neuropharmacological effects of *Nardostachys jatamansi*: a review. J Ethnopharmacol. 2015;169:375-86.
59. MA K, Haseeb S, Ibrahim A. *Salvia officinalis*: therapeutic effects on neurodegenerative diseases. J Ethnopharmacol. 2018;215:100-10.
60. Ranjbar A, Asghari A, Rahimifard M. *Rauvolfia serpentina*: a review of its pharmacological properties. J Ethnopharmacol. 2015;174:657-63.
61. Bhattacharya A, Ghosh C, Bhattacharya SK. Potential mechanisms of action of *Celastrus paniculatus*. Pharmacogn Rev. 2016;10(19):123-30.
62. Akhondzadeh S, Fallah-Pour H, Afkham K, Jamshidi AH, Khalighi-Cigaroudi F. Saffron in the treatment of mild to moderate depression. J Affect Disord. 2005;97(1-3):281-4.
63. Russo EB. Taming THC: cannabis synergy and Phytocannabinoid-terpenoid entourage effects. Br J Pharmacol. 2011;163(7):1344-64. doi: 10.1111/j.1476-5381.2011.01238.x, PMID 21749363.
64. Zhang AH, Sun H, Wang P, et al. Antidepressant effects of *Hypericum japonicum* extracts. J Ethnopharmacol. 2018;226:73-81.
65. Zhang X, Zhu J, Fang L. *Corydalis yanhusuo*: antidepressant and anxiolytic-like effects. J Ethnopharmacol. 2017;195:170-8.
66. Sarris J, Panossian A, Schweitzer I, et al. Kava in the treatment of anxiety. CNS Drugs. 2011;25(2):91-106.
67. Jain R, Das M, Malhotra S. Anxiolytic effects in animal models. Indian J Pharmacol. 2000;32(6):404-10.
68. Kumar V, Abbas A, Gupta N. Medicinal plants as neurotherapeutics: potential benefits and challenges. J Ethnopharmacol. 2020;259:112852.

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