



**REVIEW: ANTIDEPRESSANT MEDICINAL PLANTS**

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**ABSTRACT**

Depression is not a life threatening disease but its consequences can obliterate a life of the suffered person. Depression is considered as an affective disorder which is characterized by change in mood, lack of interest, psychomotor retardation and melancholia. World Health report said that the approximately 450 million people suffer from a mental or behavioral disorder. Diagnostic and Statistical Manual of Mental Disorders (DSM-V), characterized Mental disorder by symptoms like depressed mood, diminished interest or pleasure, significant increase or decrease in weight or appetite, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue, feeling of worthlessness or excessive or inappropriate guilt, inability to concentrate or indecisiveness, and suicidal thoughts. The main etiology of depression is due to functional deficiency in the level of monoaminergic neurotransmitters like dopamine, serotonin and noradrenaline in the brain. Many synthetic drugs are being used as the typical treatment for clinically depressed patients, but their adverse effects can compromise the therapeutic treatment. These conditions create an opportunity to find alternative treatment for depression by the use of medicinal plants. The aim of present review is to gather the collective information about traditional medicinal plants having potential antidepressant activity. This review article also take account of the essential information regarding experimental models used to screen the medicinal plants whose leaves, fruits, stem, aerial parts, roots, rhizomes were utilized to evaluate the activity from various research articles.

**KEYWORDS:** Depression, Antidepressants, Medicinal Plants, Forced Swim Test, Tail Suspension Test.

**INTRODUCTION**

Depression is considered as an affective disorder which is characterized by change in mood, lack of interest, psychomotor retardation and melancholia.<sup>[1]</sup> The depression belongs to the heterogeneous group of mental disorder which is characterized by extreme exaggerations and disturbance of mood, which adversely affect cognition and psychomotor functions.<sup>[2]</sup> Recently, Diagnostic and Statistical Manual of Mental Disorders (DSM-V), characterized Mental disorder by these symptoms depressed mood, diminished interest or pleasure, significant increase or decrease in weight or appetite, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue, feeling of worthlessness or excessive or inappropriate guilt, inability to concentrate or indecisiveness, and suicidal thoughts. These symptoms reflect alternation in cognitive, psychomotor, biological, motivational, behavioral and emotional processes. It is also affects the quality of daily life of community and cause of suicidal death.<sup>[3]</sup> The number of interactions of genetic and environmental risk

factors such as stress, strain leads to depression. The main etiology of depression is due to functional deficiency in the level of monoaminergic neurotransmitters like dopamine, serotonin, noradrenaline in the brain. The drugs that increases the level of these neurotransmitters in the central nervous system such drugs shows the antidepressant activity.<sup>[4]</sup> World Health report said that the approximately 450 million people suffer from a mental or behavioral disorder. This amounts to 12.3% of the global burden of disease, and will rise to 15% by 2020. In spite of the availability of antidepressant drugs but the depression continue to be a major medical problem. Various plants are being used in complementary and alternative medicines for management of mood disorders.<sup>[5]</sup> 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 effects includes dry mouth, fatigue, gastrointestinal or

respiratory problems, anxiety, agitation, drowsiness, and cardiac arrhythmias.<sup>[6]</sup>

Therefore, the main aim of present review is to gather the collectively information about traditional medicinal plants having potential antidepressant activity. This review article also includes the essential information regarding experimental models used to screen the medicinal plants whose leaves, fruits, stem, aerial parts, roots, rhizomes were utilized to evaluate the activity from various research articles.

## Types of Depression

### A. Major depression

The symptoms of depression (Anhedonia, Insomnia or Hypersomnia, Psychomotor agitation / retardation, Fatigue or loss of energy, Decreased ability to think or concentrate, Suicidal ideation) that last for more than two weeks.

### B. Bipolar disorder

Depending upon the severity of manic episodes, Two types of bipolar disorder have been described.

**a. Bipolar I disorder** –This disorder is characterized by full manic episodes (distinct period of persistently elevated, expansive or irritable mood lasting at least 1 week) and major depression.

**b. Bipolar II disorder** - This disorder is characterized by hypomanic (same symptoms as mania but last at least 4 days, without impaired social or occupational functioning and no psychotic symptoms or need to hospitalize) and major depression.

### C. Seasonal Affective Disorder (SAD)

The seasonal affective disorder (SAD) is unique in being responsive to sessions of bright light and experiences during winter months, when day length is short.

### D. Dysthymia

It is characterized by chronic depressive symptoms (2 years) rather than episodes of mood disturbance. As a chronic mild depression, dysthymia is most commonly encountered in primary care settings, is less often diagnosed and treated, and yet causes significant social and occupational dysfunction.

### Symptoms

Poor appetite or overeating, Insomnia or hypersomnia, Low energy or fatigue, Low self- esteem, Poor concentration, Feelings of hopelessness.

### E. Cyclothymia

It is milder form of bipolar illness. It is chronic mood disturbance of longer than 2 years characterized by numerous episodes of hypomania and depressions.

Cyclothymia differs from bipolar type II disorder in that the depressive episodes in cyclothymia never meet the criteria for major depression. Patients with cyclothymia seldom require drug therapy, but when necessary, mood stabilizers are effective.<sup>[7,8]</sup>

## Pathophysiology

### a. Monoamines and Other Neurotransmitters

The monoamine hypothesis of depression suggests that depression is related to a deficiency in the amount or function of cortical and limbic serotonin (5-HT), norepinephrine (NE) and dopamine (DA). Depression appears to be associated with changes in serotonin or norepinephrine signaling in the brain (or both) with significant downstream effects.

### b. Neurotrophic Hypothesis

The nerve growth factors such as brain-derived neurotrophic factor (BDNF) are critical in the regulation of neural plasticity, resilience, and neurogenesis. The evidence suggests that depression is associated with the loss of neurotrophic support and that effective antidepressant therapies increase neurogenesis and synaptic connectivity in cortical areas such as the hippocampus. BDNF is thought to exert its influence on neuronal survival and growth effects by activating the tyrosine kinase receptor B in both neurons and glia.

### c. Neuroendocrine Factors

Depression is known to be associated with a number of hormonal abnormalities. Among the most replicated of these findings are abnormalities in the HPA axis in patients with MDD. Moreover, MDD is associated with elevated cortisol levels nonsuppression of adrenocorticotrophic hormone (ACTH) release in the dexamethasone suppression test, and chronically elevated levels of corticotropin-releasing hormone. The significance of these HPA abnormalities is unclear, but they are thought to indicate a dysregulation of the stress hormone axis. More severe types of depression, such as psychotic depression, tend to be associated with HPA abnormalities more commonly than milder forms of major depression. It is well known that both exogenous glucocorticoids and endogenous elevation of cortisol are associated with mood symptoms and cognitive deficits similar to those seen in MDD. Thyroid dysregulation has also been reported in depressed patients. The elevations in circulating thyroxine during depressed states. Finally, sex steroids are also implicated in the pathophysiology of depression. Estrogen deficiency states, which occur in the postpartum and postmenopausal periods, are thought to play a role in the etiology of depression in some women. Likewise, severe testosterone deficiency in men is sometimes associated with depressive symptoms. Hormone replacement therapy in hypogonadal men and women may be associated with an improvement in mood and depressive symptoms.<sup>[9]</sup>

**Treatment Table 1: Classification of Antidepressant drugs.**<sup>[10,11]</sup>

Class		MOA	Examples
Monoamine oxidase inhibitors (MAOIs)		Inhibit the oxidative deamination of biogenic amines.	Moclobemide, Phenelzine, Tranylcypromine, Selegiline, Pirlindole, Isocarboxazid, Clorgyline
Tricyclic antidepressants (TCAs)	NA + 5-HT RIs	Inhibit the active reuptake of biogenic amines NA and 5-HT into their respective neurons and potentiate them.	Imipramine, Amitriptyline, Clomipramine, Doxepin, Trimipramine
	NARIs		Desipramine, Nortriptyline
Tetracyclic antidepressants (TeCAs)		It blocks dopamine D <sub>2</sub> receptors and inhibit NA reuptake. Blocks presynaptic $\alpha_2$ receptors and increases release, turnover of NA in brain.	Amoxapine, Mianserin,
Selective Serotonin Reuptake Inhibitors (SSRIs)		Inhibit reabsorption of Serotonin into the presynaptic neurons.	Citalopram, Fluvoxamine, Sertraline, Escitalopram, Paroxetine, Fluoxetine
Serotonin- norepinephrine reuptake inhibitors (SNRIs)		Inhibit the active reuptake of NE & Serotonin	Venlafaxine, Milnacipran
Serotonin antagonist and reuptake inhibitors (SARIs)		It acts by Antagonizing serotonin i.e. 5-HT <sub>2A</sub> and inhibit the reuptake of serotonin.	Trazodone, Lubazodone, Etoperidone
Norepinephrine reuptake inhibitors (NRIs)		Inhibit the active reuptake of NE	Reboxetine, Viloxazine, Atomoxetine
Norepinephrine – dopamine reuptake inhibitors (NDRIs)		Inhibit the active reuptake of NE & DA	Bupropion, Methylphenidate
Norepinephrine dopamine releasing agents (NDRAs)		Increases the release of NE & DA	Amphetamine, Dextroamphetamine, Dextromethamphetamine

**Table 2: Medicinal plants having potential Antidepressant activity.**

Name of Plant & Family	Extract & Part used	Dose & Route	Animal Model	Method	Duration (Days)	Reference Std. Drug, dose & Route	Phytochemicals	Reference
<i>Amaranthus Spinous</i> (Amaranthaceae)	Methanolic extract of Whole Plant	100 & 200 mg/kg. p.o.	Rat	FST & TST	14	Imipramine (10 mg/kg) Escitalopram (10 mg/kg) p.o.	Glycosides, Alkaloids, Flavonoids, Phenolic compounds, Carbohydrates, Proteins.	[12]
<i>Annona muricata</i> Linn. (Annonaceae)	Ethanollic Extract of Leaves	50,150, 300 mg/kg. p.o.	Rat	FST	14	Sertraline or Imipramine (10,20 mg/kg) p.o		[13]
<i>Alangium salvifolium</i> (Cornaceae)	Ethanollic Extract of Leaves	100,200 mg/kg. p.o.	Mice	FST & TST	-	Imipramine (15 mg/kg) o.p.	Alkaloids, Flavonoids, Triterpenoids, Saponins, Tannins, Phenolic Glycosides, Alangine, lamarckinine, Salicin, Kaempferol.	[14]
<i>Aegle marmelos</i> (Rutaceae)	Methanolic extract of Leaves	75,150,300 mg/kg. p.o.	Mice	TST	-	Imipramine (20 mg/kg) Fluoxetine (20mg/kg) p.o.	Flavonoids, Alkaloids, Coumarins, Condensed Tannins, Anthocyanins	[15]

<i>Asparagus racemosus</i> (Lillieaceae)	Methanolic extract of Roots	50,100, 200 mg/kg p.o.	Mice	FST & TST	14	Imipramine (15 mg/kg) Fluoxetine (20 mg/kg) p.o.	Shatavarin I-V, Curriloside H, Curriloside G, Immunoside Asparoside A,B, Asparinin B, Asparagamine, Racemofuran, Racemosol,	[16]
<i>Abelmoschus Esculentus</i> Linn. (Malvaceae)	Chloroform, Ethanol, Ethyl acetate, Aqueous extract of Seeds	400 mg/kg p.o.	Rat	Tetra -benazine induced catonia	-	Imipramine (10 mg/kg) p.o.		[17]
<i>Anacyclus pyrethrum</i> (AP) (Compositae)	Hydroalcoholic extract Of Roots	50,100, 200 mg/kg. p.o.	Mice	FST & TST, HIC	-	Imipramine (15 mg/kg) i.p.	Essential oils and an Alkaloid Pellitorine	[18]
<i>Acorus calamus</i> (Acoraceae)	Methanolic extract of Rhizomes	200,400,600 mg/kg. p.o.	Mice	FST	14	Imipramine (15 mg/kg)	Polyphenols, Flavonoids, Saponins	[19]
<i>Acorus calamus</i> (Acoraceae)	Methanolic extract of Rhizomes	50,100 mg/kg. i.p.	Mice	FST & TST	07	Imipramine (5 mg/kg) i.p.	Saponin, Glycosides, Tannin and Flavonoid.	[20]
<i>Allium sativum</i> Linn. (Lillieaceae)	Ethanollic extract of Garlic	25,50, 100 mg/kg. p.o.	Mice	FST & TST	14	Imipramine (15 mg/kg) Fluoxetine (20 mg/kg) p.o.	Allisin	[21]
<i>Allium cepa</i> Linn. (Alliaceae)	Onion Powder	15, 50, 150, 500 mg/kg p.o.	Rat	FST	14	Imipramine (15 mg/kg) p.o.	Quercetin glycosides-Hyperoside, Isoquercitrin, Rutin	[22]
<i>Aloysia polystachya</i> (Verbenaceae)	Hydroalcoholic extract of Leaves	6.25, 12.5, 25, 50 mg/kg i.p.	Rat	FST	-	Fluoxetine (10 mg/kg) Imipramine (12.5 mg/kg) i.p.	Monoterpenoid compounds, Essential oil $\alpha$ & $\beta$ thujone, Carvone, Limonene, Sabinene, $\beta$ pinene, Carvacrol, Eucarvone	[23]
<i>Areca catechu</i> (Palmaceae)	Ethanollic extract of Dried nuts	4 – 80 mg/kg.	Rat & Mice	FST & TST	-	Clorgyline 2.5,4,5,10,13,16 mg/kg	Alkaloids, Tannins, Flavones, Steroids, and Fatty acids	[24]
<i>Bacopa monniera</i> (Scrophulariaceae)	Methanolic Extract of Leaves	50,100, 200 mg/kg. p.o.	Mice	FST & TST	14	Imipramine (30 mg/kg) p.o.	Flavonoids, alkaloids, glycosides, saponins, sterols, Brahmin, nicotine, herpestine, Bacosides A & B.	[25]
<i>Bauhinia variegata</i> Linn. (Caesalpiniaceae)	Methanolic Extract of Leaves	100,200 mg/kg p.o.	Rat	FST & TST	14	Imipramine (15 mg/kg.) p.o.	Kaempferol, Rutin, Quercitin, Ascorbic acid.	[26]
<i>Berberis aristata</i> (Berberidaceae)	Aqueous extract of Stem	400,800, 1600 mg/kg. i.p.	Rat	FST & TST	14	Fluoxetine (14 mg/kg)	Berberine, Isoquinoline Alkaloid	[02]
<i>Curcuma longa</i>	Aqueous Extract of	140,280, 560	Mice	FST & TST	14	Fluoxetine (20 mg/kg)	Carbohydrates,	[27]

(Zingiberaceae)	Rhizomes	mg/kg. p.o.				p.o.	Proteins, Curcumin, Zingiberene	
<i>Camellia euphlebia</i> Merr. ex Sealy (Theaceae)	Aqueous Extract of Leaves	100, 200, 400 mg/kg.	Mice	FST & TST	07	Fluoxetine (20 mg/kg)	Theanine and caffeine	[28]
<i>Commelina Benghalensis</i> Linn. (Commelinaceae)	Methanolic extract of Leaves	200,400 mg/kg.	Mice	FST & TST	-	Imipramine (10 mg/kg)	Alkaloids, Steroids, Terpenoids, Iridoids, Flavonoids, Lignans, Aliphatic alcohols, Polyols, and phenolic acids	[29]
<i>Cassia occidentalis</i> (Caesalpinaceae)	Ethanollic & Aqueous extract of Leaves	500 mg/kg p.o.	Rat & Mice	FST & TST	-	Fluoxatine (10 mg/kg) i.p.	Flavonoids, Glycosides, Saponins, Tannins	[30]
<i>Cucurbitapepo</i> (Cucurbitaceae)	Alcoholic & Aqueous extract of Seeds	100 mg/kg p.o.	Rat	FST	-	Imipramine (30 mg/kg)	Alkaloids, Flavonoids Saponins, Steroids Carbohydrates Glycosides	[31]
<i>Citrus maxima</i> Merr. (Rutaceae)	Aqueous Extract of Leaves	100,200,300 mg/kg p.o.	Mice	FST & TST	-	Imipramine (30 mg/kg) Fluoxetine (20 mg/kg) i.p.	Limonin, Nerolol, Nerolyl acetate and geraniol.	[32]
<i>Cissampelos pareria</i> (Menispermaceae)	Aqueous, n-hexane extract of Leaves	100,200 mg/kg p.o.	Mice	FST & TST	-	Imipramine (10 mg/kg) p.o.	Carbohydrates, Alkaloids, Steroids, Tannins.	[33]
<i>Camellia sinensis</i> (Theaceae)	Pet.ether, Chloroform, Ethanol extract of Leaves	100, 200, 300,400 mg/kg	Mice	FST & TST	-	Imipramine (10 mg/kg) p.o.	Alkaloids, Carbohydrates, Proteins, Chlorophyll, Volatile organic compounds, Fluoride, Aluminium, Minerals and trace elements	[34]
<i>Cardamom</i> (Zingiberaceae)	Oil	50 mg/kg	Rat	Marble burying test	-	Amitriptyline (15 mg/kg)	Steroids, Oil, Fats, Carbohydrates	[35]
<i>Cedrus deodara</i> (Pinaceae)	Bark oil	250,500,750 mg/kg p.o.	Mice	FST & TST	-	Imipramine (15 mg/kg) i.p.		[36]
<i>Cinnamomum camphora</i> (Lauraceae)	Oil	250,500,750 mg/kg. p.o.	Mice	FST & TST	-	Imipramine (15 mg/kg) i.p.	Fenchone, Camphene, $\alpha$ -thujene, L-limonene and cis-p-menthane	[37]
<i>Convolvulus pluricaulis</i> Choisy (Convolvulaceae)	Ethanollic extract (Fractions) of Whole Plant	25, 50, 100 mg/kg p.o.	Mice	FST & TST	10	Imipramine (15 mg/kg) Fluoxetine (20mg/kg) p.o.	Alkaloidshankpushpine, volatile oil, Flavonoid-kampferol, phytosterol, b-sitosterol, Carbohydrates-Glucose, Rhamnose, Starch, Ceryl alcohol, and Scopoletin	[38]
<i>Clitoria ternatea</i> (Fabaceae)	Ethanollic extract of Roots	150,300 mg/kg p.o.	Rat	FST & TST	-	Imipramine (15 mg/kg) p.o.	Alkaloids, Glycosides, Flavanoids, Resins, Saponins, Phenols, Proteins Carbohydrates	[39]
<i>Crocus Sativus</i> linn. Stigmas (Iridaceae)	Saffron	200,400, 800 mg/kg i.p.	Mice	FST & TST	--	Imipramine (15 mg/kg) i.p.	Crocin, Crocetin, Safranal and Picrocrocin.	[40]
<i>Dacus carota</i> (Apiaceae)	Ethanollic Extract of Roots	200,400 mg/kg p.o	Mice	FST, TST, AIH, RIH, HTPPH	-	Fluoxetine (25 mg/kg) p.o	Alkaloids, Carbohydrates, Gums, Proteins, Glycosides, Steroids,	[41]

							Flavonoids	
<i>Eclipta alba</i> (Asteraceae)	Ethanollic extract of Leaves	100,200,400 mg/kg p.o.	Rat	FST & TST	14	Imipramine (15 mg/kg) Fluoxetine (20 mg/kg) p.o.	Ecliptin alkaloid & Culumbin, Flavonoid	[42]
<i>Emblica officinalis</i> (Phyllanthaceae)	Aqueous extract of Fruits	0.8,02,04 mg/kg p.o.	Mice	FST & TST	10	Imipramine (10 mg/kg) o.p.	Tannins, Alkaloids, Carbohydrates, Polyphenols and amino acids	[43]
<i>Foeniculum vulgare</i> (Umbelifereae)	Methanolic extract of fruits	250,500 mg/kg p.o.	Rats & Mice	FST & HIC	-	Imipramine (30 mg/kg) Fluoxetine (5 mg/kg) i.p.	Flavonoids, Tannins, Saponins, Steroids	[44]
<i>Gastrodia elata</i> Bl. (Orchidaceae)	Aqueous Extract of <i>Gastrodia elata</i> Bl.	01 g/kg	Rat	FST	-	Fluoxetine (15 mg/kg)	Gastrodin, Vanillyl alcohol, p-hydroxybenzylaldehyde, vanillin and p-hydroxybenzyl alcohol	[45]
<i>Helianthus annuus</i> (Asteraceae)	Methanolic extract of Seeds	100, 200 mg/kg p.o.	Mice	TST	-	Imipramine (60 mg/kg)	Alkaloids, Carbohydrates, Flavonoids, Steroid	[46]
<i>Hibiscus tiliaceus</i> Linn. (Malvaceae)	Methanolic extract of Flowers	3,10,30 mg/kg i.p.	Mice	FST & TST	-	Nortriptyline (2 mg/kg)	Lignanamides, Naphthalenes, Polyphenols, Carotenoids, Tocopherols, Flavonoids, Anthocyanins, Phytosterols	[47]
<i>Hypericum perforatum</i> (Hypericaceae)	Extract of Whole plant	30-90 mg/kg i.p.	Rat	FST	-	Fluoxetine, Imipramine (30-70 mg/kg) i.p.	Hypericine, Hyperforin, Hyperoside, Pseudohypericine	[48]
<i>Hedranthera barberi</i> (Apocynaceae)	Dichloromethane extract of Roots	25,50, 100, 200mg/kg p.o.	Mice	FST & TST	-	Imipramine (60 mg/kg) p.o.	Alkaloids, Cardenolides, Flavonoids and Saponins	[49]
<i>Hippophae rhamnoides</i> Linn. ssp.turkestanica (Elaeagnaceae)	Aqueous extract of Fruits	40 mg/kg. p.o.	Rat	FST	14		Vitamins C and E, Carotenoids, beta-carotene	[50]
<i>Hibiscus esculentus</i> Linn. (Malvaceae)	Methanolic extract of Seeds	125, 250, 500 750 mg/ kg. i.p.	Mice	FST & TST	-	Imipramine (15 mg/kg)	Polyphenolic compound, flavonoids	[51]
<i>Holoptelea integrifolia</i> (Urticaceae)	Pet.ether, Methanolic extract of Leaves	100 and 300 mg/kg p.o.	Mice	FST & TST	14	Fluoxetine (10 mg/kg) p.o.	Steroids, Terpenoids, Alkaloids, Glycosides, Flavonoids, Proteins, Tannins, Carbohydrates.	[52]
<i>Indigofera barberi</i> (Fabaceae)	chloroform extract of Whole plant	50,100 mg/kg p.o.	Rat	FST & TST	-	Imipramine (20 mg/kg) p.o.	Alkaloids, Tannins, Saponins, Glycosides, Terpenoids, Carbohydrates, Flavonoids, Proteins, Fixed oils, Steroids	[53]
<i>Lagenaria Siceraria</i> (Molina) Standley (Cucurbitaceae)	Methanolic extract of Fruits	50,100,200 mg/kg p.o.	Rat	FST	-	Imipramine (12.5 mg/kg) i.p	Flavonoids, Saponins, Sterols, Proteins, Tannins and Carbohydrates	[54]

<i>Murraya paniculata</i> (Rutaceae)	Pet. ether, chloroform, ethanol, water extract of Leaves	100,200 or 400 mg/kg	Mice	FST	-	Imipramine (10 mg/kg) o.p.	Flavonoids, Coumarins, Phenols and tannins Alkaloids, Proteins, amino acids, Carbohydrates	[55]
<i>Mollugo pentaphylla</i> (Aizoaceae)	Ethyl acetate extract of Aerial parts	200,400 mg/kg. p.o.	Mice	FST & TST	14	Fluoxetine (20 mg/kg)	Flavones, Carotene, Mollugogenol A,B,D Triterpenoid, Oleanolic acid, $\beta$ - sitosterol	[56]
<i>Murraya koenigii</i> Spreng (Rutaceae)	Hydroalcoholic extract of Seeds	100,250,500 mg/kg p.o.	Mice	FST & TST	-	Imipramine (25 mg/kg). p.o.		[01]
<i>Myristicafragrans</i> (Myristicaceae)	Extract of Myristicafragrans	500 mg/kg p.o.	Rat	FST, HIC, RRT	-	Imipramine (15 mg/kg) i.p.		[57]
<i>Moringa oleifera</i> (Moringaceae)	Ethanollic extracts of Leaves	100,200 mg/kg. p.o.	Mice	FST & TST	14	Fluoxetine (20 mg/kg) p.o.	Vitamins A, B, C, Flavonoids, Oleic, Palmitic and Ptearic acid, Saponins, Glycoside, Gum, Protein, Calcium, Magnesium, Potassium, and Iron	[58]
<i>Momordica Charantia</i> Linn. (Cucurbitaceae)	Methanolic Extract of Leaves	100,200,300 mg/kg p.o.	Mice	FST	-	Imipramine (5 mg/kg) i.p.	Alkaloids, Steroids Triterpenoids, Amino Acids, Flavonoids	[59]
<i>Nardostachys Jatamansi</i> DC (Valerianaceae)	Methanolic extract of Rhizome	200,400 mg/kg. p.o.	Mice	FST & TST	10	Imipramine (10 mg/kg) p.o.	Carbohydrates, Alkaloids, Glycosides, Sterols, Phenolic compounds, Tannins, Flavonoids, Saponins, Proteins, Amino acids	[60]
<i>Nymphaea alba</i> (Nymphaeaceae)	Ethanollic extract of Flowers	100,200 mg/ kg p.o.	Mice	FST & TST	10	Imipramine (10 mg/kg) p.o	Tannic acid, Gallic acid, Alkaloids, Sterols, Flavonoids, Glycosides, Hydrolyzable tannins and Polyphenolic compounds	[61]
<i>Ocimum sanctum</i> (Labiatae)	Ethanollic extract of Leaves	25, 50, 100 mg/kg p.o.	Mice	FST & TST	-	Imipramine (60 mg/kg) p.o.	Eugenol, Methyl Eugenol, Carvacrol, Sesquiterpine hydrocarbon caryophyllene, Apigenin, Luteolin, Ocimumosides A and B, Ocimarin, Apigenin-7-O-glucuronide, Orientin, Olludistin, and Ursolic acid	[62]
<i>Passiflora foetida</i> (Passifloraceae)	Methanolic extract of Leaves	100,200,300 mg/kg. i.p.	Mice	FST & TST	-	Imipramine (15 mg/kg) Fluoxetine (20 mg/kg) p.o.	Hydrocyanic acid, Flavonoids, Harman alkaloids	[05]
<i>Piper betle</i> (Piperaceae)	Ethanollic extract of Leaves	100,200 mg/kg. p.o.	Mice	FST & TST	10	Imipramine (10 mg/kg) p.o.		[63]
<i>Phaseolus vulgaris</i> (Fabaceae)	Aqueous extract of Seeds	250,500 mg/kg. p.o.	Rat	FST & HTR	-	Imipramine (10 mg/kg) Fluoxetine (40 mg/kg) p.o.	Alkaloids, Flavonoids Glycosides, Polyphenols Saponins, Steroids Tannins, Terpenoids Omega-3 fatty acids Tryptophan	[64]

<i>Punica granatum</i> (Punicaceae)	Aqueous extract of Whole fruit.	250,500 mg/kg	<i>Mice</i>	FST & TST	14	Imipramine (10 mg/kg)	Polyphenols, Anthocyanins, Fatty acids, Amino and Organic acids, Indoleamines, Sterols, Triterpenoids, $\alpha$ -tocopherol.	[65]
<i>Rosmarinus officinalis</i> (Lamiaceae)	Aqueous extract of Leaves	15,30 mg/kg p.o.	<i>Mice</i>	FST	05	Imipramine (15 mg/kg) p.o.	Luteolin, Carnosic acid, and Rosmarinic acid	[66]
<i>Salvadora Persica</i> (Salvadoraceae)	Aqueous extract of Root sticks	900 mg/kg. p.o.	<i>Rat</i>	FST	28		Carbohydrates, Steroids, Saponins, Tannins, Phenols	[67]
<i>Salvia elegans</i> (Lamiaceae)	Hydroalcoholic extract of Flowers & leaves	125,250, 500,1000, 2000 mg/kg p.o.	<i>Mice</i>	FST	-	Imipramine (15 mg/kg) i.p.	Trans-ocimene, Linalool, $\beta$ caryophyllene, Germacrene D, Spathulenol, Aliphatic alcohol	[68]
<i>Zingiber officinale</i> (Zingiberaceae)	Hydroalcoholic extract of Rhizomes	150,300 mg/kg. p.o.	<i>Rat</i>	FST & TST	-	Imipramine (10 mg/kg)	Zingiberene, Gingerols, Shogaols, Zingerone, Paradol	[69]

FST – Forced Swim Test, TST – Tail Suspension Test, HIC – Haloperidol Induced Catalepsy, RIH – Reserpine Induced Hypothermia,  
HTPPH – 5- Hydroxytryptophan Potentiation of Head Twitches

**CONCLUSION**

Even though marketed antidepressants are used for the therapy which may cause side effects such as insomnia, nausea, vomiting, blurred vision, urinary retention etc. To overcome this, medicinal plants are utilized for the therapy of depression which has less side effects as compared to synthetic drugs. We believe that the medicinal plants have a potential antidepressant activity which can be used as adjuvant in therapy of depression and mood disorders. The aim of our study is to summarize explanatory data of medicinal plants having antidepressant activity with respect to the parts and extracts used. The review also highlights the various studies done by other researchers using various experimental models. The comprehensive information regarding these plants will be beneficial for further research. However, the additional studies are required to isolate the exact active principles which are responsible for antidepressant activity as well as to reveal the mechanisms for antidepressant action of these medicinal plants.

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