



## **An Overview of Indian Traditional Medicinal Plants with Anti-Psychological Potentials**

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### **Abstract**

The traditional Indian system of medicine (Ayurveda) describes different modalities involved in the prevention and treatment of disease and stresses upon the role of diet, life style and drugs as cornerstones of therapy. Medicinal plant products are known to modify different aspects of human physiology and exert an alleviating influence on several patho-physiological states, and concepts of psychological disorder. It now appears that some of the beneficial effects of Indian medicinal plants, proposed in Ayurveda by Charaka and SushrutaSamhita, may be due to these “antipsychological” effects. Several research groups have worked on the scientific basis of such “antipsychological” effects of plant products, and as a result, considerable data has accrued. The present review summarizes some of these experimental data in an attempt to justify some of their beneficial effects in health and disease, and also to provide insights into the future research in this area. Drugs of plant origin are important in all these areas, although not usually for self-medication. They are also of historical interest; for example, the antipsychotic drug reserpine, isolated from *Rauwolfia* species, revolutionized the treatment of schizophrenia and enabled many patients to avoid hospitalization before the introduction of the phenothiazine and the newer atypical antipsychotics, in the same way Phytotherapy has a role in helping to re-establish a regular pattern of sleep which was disturbed by depression and anxiety.

**Keywords:** Anti-psychotic drug, stress, anti-psychological effects, schizophrenia etc.

### **Introduction**

A mental disorder or mental illness is a psychological pattern or anomaly, potentially reflected in behavior, that is generally associated with distress or disability, and which is not considered part of normal development in a person's culture. Mental disorders are generally defined by a combination of how a person feels, acts, thinks or perceives. This may be associated with particular regions or functions of the brain or rest of the nervous system, often in a social context.[1] According to the World Health Organization (WHO), over a third of people in most countries report problems at some time in their life which meet criteria for diagnosis of one or more of the common types of mental disorder. The causes of mental disorders are varied and in some cases unclear, and theories may incorporate findings from a range of fields. Services are based in psychiatric hospitals or in the community, and assessments are carried out by psychiatrists, clinical psychologists and clinical social workers, using various methods but often relying on observation and questioning. Clinical treatments are provided by various mental health professionals. Psychotherapy and psychiatric medication are two major treatment options, as are social interventions, peer support and self-help. Prevention is now appearing in some mental health strategies[1].

### **Various Types of Mental Disorders**

There are many different categories of mental disorder, and many different facets of human behavior and personality that can become disordered. Anxiety or fear that interferes with normal functioning may be classified as an anxiety disorder [2].

Commonly recognized categories include specific phobias like,

- Generalized Anxiety Disorder,
- Social Anxiety Disorder,
- Mood Disorder, Panic Disorder,

- Agoraphobia,
- Obsessive-Compulsive Disorder
- Post-Traumatic Stress Disorder.
- Eating Disorders involve disproportionate concern in matters of food and weight

**Different Mental conditions:**

- ❖ Stress
- ❖ Insomnia
- ❖ Depression
- ❖ Anxiety
- ❖ Migraine
- ❖ Low memory

**Stress:**

Stress is a normal physical response to events that make you feel threatened or upset your balance in some way. Modern life is full of hassles, deadlines, frustrations, and demands [65].

**Anxiety disorders:**

Anxiety disorders are mental health conditions that involve excessive amounts of anxiety, fear, nervousness, worry, or dread. Anxiety that is too constant or too intense can cause a person to feel preoccupied, distracted, tense, and always on alert.

**Insomnia:**

Insomnia or sleeplessness is known as persistent falling asleep or staying asleep or poor quality sleep or trouble in sleeping. Sometime not feeling refreshed after a night's sleep.

**Migraine:**

Migraine can be defined as a paroxysmal ailment, accompanied by a severe headache, generally on one side of the head, and associated with disorders of the digestion, the liver and the vision.

It usually occurs when a person is under great mental tension or has suddenly got over that state.

**Low memory:**

Low memory or Weak memory is very common in this present era due to stressful life conditions and day to day worries and hurries.

These psychological factors can be defined as abnormal states of mind characterized by: Impairment of General mental functions like perception and motor control in the absence of organic problems, mind control, hypothetical self-discussion, and critical analysis based on observations and different aspects of mind like decision, memory, orientation and responsiveness, conduct, psychomotor activity etc. [3].

**Depression:**

Depression is a state of low mood and aversion to activity that can have a negative effect on a person's thoughts, behavior, feelings, world view, and physical well-being.

Depressed people may feel sad, anxious, empty, hopeless, worried, helpless, worthless, guilty, irritable, hurt, or restless [2].

**List of Herbal drugs**

Sr.N	Name of drug	Parts used	Biological source	Family	Chemical constituents	Uses
1.	Hypericum	Dried aerial	<i>Hypericum perforatum</i>	<i>Hypericaceae</i>	Hypericin, hyperoside	Anti-depressant, anti-anxiety
2	Brahmi	Herbs	<i>Bacopa monnieri</i>	<i>Scrophulariaceae</i>	Bacoside A, bacoside B	Memory enhancer
3	Centella	Herbs	<i>Centella asiatica</i>	<i>Apiaceae</i>	Asiaticoside, Madecassoside	Nervine tonic
4	Valerian	Dried rhizomes	<i>Valeriana officinalis</i>	<i>Valerianaceae</i>	Valepotriates. Valerenic acid	Mild sedative, anti-anxiety
5	Curare	Barks & Stem	<i>Strychnos castelnaei</i>	<i>Menispermaceae</i>	Tubocurarine, curine	Neuropsychiatry
6	Ashwagandha	Dried roots and stem	<i>Withania somnifera</i>	<i>Solanaceae</i>	Withanine Somniferine Somniferinine	Antidepressant, anti-anxiety
7	Kava Kava	Dried leaves	<i>Piper methysticum</i>	<i>Piperaceae</i>	Kavalactones, methysticin.	Antiseizure effects
8	Ginkgo		<i>Ginkgo Biloba</i>	<i>Ginkgoaceae</i>	<i>Ginkgolide A, B, C.</i>	Alzheimer's disease

9	Passionflower	Flower, fruits	<i>Passifloraincarnata</i>	<i>Passifloraceae</i>	Benzoflavone	Anti-anxiety and insomnia
10	Ginseng	Dried roots	<i>Panax ginseng</i>	<i>Araliaceae</i>	Ginsenosides, panaxosides	Sedative activity
11	Tulsi	Leaves	<i>Ocimum sanctum</i>	<i>Labiatae</i>	Eugenol, carvacrol, caryophyllin.	Anti-stress
12	Flannel weed	Leaves	<i>Sida cordifolia</i>	<i>Malvaceae</i>	B-phenethylamine, ephedrine, pseudo-ephedrine,	Anti-stress
13	Siberian Ginseng	Leaves	<i>Eleuthero coccuss enticosus</i>	<i>Araliaceae</i>	Eleutheroside B, friedelin, isofraxidin	Anti-stress
14	Schizandra	Dried stem, leaves	<i>Schizandrachinensis</i>	<i>Schisandraceae</i>	Schizandrin, deoxy schizandrin, gomisins,	Anti-stress
15	Ligustrum	Dried seeds	<i>Zizyphili gustrum</i>	<i>Rhamnaceae</i>	Linalool, terpineol, myrtenol	Anti-anxiety
16	Mimosa	Dried seeds	<i>Albiziajulibrissin,</i>	<i>Mimosoideae</i>	2,6-dimethyl-6-O-beta-D-quinovosyl-2,7-menthiafolic acid, syringe resinol	Anti-depressant
17	<i>Stephania</i>	Dried bark	<i>Stephania intermedia</i>	<i>Menispermaceae</i>	Stephaninecrebanineisocorydine,Stepharanin	Anti-psychotic
18	Acorus	Dried rhizomes	<i>Acoruscalamus</i>	<i>Araceae</i>	Asarone, asaraldehyde.	As sedative, Tranquillising
19	Echinacae		<i>Echinacae purpurea</i>	<i>Compositae</i>	Arabingalactan	Immunostimulant
20	Butterfly-pea	Flower, leaves	<i>Clitoriaternatea</i>	<i>Fabaceae</i>	Tannins, resins, starch, taraxerol&taraxerone	Anxiolytic, anticonvulsant, antistress
21	Chinese angelica	Dried root	<i>Angelica sinensis</i>	<i>Apiaceae</i>	Coumarins, phytosterols, polysaccharides, ferulate	Sedative
22	Giloe	Dried leaves and stem	<i>Tinospora cordifolia</i>	<i>Menispermaceae</i>	Tinnosporine, Tinnosporic acid, Tinnosporol	Immuno stimulant activity
23	Chinese figwort	Leaves	<i>Scrophularia ningpoensis</i>	<i>Scrophulariaceae</i>	Furfural palmiticacidterpineol m-Cresol-Guaiacosobutyric acid.	Anti-depressant
24	Jatamansi	Dried rhizomes	<i>Nardostachysjatamansi</i>	<i>Valerianaceae</i>	Jatamansone, Nardostachone	Sedative, epilepsy
25	Celery	Seeds	<i>Apium graveolens</i>	<i>Umbelliferae</i>	D-limonene, d-selinine, sedanoic acid	Nervine sedative and tonic
27	Valeriana	Dried rhizomes, roots	<i>Valeriana jatamansi</i>	<i>Valerianaceae</i>	Chatinine, valerine, valranic acid	Cns depressant
29	Chamomile	Flowering tops	<i>Matricariachamomilla</i>	<i>Asteraceae</i>	Farnesenechamazulen eapigenin, quercetin coumarin	Anti-stress, gentle sleep aid
30	Tarragon	Rhizomatous roots	<i>Artemisia dracunculus</i>	<i>Asteraceae</i>	Methylchavicol methyl eugenollimonene, $\alpha$ -pinene	Anti-stress
31	Dill	Dried fruits	<i>Anethumgraveolens</i>	<i>Umbelliferae</i>	Carvone, D-limonene	Anti-stress

32	Rosemary	Leaves, flower	<i>Rosmarinus officinalis</i>	<i>Lamiaceae</i>	Carnosic acid, rosmarinic acid, camphor, caffeic acid, ursolic acid.	Anti-stress
33	Sage	Leaves	<i>Salvia Officinalis</i>	<i>Lamiaceae</i>	Cineole, borneol, tannic acid, oleic acid, ursonic acid,	Anti-stress
34	Bitter almond	Dried ripe seeds	<i>Prunus amygdalus</i>	<i>Rosaceae</i>	Amygdalin	Sedative
35	Wild cherry bark	Dried bark	<i>Prunus serotina</i>	<i>Rosaceae</i>	Prunasin	Mild sedative
35	Nux vomica	Seeds	<i>Strychnos nuxvomica</i>	<i>Loganiaceae</i>	Strychnine, brucine	Cns stimulant
36	Lobelia	Leaves, flower	<i>Lobelia laxiflora</i>	<i>Campanulaceae</i>	Lobeline, lobelane, meth- amphetamine	Analeptics
37	Sarpagandha	Roots & rhizomes	<i>Rauwolfia serpentina</i>	<i>Apocynaceae</i>	Reserpine, rescinnamine	Hypotensive tranquilliser
38	Tea	Leaves & leaf buds	<i>Theasinensis</i>	<i>Theaceae</i>	Theobromine, theoromine, theophylline	CNS stimulants
39	Coffee	Dried ripeseeds	<i>Coffea arabica</i>	<i>Rubiaceae</i>	Caffeine	CNS stimulants
40	Shankpushpi	Whole herbs	<i>Evolvulus inoides</i>	<i>Euphorbiaceae</i>	Xanthone, triterpenes	Nervine tonic
41	Camphor	Wood	<i>Cinnamomum camphora</i>	<i>Lauraceae</i>	Camphor, linalool, cineole, nerolidol, safrole	Analeptics
42	Red Clove	Leaves	<i>Trifolium pratense</i>	<i>Fabaceae</i>	Iso-flavone, pratensein	Anti-stress
43	Belladonna	Leaf, aerial parts	<i>Atropa belladonna</i>	<i>Solanaceae</i>	Atropine, hyoscyamine, scopolamine	Parasympathetic depressant
44	Duboisia	Leaves	<i>Duboisiamyoporoides</i>	<i>Solanaceae</i>	Scopolamine, hyoscyamine	Parasympatholytic
45	Hyoscyamus	Leaves	<i>Hyoscyamus niger</i>	<i>Solanaceae</i>	Scopolamine, hyoscyamine	Parasympatholytic
46	Kola	Seeds	<i>Cola nitida</i>	<i>Sterculiaceae</i>	Theobromine, caffeine	CNS stimulants
47	Tobacco	Leaves	<i>Nicotiana tobacum</i>	<i>Solanaceae</i>	Nicotine, nicotimine, normicotine	CNS depressant
48	Opium	Latex	<i>Papaver somniferum</i>	<i>Papaveraceae</i>	Morphine, codeine	CNS depressant
49	Stramonium	Leaf & flowering tops	<i>Datura stramonium</i>	<i>Solanaceae</i>	Scopolamine, hyoscyamine	Anticholinergic
50	Datura	Leaf & flowering tops	<i>Datura metel</i>	<i>Solanaceae</i>	Scopolamine, hyoscyamine, atropine	Anticholinergic
51	Shankpushpi	Aerial parts	<i>Convolvulus pluricaulis</i>	<i>Convolvulaceae</i>	Shankpushpine, kaempferol, beta-steroidal	Brain tonic, tranquilizer
52	Ephedra	Dried aerial parts	<i>Ephedra sinica</i>	<i>Gentaceae</i>	Ephedrine, pseudo ephedrine, norephedrine	CNS stimulants
53	Cannabis	Dried flowering, fruiting	<i>Cannabis sativa</i>	<i>Cannabinaceae</i>	Cannabidiol, tetra-hydrocannabidiol	Psychotropic

		tops				
54	Poppy latex	Latex	<i>Papaver orientale</i>	<i>Papaveraceae</i>	Morphine, codeine	CNS depressant
55	<i>Plantago</i>	Leaves	<i>Plantago asiatica</i>	<i>Plantaginaceae</i>	Allantoin, aucubin, ursolic acid.	Anti-depressant
56	<i>Ilex pubescens Hook</i>	Stems	<i>Ilex pubescens</i>	<i>Aquifoliaceae</i>	Luteolin, quercetin, hyperoside, rutin	Anti-depressant
57	Hoodwort	Dried Leaf	<i>Scutellaria lateriflora</i>	<i>Lamiaceae</i>	Cubebene, humulene, calamenene	Anti-anxiety
58	Hops	Rhizoms	<i>Humulus lupulus</i>	<i>Cannabaceae</i>	Myrcene, humulene, xanthohumol, myrcenol, linalool	Psychoactive effects
59	Chamomile	Leaves	<i>Matricaria chamomilla</i>	<i>Asteraceae</i>	Luteolin quercetin rutin, polyacetylenes	Anti-anxiety, stress and insomnia
60	Lemon balm	Leaves	<i>Melissa officinalis</i>	<i>Lamiaceae</i>	Caffeic acid chlorogenic acid copaene, geraniol geraniol oleanolic acid	Anti-anxiety, stress and insomnia

### Detail of Some Medicinal Plants

#### *Hypericum perforatum* (St. John's Wort):



#### Biological source:

It consists of dried aerial parts of the plant *Hypericum perforatum* belonging to family *Hypericaceae* [5]. St. John's Wort has a history of medicinal use, particularly as a 'nerve tonic' and in the treatment of nervous disorders [11]. It is an aromatic perennial native of Europe [3, 23].

#### Constituents:

Hypericin was considered to be the antidepressant constituent of St. John's wort, although experimental and clinical evidence has now emerged that hyperforin is a major constituent required for antidepressant activity [8,9,10].

#### Pharmacological effects and clinical efficacy:

The German monograph for St. John's wort identifies hypericin, a purported monoamine oxidase (MAO) inhibitor, as the active ingredient in the herb. The hypericin content of St. John's wort is used as the basis for dosing. However, one U.S. study showed that pure hypericin does not bind to MAO. In this study, a crude St. John's wort extract exhibited significant receptor affinity for MAO, but the investigators stated that concentrations of the crude extract required for this activity are unlikely to be achieved after oral administration [20]. Hypericin, in a standardized extract has shown a significant antidepressant activity by inhibiting the enzyme mono amino oxidase (MAO). The antidepressant activity of Hyperforin is attributed to its inhibition of neuronal uptake of serotonin, norepinephrine and dopamine like many other antidepressants and also inhibits GABA and glutamate uptake [15]. The antidepressant activity of hypericum is not only limited to hypericin and hyperforin, xanthenes of the plants are also reported to exhibit this property [12].

**Dose:**

When the aqueous methanolic extract of the herb was administered in the dose of 900 mg per day, for the duration of at least four weeks, the Hamilton Rating Scale for Depression (HRSD) was used as an outcome measure, slightly greater improvement in HRSD scores was obtained [5,11].

**Toxicity:**

St. John's Wort has long been considered safer than the conventional pharmaceutical agents. However its ability through its active constituent's hypericin, pseudohypericin and hyperforin, to induce P – glycoprotein/ MRD1 and both intestinal and hepatic CYP3A4 enzyme, could markedly reduce the distribution and disposition of their co-substrates [14]. St. John's Wort is a potent uptake inhibitor of neurotransmitters serotonin, norepinephrine and dopamine all of which have a role in mood control [13]. It has been reported that St. John's wort may be toxic during pregnancy and lactation in mice. There is considerable evidence that St. John's Wort can cause severe photosensitivity in animals grazing extensively on the plant [6]. In fact, the term "hypericism" has been used to describe a skin disease found in animals that graze on large quantities of St. John's Wort [9].

**Uses:** Anti-depressant and anti-anxiety [7].

***Bacopa monnieri* (Brahmi)**



**Biological source:**

*Bacopa monnieri* (Brahmi) belonging to family *Scrophulariaceae*. It is an annual creeping plant found throughout India in wet, damp and marshy areas[5]. It is the important drug in Ayurveda for improvement of intelligence and memory and revitalizing of sense organs [23].

**Constituents:**

The main constituents present in *Bacopa monnieri* are saponins, bacoside A, bacoside B, monnieriin and hersaponin, which are also responsible for the biological activity. Most of the work reported is on the alcoholic extract of the plant [5, 32, 54].

**Pharmacological effects and clinical efficacy:**

Administration of bacosides attenuated the retrograde amnesia produced by immobilization induced stress, electroconvulsive shock and scopolamine [55]. Treatment with the plant extract for one month reduced levels of anxiety, adjustment disability leading to improved mental functions. The protective action of *B. Monnieri* was demonstrated against phenytoin induced cognitive deficit. One of the marketed preparation contains the novel drug molecules, in experimental models increased protein kinase activity and new protein synthesis specifically in brain cells that are concerned with alertness, briskness and long term memory thereby resulting in the reduction of learning process. Another commercial preparation in a capsule form containing 500 mg of leaf powder is also claimed to improve the brain function and memory power in elderly people [24].

**Toxicity:**

Therapeutic doses of *Bacopa monnieri* are not associated with any known side effects, and *Bacopa monnieri* has been used safely in Ayurvedic medicine for several hundred years [55]. A double blind, placebo controlled clinical trial of healthy male volunteers investigated the safety of pharmacological doses of isolated bacosides over a four-week period [25].

**Dose:**

Concentrated bacosides given in single (20-30 mg) and multiple (100-200 mg) daily doses were well tolerated and without adverse effects [23].

**Uses:** Used as Memory enhancer and revitalizing of sense organs [26].

***Valeriana officinalis* (Valerian)**



**Biological source:**

The root of *Valeriana officinalis* of family *Valerianaceae* has served thousands of years as a mild sedative. From 1820 until 1942, it was listed in the U.S. Pharmacopoeia as a tranquilizer [30]. It's widely used and approved in Europe as a mild hypnotic to induce sleep and relieve anxiety [27]. In the United Kingdom, Valerian is also a popular and government approved sleep aid[28].

**Constituents:**

The main constituent of Valeriana is Valerenic acid and Valepotriates [5,55].

**Pharmacological effects and clinical efficacy:**

Valerian targets the same neuroreceptors as benzodiazepines. As per the study in 1993, Valerian and Humulus lupulus (Hops) are calming to the central nervous system and reduce depression and anxiety [29]. The mechanism of Valerian tends to sedate by stimulating activity of the nerve transmitter GABA that dampens the brain's arousal system. Perhaps, Valerenic acid and Valepotriates, chemicals unique to Valerian sedate the brain cells responsible for arousal [30].

**Dose:**

Valerian extract in the dose of 400 to 900 mg decreases sleep latency and nocturnal awakenings and improved subjective sleep quality [31].

**Toxicity:**

Adverse effects of valerian are rare but include gastrointestinal upset, contact allergies, headache, restless sleep and mydriasis [29]. Valerian appears to be relatively safe in overdose with the major effect being central nervous system depression [31].

**Uses:** Mild sedative, tranquilizer and anti- anxiety.

***Withania somnifera* (Ashwagandha)**



**Biological source:**

It consists of dried roots and stem bases of *Withthenia somnifera* belonging to family *Solanaceae* [5].

The plant is used as adaptogen since long time. The root is a nervine sedative and is used in doses of one gram in all cases of general debility nervous exhaustion, brain – fatigue and loss of memory [33].

**Constituents:**

The main constituent of ashwagandha is withanine. Some others alkaloids are somniferine, somnine, somniferine, withananine, tropine, pseudotropine, anaferrine, and anahydrine. The leaves contain steroidal lactone (withanolides-withaferin&withaferin A) [5, 54,56].

**Pharmacological effects and clinical efficacy:**

Ashwagandha exhibited an antidepressant effect comparable to that induced by imipramine in the forced swim-induced “behavioral despair” and “learned helplessness” tests [35].

When the anxiolytic and antidepressant activity of *W. Somnifera*(dose 20 and 50 mg/ kg) was compared with that of Lorazepam (0.5 mg/kg i.p.) And also with Imipramine (10 mg/kg i.p.), the herbal drug showed comparable results. Thus, *W. Somnifera* is an effective mood stabilizer in clinical conditions of anxiety and depression [46].

**Dose:**

A typical dose of ashwagandha is 3-6 grams daily of the dried root, 300-500 mg of an extract standardized to contain 1.5 percent withanolides, or 6- 12 ml of a 1:2 fluid extract per day [34].

**Toxicity:**

Ashwagandha is generally safe when taken in the prescribed dosage range. Large doses have been shown to cause gastrointestinal upset, diarrhea, and vomiting [36].

Large doses of ashwagandha may possess abortifacient properties; therefore, it should not be taken during pregnancy. Since ashwagandha acts as a mild central nervous system depressant, patients should avoid alcohol, sedatives, and other anxiolytics while taking ashwagandha [37].

**Uses:** Antidepressant, anti-Anxiety and nervine sedative [5, 54, 36].

***Piper methysticum (Kava)***



**Biological source:**

It consists of dried roots and stem bases of *Piper methysticum* belonging to family Piperaceae. It is a shrub, native to Polynesia [5]. It has traditionally been taken by Pacific Islanders as a beverage mixed with coconut milk and water. Most medicinal forms are either ethanol – water or acetone – water extracts [39]. Kava is marketed as a mild anxiolytic in European countries [37]. In the United States, kava is sold in health food stores as a natural alternative to anti-anxiety drugs and sleeping pills [40].

**Constituents:** Major chemical constituents are Kava lactones and methysticin [5, 54, 55].

**Pharmacological effects and clinical efficacy:**

The active constituents in Kava known as Kava pyrones have a variety of actions like inhibition of voltage – dependent sodium channels, increasing GABA-A receptor density, blocking norepinephrine reuptake and suppressing the release of glutamate. Kava lactones, the active principles in kava, are potent inhibitors of several of the CYP 450 enzymes, suggesting a high potential for causing pharmacokinetic interactions with drugs and other herbs which are metabolized by the same CYP 450 enzymes [39]. Some kava lactones have been shown to possess pharmacological effects, such as blockade of GABA receptors and sodium and calcium ion channels, which may lead to pharmacodynamics interactions with other substances, which possess similar pharmacological properties. Kava is as effective in treating forms of anxiety and the powerful tranquilizers known as benzodiazepines. Kava is not habit forming and does not reduce alertness [41].

**Toxicity:**

The side effects included oral and lingual dyskinesia, torticollis, and painful twisting movements of the trunk, oculogyric crisis and exacerbation of Parkinson's disease [40]. Kava has also been shown to have additive effects with central nervous system depressants. A patient who was taking alprazolam (Xanax), cimetidine (Tagamet) and terazosin (Hytrin) became lethargic and disoriented after ingesting kava [37].

**Uses:** As Antiseizure and sleeping pills [5, 38].

***Ginkgo biloba* (Ginkgo)**



**Biological source:**

It consists of dried leaves of *Ginkgo biloba* Linn belonging to family *Ginkgoaceae*. It is an ancient Chinese medicinal plant, which is now being cultivated in several countries including India [5]. A standard Ginkgo biloba extract of leaves contain 24 percent flavonoids and 6 per cent terpenes, increases cerebral blood flow, especially in geriatric patients whose conditions include short-term memory loss [43].

**Constituents:**

The active ingredients of ginkgo leaf are various flavonol glycosides, which mainly include flavonol, mono-flavonol glycosides, and triglycosides of kaferol, and isorhamnetin. The leaves also contain diterpene lactone like ginkgolides A, B, C, & J and organic acids like 4-hydroxy benzoic acid and shikimic acid [5,45,56].

**Pharmacological effects and clinical efficacy:**

The extracts of Ginkgo biloba has anti – free radical properties in various in – vitro systems that may contribute to its efficacy in free radical induced cerebral insufficiencies. In a review of more than 40 controlled trial of Ginkgo showed that all but one found clinically significant improvements in symptoms such as memory loss, concentration difficulties, fatigue, anxiety and depressed mood [47].

**Dose:**

In a 52 – week, randomized, double blind, placebo controlled multi-center study of more than 300 patients with Alzheimer’s disease or vascular dementia used the extract at a dosage of 120 mg a day [44].

**Toxicity:**

Side effects of Ginkgo extract are uncommon but include headache, gastrointestinal upset and allergic skin reactions and rarely cerebral hemorrhage [46].

**Uses:** Alzheimer’s disease [37].

***Panax ginseng* (Ginseng)**



**Biological source:**

It consists of dried roots of various species of *Panax ginseng* belonging to family *Araliaceae* [5]. It is a commonly used herb in maintaining emotional balance [49].

**Constituents:**

Ginseng contains a mixture of several saponin glycosides, belonging to triterpenoid group like ginsenosides, panaxosides, and chikusetsusaponin. The main constituents of ginseng is oleanolic acid [5,54,56].

**Toxicity:**

Side effects with either type of ginseng are rare. There are a few case reports of breast tenderness, postmenopausal vaginal bleeding, and menstrual abnormalities associated with Panaxginseng. Combination treatment with Panax ginseng and antidepressant drugs may result in a manic episode [51].

**Uses:** As Sedative and also maintain emotional balance [53].

***Leonurus cardiaca* (Motherwort)**



**Biological source:**

It consists of dried aerial parts of *Leonurus cardiac* belonging to family *Labiatae*. The herb is collected during flowering period. It is native to Siberia and found generally throughout Europe [5].

**Constituents:**

The major constituents of motherwort are flavonoids, iridoids, terpenoids and tannins. Flavonoids includes hyperosides, kaferol-3-D-glucosides, quercitrin. Iridoids includes leonuride. Diterpenes contains leocardinetc [5, 56].

**Pharmacological effects and clinical efficacy:**

It is also known as ‘heart herb’. It increases blood circulation in the brain. In the 17th century, it was recommended by the herbalist Nicholas Culpeper to prevent melancholy. In modern time, it has been studied in Germany where it was recognized as having a mild sedative effective for treating anxiety and sleep disorders. Modern herbalists report that it helps to alleviate depression especially when combined with other antidepressant herbs [37]. A single application of motherwort extract (concentration not reported) in excess of 3 grams may cause diarrhea, uterine bleeding, and stomach irritation. It should be avoided in pregnancy as large amounts may cause uterine contraction and potential miscarriage. The investigational studies suggest that kava might have additive effects with benzodiazepines, given that they act on the same receptor and on the same areas of the central nervous system with increased GABA receptors [48].

**Toxicity:**

Adverse effects of *Leonurus cardiac* are rare but include gastrointestinal upset, contact allergies, headache, restless sleep and mydriasis. Valerian appears to be relatively safe in overdose with the major effect being central nervous system depression [28].

**Uses:** As Anti-anxiety [5].

***Centella asiatica* (Mandukaparni)**



**Biological source:**

Drug consists of the dried aerial parts, preferably leaves of *Centella asiatica* belonging to family *Apiaceae*. It is distributed throughout the tropical and subtropical regions of India [5,56].

The plant is a 'rasayana' in Ayurvedic medicine; it enhances the immune system and is considered to have a rejuvenating, neurological 'tonic' and mild sedative effect [23,66].

**Constituents:**

Tri-terpenoidsaponins; madecassoside and asiaticoside and their aglycones; Asiatic acid and madecassic acid. Madecassoside 0.7 – 5.0 %; Asiaticoside 0.1 – 0.6 %; Asiatic acid 0.1 – 0.5 % and Madecassic acid 0.5 – 0.8 % are major constituents [5].

While saponins; asiaticoside B, brahminoside, centelloside, indeentelloside, thankuniside and isothankuniside; triterpenoid acids; brahmic acid, isobrahmic acid, betulic acid, centic acid and centoic acid; flavonoid glycosides; 3-glucosylquercetin and 3-glucosylkaempferol and an alkaloid hydrocotyline are some of the minor constituents [54, 56,69].

**Pharmacological effects and clinical efficacy:**

Aqueous extract of fresh leaves has effect on learning, memory and biogenic amine turnover in albino rats and the effect is dose dependent. In double blind clinical trial conducted on 30 mentally retarded children who were free from epilepsy and other neurological conditions to study effects of C. Asiatica on general mental ability, significant improvement in general ability and behavior pattern was observed after administering the drug for a period of 6 weeks. The indigenous drug Geriforte (brand name) contains C [22]. Asiatica as one of the constituents, has been found to impart protective and antifatigue effects on stressed rats and also an excellent nervine tonic in decline age [64].

**Toxicity:**

Contact dermatitis has been observed due to madecassol. Triterpene glycosides have been identified as having oncogenic activity and asiaticoside has been implicated as a possible carcinogen where repeated applications are used [22, 23].

**Contraindication:**

In most cases, the herb, its extract or its preparations are not recommended for use in the children under age 12, pregnant or lactating women [21].

**Uses:**

- It has beneficial effect on behavior learning and memory.
- Nervine tonic.
- The plant is traditionally considered as a tonic in diseases of nerves and blood and for improving memory.
- The plant is especially used in the treatment of amnesia and hysteria. [5,54,56]

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