

## Nootropic Plants: A Review: Part VII

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## Abstract

The present article is the 7<sup>th</sup> in the series of Nootropic Plants: A Review. In this article the nootropic role of 6 plants, namely LEONTOPODIUM ALPINUM (Edelweiss), HYPERICUM PERFORATUM (St. John's wort), THESPESIA POPULNEA (PARISHA), RUBIA CORDIFOLIA (MANJISTA), MURRAYA KOENIGII (CURRY LEAVES) and ANEMARRHENA ASPHODELOIDES are discussed. The data was collected from various published sources and compiled.

### 1. LEONTOPODIUM ALPINUM (Edelweiss)

Leontopodium alpinum ('Edelweiss') is a central Asian plant which is known to enhance cholinergic neurotransmission. The potency to increase synaptic availability of acetylcholine (ACh) in rat brain Isocomene was investigated with behavioural tasks in mice. It restored object recognition in scopolamine-impaired mice and showed nootropic effects in the T-maze alternation task in normal and scopolamine-treated mice. Additionally, this sesquiterpene reduced locomotor activity of untreated mice in the open field task while the activity induced by scopolamine was abolished (Hornick et al, 2008).

### 2. HYPERICUM PERFORATUM (St. John's wort)

St. John's wort extract is commonly used as a wound healing, anti-inflammatory, anxiolytic, diuretic, antibiotic, anti-viral and cancer chemo-protective agent. Jang et al, 2002 have shown the protective effect of H. perforatum against hydrogen peroxide induced apoptosis on human neuroblastoma cells. El-Sherbiny et al, 2003 have reported the antioxidant role of H. perforatum extracts against elevated oxidative status induced by amnesic neuroblastoma cells. Kraus et al, 2007 have reported H. perforatum extract had ameliorative effect on amyloid beta mediated toxicity in microglial cells. It also has nootropic and/or anti-amnesic effects that single administration of St. John's wort extract (500 mg/kg) caused PPI disruption in rats (Tadros et al 2009). Rahim et al 2009 have reported the efficacy and tolerability of H. perforatum in major depressive disorders. Lu et al, 2012 have demonstrated the protective role of Hyperoside, a compound from H. perforatum to protect cortical neurons from oxygen glucose deprivation reperfusion induced injury via nitric oxide signal pathway. Altun et al,

2013 have assessed the inhibitory and antioxidant roles of *H. perforatum* on cholinesterase and tyrosinase enzymes. Oliveira et al, 2016 have shown in their findings that the protective role of this plant's compounds in neurotoxicity which could help control neuro-degeneration in Alzheimer's disease. Cai et al, 2017 indicated that *H. perforatum* extract attenuates behavioural, biochemical and neurochemical abnormalities in aluminium chloride induced Alzheimer's disease in rats. Hong et al, 2023 have given a detailed account of chemical constituents and neuro-protective activity of *H. perforatum*.

### **3. THESPESIA POPULNEA (PARISHA)**

*Thespesia populnea* (Malvaceae) is a large tree found in the tropical regions and coastal forests of India. Various parts of *T. populnea* are found to possess useful medicinal properties, such as antifertility, antibacterial, and anti-inflammatory. The learning and memory parameters were assessed using elevated plus maze and passive avoidance apparatus. It showed significant improvement in memory of young and aged mice. *T. populnea* bark possessed a powerful memory enhancing activity in mice. Since diminished cholinergic transmission and increased cholesterol levels appear to be responsible for development of amyloid plaques and dementia in Alzheimer patients (Vasudevan and Parle, 2006; Vasudevan and Parle, 2007).

### **4. RUBIA CORDIFOLIA (MANJISTA)**

Manjista has many other therapeutic properties like calcium channel blocking, anti-diabetic, anti-stress, and anti-platelet. It has anticancer activity and is used in the treatment of skin disorders. *Rubia cordifolia* derived components have anti tumor, anti-oxidative, anti-platelet aggregation, and anti-inflammatory effects. Effect of alcoholic extract of roots of *Rubia cordifolia* investigated on cold restraint induced stress and on scopolamine-induced memory impairment. Alcoholic extract enhanced brain gamma-amino-n-butyric acid (GABA) levels and decreased brain dopamine and plasma corticosterone levels. Acidity and ulcers caused due to cold restraint stress were inhibited by alcoholic extract. Rawal et al, 2004 have reported the neuro-protective role of *Rubia cordifolia* in induced oxidative stress in brain hippocampal slices. Animals treated with alcoholic extract spent more time in open arm in elevated plus maze model. It also antagonized scopolamine induced

learning and memory impairment (Patil et al, 2006). Wen et al, 2022 have reviewed the traditional uses, phytochemistry, pharmacological and chemical applications.

## **5. MURRAYA KOENIGII (CURRY LEAVES)**

*Murraya koenigii* leaves (MKL) commonly known as curry patta or kurry leaves are added routinely to Indian gravy and vegetarian dishes as a favorite condiment. The MKL diets produced a significant dose-dependent improvement in the memory scores of young and aged mice and significantly reduced the amnesia induced by scopolamine (0.4 mg/kg, i.p.) and diazepam (1 mg/kg, i.p.). The underlying mechanism of action for the observed nootropic effect may be attributed to pro-cholinergic activity and a cholesterol lowering property. (Vasudevan and Parle, 2008; Vasudevan and Parle, 2009). Mani et al, 2012 have shown that the total alkaloids extract of *M. koenigii* leaves have protective role on experimentally induced dementia. Mani et al, 2013 also have shown the positive role of *M. koenigii* leaf extracts of oxidative stress and cholinergic transmission in old aged mice. Sanaye and Pagare, 2016 have evaluated the antioxidant effect and anticancer activity of *Murraya koenigii* against human glioblastoma. Azzubaid and Al-Ani 2019 have assessed the neuroprotective role of *M. koenigii* leaves on partial global cerebral ischemia. Reddy et al, 2019 have shown the anti-Alzheimer's activity of *M. koenigii* leaf aqueous extracts on aluminium chloride induced neurotoxicity in rats. Reddy et al, 2020 have shown the anti-Parkinson's activity of aqueous extracts of leaves of *M. koenigii* in Wistar rats. Tan et al, 2022 have suggested the multi-target approach of *Murraya koenigii* leaves in treating neurodegenerative disease.

## **6. ANEMARRHENA ASPHODELOIDES:**

*Anemarrhena asphodeloides* Bunge. (AA, family Liliaceae), which is a Chinese medicinal herb, primarily contains xantones, such as mangiferin, and steroidal saponins, such as timosaponin. The memory-enhancing effects of these saponins were investigated in scopolamine-treated mice. Piwowar et al 2002 have reported the neuroprotective role of Mangiferin present in *A. asphodeloides* from the induced neurotoxicity on PC12 cells. Oh et al, 2007 also indicated the neuroprotective role of *A. asphodeloides* on induced focal ischemia in rat brain. The memory-enhancing effect of timosaponin AIII (TA3) was greater (Lee et al.2009). Wang et al 2018 have shown the anti-inflammatory role

of active compounds isolated from the rhizome of *Anemarrhena asphodeloides*. Ji et al, 2019 also reported the anti-inflammatory role of *Anemarrhena asphodeloides*. Similarly, Zhang et al 2020 have shown the neuroprotective and immune-regulatory role of one fructan isolated from *Anemarrhena asphodeloides*. Wang et al 2022 have shown the scientific basis for the application of this plant in the prevention and treatment of AD.

## CONCLUSION

The above list of 6 plants which are mostly used as neuroprotective and neuroregenerative plants. This is the 7th list of nootropic plants and the series continues in subsequent issues.

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