SM Journalonet

ISSN no. 2249-8451

Nootropic Plants: A Review: Part II

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Abstract

The present article is the 2nd in the series of Nootropic Plants: A Review. In this article the nootropic role of 7 plants is discussed. The data was collected from various published sources and compiled.

1. Curcuma longa L.

Curcuma longa is a household culinary item used extensively. Its medicinal roles have been discussed extensively for its various medicinal roles. Numerous studies are reported that curcuminoids are associated with antioxidant and anti-inflammatory activities, but studies with particular attention to cognitive disorders and any clinical effects are lacking. Curcumin was shown to be neuro-protective against ethanol-induced brain injury in vivo following oral administration; an effect that was related to a reduction in lipid peroxide levels and enhancement of glutathione in rat brain. There are reports that Curcumin removes the amyloid plaques in Alzheimer's animal model. It helps ameliorate focal ischemia in rat brain. It is also reported that Curcumin shows inhibitory effect on ACHE activity on scopolamine induced Alzheimer's in rats. Thre are reports that curcumin attenuates aluminium induced neurotoxicity and dementia in rats. The anti-Parkinson's role of curcumin is also known. Curcumin's role as antioxidant is shown in rat brain. It attenuates the neurotoxicity induced by fluride in rats. Reddy et al, 2018 have reported the protective role of curcumin of Alzheimer's disease. Abbas et al, 2020 have reported the

effect of curcumin induced dementia in rats. Barreto et al, 2020 have reviewed the highlights of current and emerging strategies to facilitate curcumin permeation across the Blood Brain Barrier for the treatment of various neurodegenerative diseases.

2. Butea monosperma (Palasa)

the gum is astringent. Leaves of Butea are rich in glucoside, linoleic acid, oleic In Ayurveda it is used as anthelmintic and tonic. Its seeds are used as anti-parasitic and acid and lignoceric acid. There are some reports on the neuroprotective role of this plant. Thiagarajan et al, 2012 have shown the ameliorative potential of Butea monosperma on chronic constriction injury of sciatic nerve induced neuropathic pain in rats. Das et al, 2016, have shown the antiepileptic activity of methanol extract of Butea monosperma and its isolated bioactive compound in experimentally induced convulsion in Swiss Albino mice. Shari et al, 2020 have shown the role of flavonoid rich fraction of Butea monosperma in memory enhancing activity. Datta et al, 2020 have also shown the neuroprotective role of Butea monosperma against arsenic induced aberrant methylation and mitochondrial DNA damage in rat model.

Although pre-clinical animal studies have shown that Butea monosperma has nootropic effects in established learning and memory models, few clinical studies have been performed to complement these findings. Moreover, other clinical studies have to be encouraged, also to evidence any side effects and possible interactions between this herbal medicine and synthetic drugs.

3. Withania somnifera (Aswagandha)

Ashwagandha contains chemicals that might help calm the brain, reduce swelling, lower blood pressure, and alter the immune system. Since Ashwagandha is traditionally used as an adaptogen, it is used for many conditions related to stress. It has been known as one of the Rasayana drug in Ayurveda. There are quite a few reports on the neuroprotective role of Aswagandha. There are many reports on the neuroprotective role of Withania. Glycowithanoilides from Withania have attenuative role of on tardive dyskinesia in rat model. Withaferin A and its derivatives from Withania have shown positive role in the management of Alzheimer disease. The neuroprotective role of Withania root extract on Huntington's disease against 3 nitropropionic acid induced behavioural, biochemical and mitochondrial dysfunction in animal model was also reported. The root extracts of

Withania improves catecholamines and physiological abnormalities in Parkinson's disease in mice model. Rabhi et al, 2019 have shown the neuroprotective role of derivative of Withaferin from Withania.

Withanolide A from Withania penetrates brain via intra-nasal administration and exerts neuroprotection in cerebral ischemia reperfusion injury in mice. It was also reported to that Withanolide and withanoside derivative have an inhibitory role on aggregation of beta amyloid aggregation in brain. The ameliorating effect of Withaferin A on Huntington's disease induced by heat shock in animal model was also reported. Mikulska et al, 2023 have explained the various medicinal roles of Withania somnifera in their review.

4. Pueraria tuberosa (Vidari)

Pueraria tuberosa (Vidari) is used traditionally to relieve body heat, eye soring, dry mouth, headache associated with high blood pressure, and stiff neck problems. There are reports of the nootropic effects of tuber extracts of Pueraria tuberosa. Bharti et al, 2021 have reviewed the traditional uses, pharmacology and phytochemistry of P. tuberosa. Dosani et al, 2023 have demonstrated the role of Ayurvedic herbs and Panchakarma procedures in the management of cerebral palsy.

5. Commiphora whighitii (Syn. Commiphora mukul) (Guggulu)

Gugglu is resin or gum from the trees of Commiphora mukul and used extensively in Ayurveda and Sidhha medical practice as potent medicine for many formulations. Multiple pharmacological activities especially hypolipidemic, antiobesity, anti-inflammatory, anti-tumor effects, cardioprotective, neuroprotective, hepatoprotective, thyroid stimulatory effects etc. It effectively regulates different transcription factors, enzymes, cytokines, and anti-apoptotic proteins which are involved in inflammation, carcinogenesis, and other chronic diseases. Further, Commiphora in combination with other Ayurvedic herbs is

commercially available and marketed for the treatment and cure of arthritis, obesity and associated side effects of the disease. Gugulipid, an ethyl acetate extract of the resin of plant Commiphora whighitii is an established hypolipidemic agent in clinical practice. Gugulipid was investigated for its effect on learning and memory, parameters of oxidative stress (GSH and MDA) and acetylcholinesterase (AChE) activity in the STZ (ic)-treated mice. The study demonstrated that gugulipid has significant protective affect against streptozotocin-induced memory deficits model of dementia that can be attributed to anti-oxidant and anti-AChE activity of gugulipid (Saxena et al, 2007). Kunnumakkara et al, 2018 have indicated the neuroprotective role of Guggulu along with its various medicinal roles.

6. Brassica oleracea var. italic

Broccoli is a particularly rich source of vitamin C and vitamin K. It is a highly neutrious vegetable which is eaten a raw as well as cooked. Its neuroprotective roles have been studied of by a number of researchers. It was shown that the protective role of Broccoloi leaf extract on H_2O_2 induced oxidative stress. It was also shown the neuroprotective effect of Brassica oleracea crude juice in cellular model of Alzheimer's disease. It has been reported that it has antiamnesic role. Ahmad et al, 2023 have shown the phosphodiesterase 1B inhibiting potential of ethanolic extract of white cabbage.

7. Sesbania grandiflora (Fabaceae) (Agati)

Agastya or Agati botanically known as Sesbania grandiflora is found mostly in the tropics and is a rich source of Vitamin A, B, C, calcium, phosphorus, iodine, iron, etc. In Ayurvedic classical texts, Agastya is considered the drug of choice for night blindness i.e Nakta Aandhya. It was reported that this plant has anxiolytic and anticonvulsive roles in experimental animals. The neuroprotective role of seeds of this plant are antiamnesic. Kanchav et al, 2022 have reviewed the positive effects of S. glandiflora in the treatment of dementia and neuro- diseases.

CONCLUSION

The above list of 7 plants which are mostly used as neuroprotective and neuroregenarative plants in Ayurveda and Sidhha medicinal practices. This is the 2nd list of nootropic plants and the series continues in subsequent issues.

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