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Covering letter for Submission of Manuscript

From,

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Sub: Submission of manuscript for publication

Dear Editor-in-Chief S M Journal,

I am enclosing herewith the manuscript entitled ‘Nootropic Plants: A Review- Part V’ for publication in your esteemed journal.

This is to inform that this paper has not been published or under consideration for publication in any other journal and all authors approve of this submission. This is to further inform that there is no conflict of interest among the authors. All the authors have contributed at different stages of the work.

Nootropic Plants: A Review: Part V

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Abstract

The present article is the 5th in the series of Nootropic Plants: A Review. In this article the nootropic role of 4 plants, namely ***Phyllanthus amarus (*Bhumyaamalaki)*, Asparagus racemosus (Satawari), Evolvulus alsinoides*** **and** ***Zingiber officinale*** are discussed. The data was collected from various published sources and compiled.

*1. Phyllanthus amarus (*Bhumyaamalaki)

In Ayurveda the whole plant is used in gonorrhea, menorrhagia and other genital affections. It is useful in gastropathy, diarrhoea, dysentery, intermittent fevers, ophthalmopathy, scabies, ulcers and wounds. There are some reports on the neuroprotective role of this plant. Srilatha and Reddy, 2019 have demonstrated the recovery of structure and function of sciatic nerve after being stress induced by STZ hyperglycemia. Alagan et al, 2019 also have shown the neuroprotective role of *Phyllanthus amarus* on induced neuroinflammation and cognitive impairment in rats. Oyeleye et al, 2022 have reported that Phyllanthus amarus extracts improved memory function, attenuated cholinergic and

purinergic dysfunction and suppressed the oxidative stress in brain, induced by doxorubicine. Hashim et al, 2022 have evaluated the neuroprotective activity of *P. amarus* in attenuating arsenic induced neurotoxicity in vivo. Enogieru and Omoruyi, 2022 have explored the protective role of *Phyllanthus* leaf extract against mercury oxide induced neurotoxicity in rats.

2. Asparagus racemosus (Satawari)

Asparagus racemosus (AR) has earlier been reported to possess antidepressant activity possibly mediated through the monoaminergic system, and nootropic and anti-amnestic activities possibly through the cholinergic system. *Asparagus racemosus* competitively inhibits in vitro the acetylcholine and monoamine metabolizing enzymes (Meena et al, 2011). Uddin et al, 2016 have shown the neuroprotective role of *Asparagus* against ethanol induced cognitive impairment and oxidative stress in rat brain. Lalret et al, 2018 have reported the neuroprotective role of *Asparagus* root extract by enhancing brain derived neurotrophic factor and estrogen receptor in overiectomized rats. Mazumdar et al, 2021 have reviewed the neuroprotective role of *Asparagus*. Jagadish and Maheep, 2021 have discussed the neuroprotective role of *Asparagus* on hippocampal neurons in scopolamine induced mouse model of Alzheimer's disease.

3. Evolvulus alsinoides

Evolvulus alsinoides (EA), considered as Shankhpushpi on learning and memory in rodents.
Nootropic activity using Cook and Weidley's pole climbing apparatus, passive avoidance paradigms and active avoidance tests were used to test learning and memory. The ethanol extract of EA and its ethyl acetate and aqueous fractions were evaluated for their memory enhancing properties (Nahata et al, 2010). Mehla et al, 2012 have shown the ameliorative role of *Evolulus alsoinoides* on STZ induced cognitive impairment in rats. Yadav et al, 2019 have reported the neuroprotective role of *Evoluvulus alsinoides* ethanolic extracts on scopolamine induced swiss albino rats. Sundaramoorthy *et al*, 2020 have also shown its neuroprotective and cytotoxic effect of this plant.

***4. Zingiber officinale*:**

The potential of an ayurvedic rasayana (rejuvenator) drug *Zingiber officinale* Roscoe used as a memory enhancer. Elevated plus maze and passive avoidance paradigm were employed to evaluate learning and memory parameters. *Z. officinale* significantly increased whole brain acetyl cholinesterase inhibition activity. *Z. officinale* prove to be a useful memory restorative agent in the treatment of dementia seen in the elderly. Farombi et al, 2016 also reported the neuroprotective role of 6 gingerol on induced neurotoxicity in male Wistar rats. Jafazadeh et al, 2017 have reported the modulatory role of ginger extracts of chemokines CCL20 and CCL22 and their receptors (CCR6 and CCR4) in the CNS of induced autoimmune encephalomyelitis. Hussein et al, 2017 have shown the neuroprotective role of ginger on induced neurotoxicity in rats. Halawany et al, 2017 have reported

the inhibition of beta amyloid, COX-, alpha, beta scretase and APh1a by gingerol in induced Alzheimer's disease. Kim et al, 2018 have studied the molecular mechanism of neuroprotection of 6-gingerol from ginger in scopolamine induced amnesia in mice. Sapkota et al, 2019 have shown the neuroprotective effects of 6 shogaol and its metabolites in multiple sclerosis. Talebi et al, 2021 have shown in their preclinical studies the ameliorative effects of ginger extract of Alzheimer's disease. Acrusa et al, 2022 have discussed the potential of ginger in prevention of neurodegenerative diseases.

CONCLUSION

The above list of 5 plants which are mostly used as neuroprotective and neuroregenarative plants in Ayurveda and Sidhha medicinal practices. This is the 5th list of nootropic plants and the series continues in subsequent issues.

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