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REVIEW ON SPECTRUM OF NOOTROPIC MEDICINES IN AYURVEDA

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ABSTRACT

Aim: This study focuses on the documentation and critical review of the nootropics in Ayurveda. **Background:** Nootropic drugs were proposed as a class of psychoactive drugs that selectively improve efficiency of higher telencephalic integrative activities. A detailed account of medicinal plants for enhancement of neurocognitive functions, such as medhya rasayanas, smritikara, buddhivivardhaka drugs etc. are available in Ayurveda. Memory boosters, cognitive enhancers, intelligence enhancers and nerve tonics are all terms used to describe Nootropic medications. **Review results:** Description of the valuable knowledge about plant drugs ascribed with nootropic effect is scattered in ayurvedic medical literatures and numerous researches which is pivotal for further research and drug development. For rational, evidence-based use and development of safe, effective, and acceptable pharmacological dosage forms, it is vital to comprehend the mode of action of these plant drugs based on their traditional use, principles mentioned in Ayurveda texts, and also applying modern pharmacological methods Conclusion: It is an effort to bring together some of the best nootropics in Ayurveda & to bridge the gap connecting effective, affordable traditional medicines to neurological pharmacotherapeutics. The focus of the present review is to assemble and summarize important research finding regarding nootropics in Ayurveda.

KEYWORDS: Nootropics, Neurology, Medhya, Smrithi.

INTRODUCTION

The term Nootropic is derived from Ancient Greek word nóos which means mind' & tropḗ which refers to bend or turn. The word "Nootropic" is used in reference to substances purported to increase cognitive functions & was found by Corneliu E Giurgea (who was a Romanian psychologist and chemist), in 1972. When working on a new compound, Giurgea found a spectrum of effects that did not align with that of any psychotropic drug category, leading to discovery of a new category called the Nootropic.

Nootropic drugs were proposed as a class of psychoactive drugs that selectively improve efficiency of higher telencephalic integrative activities. The main features of the Nootropic profile consist of: (a) enhancement of learning acquisition; (b) resistance to impairing agents; (c) facilitation of interhemispheric transfer of information; (d) enhanced resistance to brain "aggressions"; (e) increased tonic, cortico-subcortical "control"; and (f) absence of usual pharmacological effects of neuro psychotropic drugs.[1]

Memory boosters, cognitive enhancers, intelligence enhancers and nerve tonics are all terms used to describe Nootropic medications. By encouraging nerve development, Nootropic medications boost the oxygen supply to the brain. In Ayurveda, Nootropic Drugs are coined under the term Medhya[2] which has been mentioned under medhya rasayana. Apart from this terminology, we find references of Smrithi-medha balakara,[3] Budhi balakara,[4] Medha Vardhaka[5] etc in rasayana adhyaya of Brihatrayees.

Ayurveda provides a list of herbs known for nootropic activity as well as their multi-dimensional utility in various conditions. Medhya rasayana are a group of four drugs which are said to be the best Nootropic drugs. They are Mandukaparni (Centella asiatica Linn.), Yastimadhu (Glycirrhiza glabra Linn.), Guduchi (Tinospora cordifolia and Shankhapushpi (Convolvulus pleuricaulis), specially mentioned as the ones with multifold benefits regarding the cognitive spectrum.

Review of research contributions on nootropics in ayurveda

Mandukaparni

Mandukaparni present in *Medhya Rasayana* improves learning and memory processes by modulating dopamine, 5-Hydroxytryptamine receptor, and noradrenaline systems, which was also reported in a study on rats.[6] It is also effective in preventing the cognitive deficits as well as oxidative stress.[7]

Yashtimadhu

Yashtimadhu (Glycyrrhiza glabra/Liquorice), the word Glycyrrhiza has been derived from ancient Greek word glykos, meaning sweet and rhiza, meaning root.[8] Yashtimadhu also have good memory enhancer, antioxidant, tranquilizer, anabolic activity, wound healing, and rejuvenating properties so it acts as Rasayana. The isoflavones glabridin and hispalglabridins A and B of *G. glabra* Linn. have significant antioxidant activity. The antioxidants protect susceptible brain cells from the oxidative stress, resulting in reduced brain damage and improved neuronal function, thereby enhancing the memory.[9] Liquorice has significant action on memory enhancing activity in dementia.[10]

Guduchi

Guduchi (Tinospora Cordifolia) has been shown to enhance cognition (learning and memory) in normal rats and reverse cyclosporine induced memory deficit. Alcoholic and aqueous extracts of Tinospora cordifolia have been shown to produce a decrease in learning scores in Hebb William maze and retention memory, indicating enhancement of learning and memory.[11] Juice of whole plant is used therapeutically as Medhya.[12] Tinospora cordifolia has been claimed to possess learning and memory enhancing properties.[13]

Brahmi

Brahmi (Bacopa monnieri), keeps the brain safe from free radical damage and stimulates improved learning and cognitive function. Its medicinal properties are derived from the two main alkaloids present ³n ³t – brahmine and herpestine. It stimulates improved learning and cognitive function.[14]

Shankhapushpi

Acharya Charaka has described shankhpushpi as one of the best Medhya rasayana.[15] Plants commonly used under the name shankhpushpi are: Convolvulus pluricaulis Chois., Evolvulus alsinoides Linn., both from Convolvulaceae, and Clitoria ternatea Linn. (Leguminosae). The alcohol, ethyl acetate and aqueous extracts of C. pluricaulis showed significant memory-enhancing activity in rodents when tested using Cook and Weidley's pole climbing apparatus, active and passive avoidance models.[16] Neuroprotectve and intellect promoting activity implicated to free radical scavenging and antioxidant property.[17]

Bhallataka

Bhallataka acts as a potent drug against a variety of ailments and is popularly known as Ardha Vaidya.[18] Semecarpus anacardium Linn, (Anacardiaceae), a plant traditionally used to treat brain diseases, improve memory, as a rejuvenating drug and also used for neurological disorders.[19] In vitro studies with S. anacardium had shown a potent effect of AchE inhibition and it is shown to neuroprotective especially to the hippocampal regions in stress-induced neurodegeneration.[20]

Jyotishmati

Jyotishmati (Celastrus panniculata) stimulates a significant decrease in the brain levels of malondialdehyde, with simultaneous significant increases in levels of glutathione and catalase. The findings of research study indicate that the aqueous extract of C. paniculata possess cognitive-enhancing properties and an antioxidant effect.[21] Seed oil of *Celastrus panniculata* (*Malkangni*) reversed scopolamine-induced deficits in navigational memory task in young adult rats.[22]

Jatamamsi

Jatamansi has been traditionally used in treatment of wide range of disorders, which include digestive system, circulatory system, nervous system, respiratory system, urinary system, reproductive system and skin diseases.[23] Jatamamsi ethanolic extract significantly improved learning and memory in young mice and also reversed the amnesia induced by diazepam. As scopolamine-induced amnesia was reversed, it is possible that the memory improvement may be because of facilitation of cholinergic transmission in the brain. Hence, *N. jatamansi* might prove to be a useful memory restorative agent in the treatment of dementia seen in elderly persons.[24]

Vacha

Vacha (Acorus calamus) has also been clinically investigated as a monotherapy as well as in combination with other medicinal herbs in healthy subjects and sufferers of various metabolic and neurological ailments. Most clinical research has looked at the Acorus calamus' effect on its neuroprotection activity. Rhizome is useful part having Medhya quality. It has been used in Indian and Chinese system of medicine for hundreds of years to cure diseases especially the central nervous system (CNS) abnormalities.[25]

Kushmanda

Kushmanda (Benincasa hispida) has one among medhya rasayana by its specific action. According to commentators of Ayurveda, Kushmanda ghrita act as a Memory booster by its Prabhava. It has a tissue protective preventive effect on colchicine induced Alzheimer's disease via direct and indirect antioxidant activity.[26]

Review result

Description of the valuable knowledge about plant drugs ascribed with nootropic effect is scattered in ayurvedic medical literatures and numerous researches which is pivotal for further research and drug development. For rational, evidence-based use and development of safe, effective, and acceptable pharmacological dosage forms, it is vital to comprehend the mode of action of these plant drugs based on their traditional use, principles mentioned in Ayurveda texts, and also applying modern pharmacological methods.

CONCLUSION

It is an effort to bring together some of the best nootropics in Ayurveda & to bridge the gap connecting effective, affordable traditional medicines to neurological pharmacotherapeutics. The focus of the present review is to assemble and summarize important research finding regarding nootropics in Ayurveda. Dementia is one among the important health concerns of geriatric neurology in the current scenario, owing to the paradigm shift of the disease burden from communicable disease to non-communicable disease in developed and developing countries, the potential leads from Ayurveda texts may be taken forward for further development of safe, effective, and user-friendly dosage forms of Nootropics through systematic research.

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