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Updated Review On Naturally Occurring Nootropic Agents

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ABSTRACT: Nootropics are also called as smart drug, memory enhancers, neuro enhancers, cognitive enhancers, intelligence enhancers¹. Basically they improve your memory, creativity, concentration, motivation and attention. Nootropics are substances that people take to improve their cognitive performance. In other words, to boost their brain power. Nootropics also help us learn things faster and better. People commonly refer to them as cognitive enhancers or smart drugs. At present, this paper is review concentrated on the knowledge on “Herbal Nootropics Drugs” consisting their therapeutic and pharmacological action along with mechanism of action, major chemical constituent, safety of natural herb chosen from the ayurvedic pharmacopoeia and also examination and normalization of natural herb.

keywords : Herbal nootropics , ayurvedic pharmacopoeia neuro enhancers, cognitive deficit.

Introduction: Basically Nootropics are the drugs which improve our memory. Nootropics are also known as **Cognition Enhancers** or **Cerebroactive Drugs**. These are those drug which work as to elevate mood and enhance the memory and the actual purpose of this drugs is to boost the memory. It is also called as a **smart drug** because it is used to increase our smartness .In the present time the nootropics drugs are widely used, specially among students.

There are two purpose of nootropics :-

- i) Therapeutic purpose
- ii) Maintenance adjecting balancing purpose

I)Therapeutic purpose :-

In therapeutic purpose we used nootropics drugs in a condition in which certain type of memory is altered or loss of memory.

II)Maintenance adjuncting balancing purpose:-

In this any normal person can used nootropics drug to sharp their memory .This drugs may be synthetic or natural also.

Indication of Nootropic Drugs:-

- 1) Alzheimer Disease
- 2) Mild cognitive impairment
- 3) Common symptoms of elderly = Dizziness
- 4) Mental retardness in children = learning defect
- 5) Organic psychosis = Head injury, Brain surgery

In this review paper we are going to discuss about nootropics having natural origin, no need of prescription, and can usually be easily obtained in the form of food supplements and herbal extracts. The natural nootropics having low side effect. Most nootropics does not have an immediate effect after single dose, and therefore long term use is necessary to achieve desired results.

In this review we tried to include all the currently popular natural smart drugs, importance of nootropics , their types, use, dosage, and side effect.

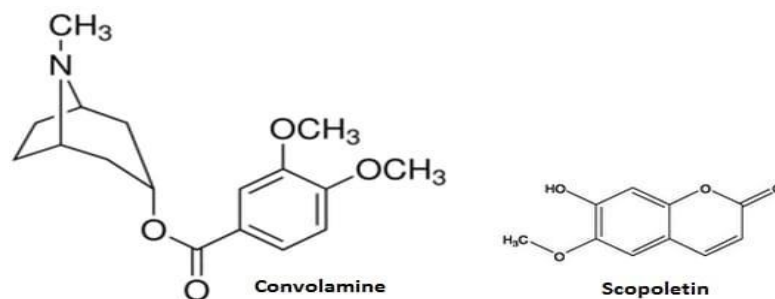
Herbal Nootropic Drugs

1. *Convolvulus pluricaulis* ,Shank Pushpi, a well-known medicine in Ayurveda, is widely used for various Central Nervous System (CNS) effects, especially memory improvement. Under the name Shankpushpi, different plants are used in different parts of India, so their true origin is unknown. Plants commonly used under the name shankpushpi are : *Convolvulus pluricaulis* Choisy, *Evolvulus alsinoides* Linn., both from *Convolvulaceae*, and *Clitoria ternatea* Linn . (*Leguminosae*).

Convolvulus pluricaulis (of the family *Convolvulaceae* and synonymous with *Convolvulus microphyllus*) is one of four plants that is referred to as Shankpushpi, and appears to be the 'true' form of Shankpushpi according to the Ayurvedic Pharmacopoeia with the other three herbs (*Clitoria ternatea*, *Evolvulus alsinoides*, and *Canscora decussata*) being used as replacements for *Convolvulus* depending on herb availability and region.



Figure 1 Shankpushpi



Composition

Shankhpushpina (similar to *evolvulus alsinoides*)

Convolamine
Scopoletin
Ceryl alcohol
 β -sitosterol

2. *Emblica officinalis* (Amalaki)

Emblica officinalis, commonly known as Amla, is an important medicinal plant of India. Its fruits contain tannoids, tannins, vitamin C and flavonoids, which are powerful antioxidants. The aim of this study was to investigate the beneficial effects of hydroalcoholic extracts from fruits of *Emblica officinalis* (EO) on memory impairment in Swiss albino mice. Scopolamine (1 mg kg⁻¹, i.p.) was administered to induce amnesia, and memory was assessed using the elevated plus maze and the passive avoidance test. Piracetam (200 mg kg⁻¹, i.p.) was used as a standard nootropic. EO extract was administered intraperitoneally to different groups of mice at four graded doses (150, 300, 450, and 600 mg kg⁻¹) for 7 consecutive days. Mice were sacrificed on day 8 after memory assessment. Brain acetylcholinesterase (AChE) activity was measured, as well as malondialdehyde (MDA) and glutathione (GSH). EO extract was observed to reverse scopolamine-induced amnesia. The mean transduction and retention delay times for the EO extract 600 mg kg⁻¹ group and vehicle-treated scopolamine group were 13.46 s ($p < 0.001$) and 134.4 s ($p < 0.001$), respectively. vs 23.99 seconds and 44.55 s EO extract treatment also significantly ($p < 0.001$) ameliorated oxidative stress induced by scopolamine administration. Brain MDA and GSH levels in mice in the 600 mg kg EO extract group (-1) compared to the scopolamine group were 29.95 nmol g⁻¹ in moist tissue and 51.87 microgram g⁻¹ in tissue vs. 55.22 nmol g⁻¹ (.) wet wipes or 28.33 micrograms g⁻¹ tissue. EO Extract (also 300, 450, 600mg) kg⁻¹, i.p.) significantly ($p < 0.001$) reversed the scopolamine-induced increase in brain acetylcholinesterase (AChE) levels. Compared to the scopolamine group, brain Ach E levels in mice in the 600 mg kg EO extract(-1) group were 70.23 vs. 151.49 U mg⁻¹ protein(-1). These results suggest that EO has memory-enhancing, antioxidant, and anticholinesterase activities. It may be useful in treating cognitive deficits induced by cholinergic dysfunction. Its potential in the treatment of dementia and Alzheimer's disease needs further investigation.

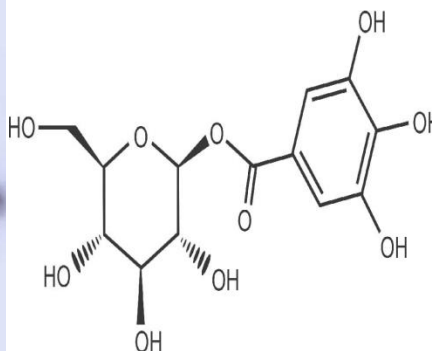


Figure 2 Amalkai

5. Withania somnifera (Ashwagandha)

Ashwagandha (*Withania somnifera* L.) root extract (50, 100, and 200 mg/kg; po) improved maintenance of the passive avoidance task in a step-down paradigm in mice. Ashwagandha (50, 100, and 200 mg/kg; orally) reversed acquisition-retention disruption by scopolamine (0.3 mg/kg) and acute electroconvulsive shock (ECS) treatment-induced memory loss immediately after training, reduced. His chronic use of ECS at 24-hour intervals for 6 consecutive days interfered with memory consolidation on the 7th day. Daily administration of ashwagandha for 6 days significantly improved memory . Consolidation of mice undergoing long-term ECS treatment. Ashwagandha administered on day 7 also reduced memory consolidation deficits induced by chronic treatment with ECS. Glucoside and cytoindoside found in ashwagandha not only show anti-stress and antidepressant effects, but are also said to have therapeutic benefits in cognitive decline and dementia . According to a study, oral administration of ashwagandha root extract for 1 month resulted in reverse behavioral deterioration, aggregation of A β , and plaque pathology in AD brains (transgenic mice) . Ashwagandha was found to be beneficial in attenuating neurobehavioral abnormalities induced by various chemical and physical stimuli to oxidative stress in the (rodent) brain, and was found to be beneficial in reducing various neurobehavioral stresses in the rodent brain. It significantly reduced the levels of protein carbonyls, AchE, and nitrites that were elevated in the high section.

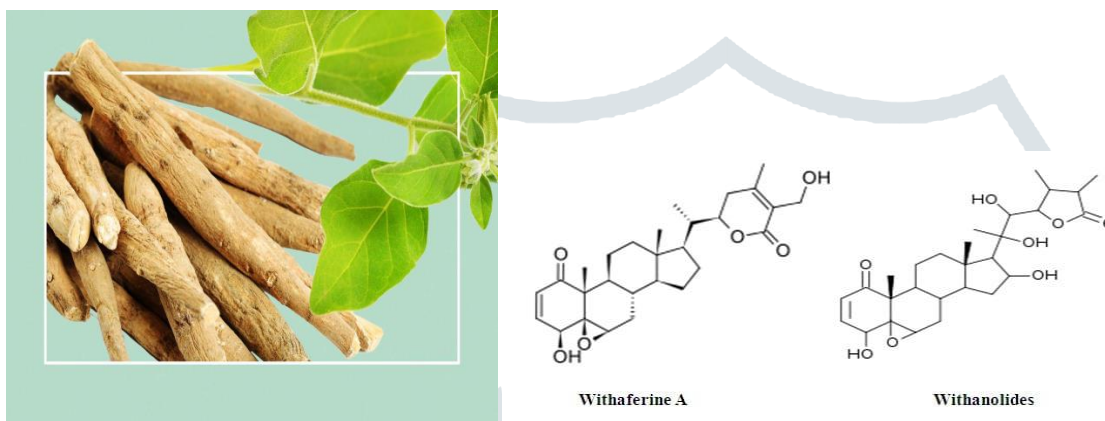


Figure 5 Ashwagandha

6. Rhodiola rosea (golden root)

Rhodiola rosea is known as golden root and arctic root, enhances cognitive function, improves memory and learning, and is thought to protect the brain. This plant belongs to the Crassulaceae family and increases 5-HT and NE levels in the cerebrum, prefrontal cortex, and frontal cortex. *Rhodiola rosea* is a flowering plant grown in high altitude regions of the world. It has been used in traditional medicine for centuries in parts of Europe, Asia and Russia. A lot of research has been done on this plant with promising results, but more research is in progress. Today, *Rhodiola rosea* is widely used as a dietary supplement for its many health benefits. We all experience some form of stress in our lives. Short-term acute stress, whether physical or mental, is a normal part of survival. The human body has stress mechanisms and control systems to maintain homeostasis, a stable and balanced state of bodily function. *Rhodiola rosea* is an adaptogen. Adaptogens are defined as biologically active plants or herbs. Adaptogens have been around for thousands of years and help to ameliorate internal and external stressors, normalize body function and maintain homeostasis.

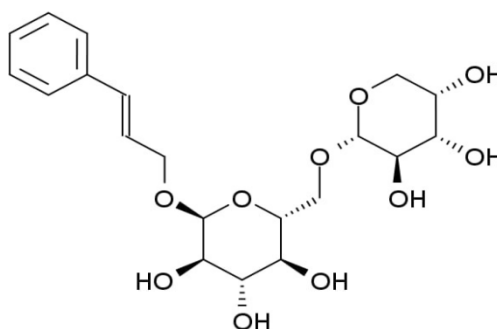


Figure 6 Golden root

7. Panax ginseng (Asian ginseng)

Korean ginseng root (panax ginseng) is probably one of the best known nootropic supplements. It has been a staple of traditional Chinese medicine for thousands of years to improve brain function and mental processing. A large body of evidence suggests that ginsenoside metabolites contribute significantly to the pharmacological effects of ginseng. A recent study aimed to obtain evidence that rare ginsenosides make important contributions. Placebo-controlled, double-blind studies demonstrate significant anti-fatigue effects, including improved mental performance, especially cognitive function. These adaptogenic plant extracts can increase stress tolerance and improve performance, focus and endurance during fatigue.

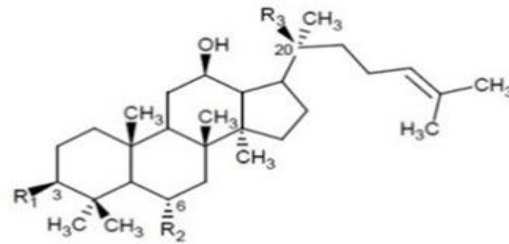


Figure 7 Asian ginseng

Conclusion

Ayurveda as an integrated science designs solutions for memory and cognitive disorders in a beneficial way. Our understanding of the mechanisms affected by the administration of natural nootropics has increased significantly over the past decade. Nootropics are a diverse group of drugs that affect the metabolism of the neurons of the central nervous system. They primarily improve cognitive function, especially when damage or degeneration is present. Most of these substances do not work immediately after a single dose and must be used for a longer period of time before any measurable improvement is seen.

Authors contribution:

The first author contributed about the information of natural nootropic drug which are widely used in medicinal industry. Also conceptualization of the article along with the collection of data and preparation of manuscript. Corresponding author provided expertise and feedback.

Competing interests:

We declare that we have no conflicts of interest.

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