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Review Article

An Overview of Memory-Boosting Herbs (Natural Cognitive Enhancers)

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ABSTRACT

Optimum memory and cognition play crucial roles in day-to-day life. Smart Drug, also known as 'nootropics' and 'cognitive enhancers' [CEs], are commonly used by healthy individuals to increase memory, attention, learning, executive functions, and vigilance.Herbal medications are well-known nootropics that significantly affect memory and cognitive function. Bacopa monnieri (Brahmi), Camellia sinensis (Green tea), Centella asiatica (Gotu Kola), Ginkgo biloba (Ginkgo), Zingiber Officinale(Ginger),Rhodiola rosea (Rhodiola),Salvia officinalis (Sage),Evolvulus alsinoides(Shankpushpi), andGlycyrrhiza glabra (Liquorice) are among the popular nootropic herbs. The idea of nootropics is briefly introduced in this article, along with the nootropic benefits of common herbal remedies.

INTRODUCTION

The brain is responsible for memory, reasoning, judgment, consciousness, and emotion. Supporting brain health is critical for ensuring that successful regulation and coordination of bodily functions. Nutritional supplements can help maintain brain health. Herbs have been shown to improve brain function, including memory, alertness, intelligence, and mentalability. Cognitive enhancers include medications, supplements, nutraceuticals, and functional foods that improve attention and memory. Nootropics are cognitive enhancers that are neuroprotective or extremely safe. Nootropics, also known as smart drugs, memory enhancers, neuro-enhancers, cognitive enhancers, and intelligence enhancers, are drugs, supplements, nutraceuticals, and functional foods that aim to improve mental functions like cognition, memory, intelligence, motivation, attention, and concentration.[1]The word “nootropics” (from Greek “noos,” mind, thinking; “tropes,” direction) was coined by Belgian scientists K. Giurgea and V. Scondia (UCB) to refer to a new class of drugs that positively affect cognitive and integrative brain

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functions.[2] Nootropic medicines often have low toxicity, minor adverse effects, and do not produce verbal or motor excitement, anxiety, addiction, or depletion of functional capacities. They also work well with other pharmaceuticals. [2] Certain nootropics are contraindicated for patients with acute renal failure, diabetes mellitus, neuroinfections, epilepsy, and mental agitation. Nootropic therapy is not recommended for persistent and significant impairment of mental activity or intelligence.[3]

Various mechanisms by which nootropics acts are as follows:

- Improving blood flow to the brain.
- Providing precursors for neurotransmitters (chemical messengers in the brain).
- Improving neuronal function. Minimizing free radical and oxidative damage to brain cells
- Providing useful energy to the brain, and so forth.[4]

2. Herbal Drugs for Memory Enhancement:

2.1 *Bacopa monnieri* (Brahmi):

Fig. 2.1 *Bacopa monnieri* (Brahmi)

It is an ayurvedic herb that has long been used as a cognitive enhancer; it protects the brain from free radical damage and promotes better learning and cognitive function. Bakosides A: 3-(α-L arabinopyranosyl)-O-β-D-glucopyranoside-10, 20-dihydroxy-16-keto-dammar-24-ene, and the alkaloid brahmine, nicotinine, and herpestine (5–6) were found in Bacopa monniera.was separated from Bacopa monniera [3]. Bacopa monniera also yielded triterpenoid saponins, Saponins A, B, and C, as well as pseudojujubogenin glycoside. One of the most valued advantages of brahmi is its capacity to improve mental function, especially memory and focus, alleviate stress and anxiety, delay the development of cognitive decline as we age, and reduce swelling and inflammation withinthe body as well, A daily or weekly intake of Brahmi can provide a boost to the immune system, avoid epileptic episodes and other mental illnesses, improve hypoglycemia, and maintain a healthy metabolism and excellent quality of life. [4]

2.2 *Camellia sinensis* (Green tea):

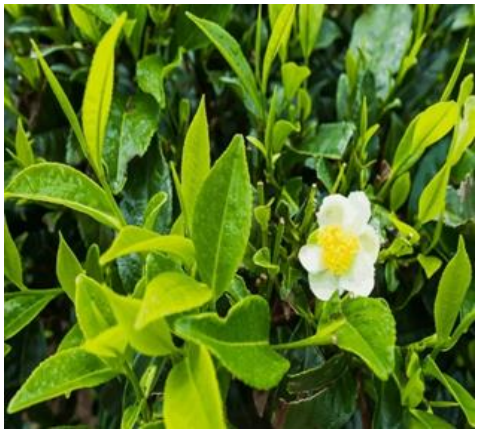

Fig. 2.2 *Camellia sinensis* (Green tea)

Green tea extract is rich in polyphenols, a type of bioflavonoid, and EGCG, a strong antioxidant that can fight free radicals hundreds of times more effectively than vitamin E. Green tea consumption is related with a lower risk of cognitive impairment. Green tea includes trace levels of theanine, a unique amino acid. Theanine in the brain turns to GABA, a neurochemical that inhibits excessive mental processes like stress, anxiety, worrying, and uneasiness. Theanine, unlike herbs,

preserves and improves cognitive function without inducing sleepiness or drowsiness. It promotes quick relaxation by increasing GABA levels. Compared to GABA supplements, it easily crosses the blood-brain barrier and has stronger benefits on increasing GABA levels.[5-8]

2.3 *Centella asiatica* (Gotu Kola):

Fig. 2.3 *Centella asiatica* (Gotu Kola)

This plant has been characterized in Indian literature as having CNS effects, including rejuvenating, sedative, tranquilizing, stimulating, nervine tonic, and intelligence-promoting properties. This herb reduces adrenal corticosterone blood levels during stress and is beneficial for cognitive and nervous disorders as well as vascular problems in the brain.[8]

2.4 *Ginkgo biloba* (Ginkgo):

Fig. 2.4 *Ginkgo biloba* (Ginkgo)

This plant's leaves have been known for increasing brain blood flow and supplying tissues with more oxygen. While influencing the brain's levels of amine neurotransmitter chemicals, this plant enhances the metabolism of glucose in the brain.Ginkgo leaf contains flavonoids (quercetin, kaempferol, andisorhamnetin), minor flavonoids (dehydrocatechins, proanthocyanidins), catechins, flavones (e.g., ginkgetin, amentoflavone, bilobetin, sciadopitysin), terpenes (ginkgolides A, B, C, J, and M), and bilobalide. Gingko Biloba is an antioxidant that removes free radicals, improves oxygen supply, reduces cognitive deterioration in the aged, and enhances memory through behavioral adaptation. Ginkgo extract possesses anti-amyloid qualities, according to in vitro research. Increased transthyretin RNA levels from ginkgo biloba extract support the beta-amyloid transport pathway and stop amyloid buildup in the brain. This plant's leaves have been known for increasing brain blood flow and supplying tissues with more oxygen. While influencing the brain's levels of amine neurotransmitter chemicals, this plant enhances the metabolism of glucose in the brain.[9]

2.5 *Zingiber officinale* (Ginger):

Fig. 2.5 *Zingiber officinale* (Ginger)

Ginger, also known as Zingiber officinale, is a member of the Zingiberaceae family and is utilized in Asian, Indian, and Arabian folklore as medicine

and spice. Zingiber officinale contains active compounds including ginger, gingerol, shogaol, and zingerone. The active component, 6-gingerol, enhances acetylcholine (ACh) to inhibit cholinesterase action. It possesses pharmacological properties including antilipidemic, antiemetic, antibacterial, anti-arthritic, and antioxidant action [10]. Arabian folklore aids in memory improvement. In the hippocampus and cerebral cortex, it also raises serotonin, dopamine, epinephrine, and norepinephrine levels.[12]

2.6 *Rhodiola rosea* (Rhodiola):

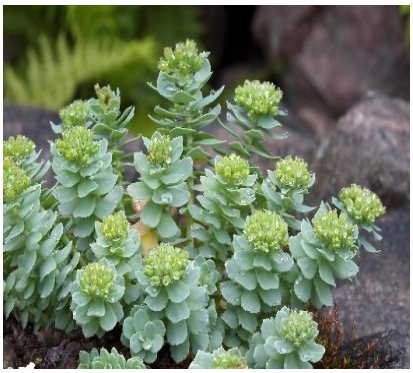

Fig. 2.6 *Rhodiola rosea* (Rhodiola)

Rhodiola rosea is a perennial plant found in the Arctic regions of Europe and Russia.[10] It has long been utilized in traditional medicine in Russia and Scandinavia, and has been widely explored in Russia and China during the last few decades. Research indicates that Rhodiola rosea stimulates the body.[11It is a kind of plant that has been shown to be useful in lowering depression and elevating mood. It lessens fatigue and improves both mental and physical performance. Because of its action on opioid peptides like betaendorphins and its inhibition of monoamine oxidase, rhodiola rosea may have an effect on serotonin and dopamine levels. It belongs to an assortment of plant derivatives known as adaptogens, which are physiologically different from chemical stimulants like nicotine. It is a kind of plant that has been shown to be useful in lowering depression and elevating mood. It lessens fatigue and improves both mental and physical performance. Because of its action on opioid peptides like betaendorphins and its inhibition of monoamine oxidase, rhodiola rosea may have an effect on serotonin and dopamine levels. It belongs to an assortment of plant derivatives known as adaptogens, which are physiologically different from chemical stimulants like nicotine.[13]

2.7 *Salvia officinalis* (Sage):

Fig. 2.7 *Salvia officinalis* (Sage)

Salvia officinalis, commonly referred to as sage, was used by the Egyptians as a fertility remedy to treat wounds, insect bites, ulcers, coughs, fevers, digestive problems, sores, diarrhea, vaginal infections, and sore throats.[15] Sage (Salvia) has long been used in the kitchen and medicinally to improve memory, according to British herbal encyclopaedias. Sage (Salvia) has been shown to suppress acetylcholinesterase (AChE) activity in mild to severe Alzheimer's disease by breaking down acetylcholine, a neurotransmitter lacking in Alzheimer's patients. Additionally, it significantly impacted behavior and attention.[14]

2.8 Evolvulus alsinoides (Shankpushpi):

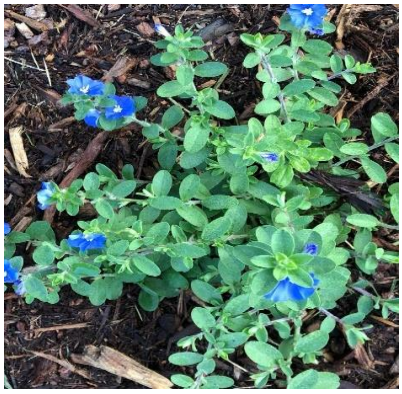

***Fig. 2.8 Evolvulus alsinoides* (Shankpushpi)**

In traditional medical systems, Evolvulus alsinoides (Convolvulaceae) is utilized as a brain tonic or noortopic. The entire herb known as "Shankhpushpi" has been used in Ayurvedic medicine for ages due to its sedative, anxiolytic, and memory-enhancing qualities.[17] Extracts of Evolvulus alsinoides, including ethanol, aqueous, and ethyl acetate, have been demonstrated to boost rat learning and memory.[16]

2.9*Glycyrrhiza glabra* (Liquorice):

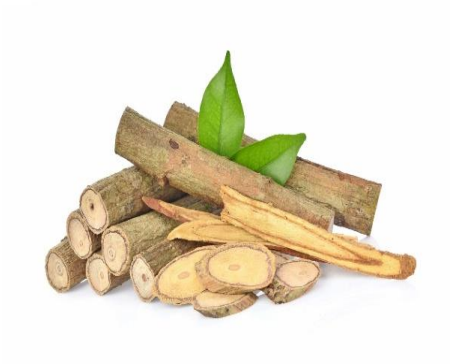

Fig. 2.9 *Glycyrrhiza glabra* (Liquorice)

Glycyrrhiza glabra's root is known as liquorice or licorice.[18-19] The rhizomes and roots of Glycyrrhiza glabra (Fabaceae) are a powerful brain tonic that balances blood sugar levels and improves circulation into the central nervous system.[20] Liquorice has been shown to enhance memory and learning in those with dementia caused by scopolamine.[21-23] Glycyrrhizin is Glycyrrhiza glabra's primary component.[24] Liquorice's antioxidant qualities, which lessen brain damage and enhance neuronal function, may be responsible for its protective effects and memory-boosting effects.[25]

3. CONCLUSION:

Nootropics can improve intelligence, speed, focus, mental awareness, and other traits. Finding the appropriate medication for one's condition is crucial because many different substances are categorized as nootropics or cognitive enhancers. Cognitive enhancers can also be used to treat the symptoms of some major medical disorders, such Alzheimer's disease, Parkinson's disease, or possibly ADHD. The selection of nootropics can be made by consulting a doctor or other medical professional who is knowledgeable about the disease's pattern. Experts must also be consulted to determine how they can assist in treating any mental health issue.

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