

Memory Enhancing Medicinal Herbs

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Abstract:

Memory is an individual's ability to encode, store, retain and subsequently recall information and past experiences in the brain of the individual. Memory gives an individual the capability to learn and adapt from previous experiences and the power of recalling the previously learned facts, skills and habits. Poor memory, slow recall and lower retention are common problems in today's world. Memory declines mostly under stress and fatigue. People over 40 years of age commonly experience memory loss called as age related memory impairment. This might be due to hormone and proteins (Growth factors) which repair the brain cells decline with age. During ancient times in India, herbs were used to enhance memory power. One can enhance his/her memory by using one of the herbs one at a time. Some the herbs that helps in enhancing one's memory are Bacopa monniera, withania somnifera, rhodiola rosea, Ginkgo biloba, Gotu kola, Shankhpushpi, Malkangani and Rosmarinus officinalis Linn. In this review some of the herbs like Bacopa monniera, Withania somnifera, Rhodiola rosea and Rosmarinus officinalis Linn. will be discussed about their role in biochemical action in enhancing the memory is discussed.

Key words:

Memory enhancer, Medicinal herbs, Brahmi, Rosemary, Ashwagandha, Rhodiola

INTRODUCTION:

Memory is the usual consequence of learning and reflects the enduring changes in the nervous system that result from transient experiences⁽¹⁾. Bacopa monniera, also referred to as Bacopa monnieri, Herpestis monniera and "Brahmi," has been used in the Ayurvedic system of medicine for centuries⁽²⁾.

Bacopa monniera is a member of the Scrophulariaceae family. It is a small, creeping herb with numerous branches, small oblong leaves, and light purple flowers. In India and the tropics it grows naturally in wet soil, shallow water, and marshes^(3,4). The herb has been mentioned in several Ayurvedic treatises including Charaka Samhita and Sushruta Samhita in the 3rd century AD 11⁽⁵⁻⁷⁾. This plant has been used in India and Pakistan as a cardiac tonic, digestive aid, and also to improve respiratory function in cases of bronchoconstriction⁽⁸⁾.

Withania somnifera (ashwagandha) is widely used in Ayurvedic medicine, the traditional medical system of India^(9,10). Withania somnifera is a shrubby plant cultivated in India, parts of East Asia and Africa which offers tremendous potential as an energizing medicinal herb⁽¹¹⁾. Its leaves are used in Ayurvedic and Unani systems for treatment of tumors and tubercular glands⁽¹²⁾.

Rosemary (Rosmarinus officinalis L.) is a medicinal and aromatic plant belonging to the Lamiaceae family. Rosemary herbs were used as medicinal, culinary, and cosmetic virtues in ancient Egypt, Mesopotamia, China and India⁽¹³⁾. It is an evergreen branched bushy shrub, attaining a height of about one metre with upright stems, whitish-blue flowers and dark green leaves which are small with edges turned over backward⁽¹⁴⁻¹⁶⁾.

Rhodiola rosea (golden root or Arctic root) is distributed at high altitudes in Arctic and mountainous regions throughout Europe and Asia. It is a popular plant in traditional medical systems in Eastern Europe and Asia, with a reputation for stimulating the nervous system, decreasing depression, enhancing work performance, eliminating fatigue, and preventing high altitude sickness⁽¹⁷⁾.

BIOCHEMICAL ACTION OF MEMORY ENHANCING HERBS:

Brahmi:

The active constituents responsible for Bacopa monniera's cognitive effects are bacosides A and B⁽¹⁸⁻²²⁾. Brahmi, most importantly used for therapeutic means, is to enhance cognitive function, most research has focused on the mechanism behind these properties. The triterpenoid saponins and their bacosides are responsible for Brahmi's ability to enhance nerve impulse transmission. The bacosides also aid in repair of damaged neurons by enhancing kinase activity, neuronal synthesis, and restoration of synaptic activity, and nerve impulse transmission⁽²³⁾. A 2012 research on elderly people demonstrated that Bacopa monnieri suppresses AChE activity resulting in enhanced cholinergic function, which in turn enhances attention and memory processing and increases working memory⁽²⁴⁾. Similarly, the research were done on children where a 12 week Brahmi treatment revealed significant benefits with improvement in sentence repetition, logical memory, and paired associate learning tasks⁽²⁵⁾.

Ashwagandha:

Total alkaloid extract (ashwagandholine, AG) of Withania somnifera roots has been studied for its effects on the central nervous system⁽²⁶⁾. Effects of sitoindosides VII-X and withaferin isolated from aqueous methanol extract of roots of cultivated varieties of Withania somnifera, were studied on brain cholinergic, glutamatergic and GABAergic receptors in male Wistar rats⁽²⁷⁾. The compounds slightly enhanced acetylcholinesterase (AChE) activity in the lateral septum and globus pallidus, and decreased AChE activity in the vertical diagonal band were noted. These changes were accompanied by enhanced M1-muscarinic-cholinergic receptor-binding in lateral and medial septum as well as in frontal cortices, whereas the M2- muscarinic receptor-binding sites were increased in a number of cortical regions including cingulate, frontal, piriform, parietal, and retrosplinal cortex. So the data suggests that compounds preferentially affect events in the cortical and basal

forebrain cholinergic-signal transduction cascade. The drug-induced increase in cortical muscarinic acetylcholine receptor capacity might partly explain the cognition-enhancing and memory-improving effects of *Withania somnifera* extracts in animals and in humans⁽²⁸⁾.

Rosemary:

The essential action of rosemary essential oil is in stimulation of the nervous system under sympathetic control resulting in improved memorizing and concentrating abilities⁽²⁹⁾. Rosemary essential oil was causes moderate inhibition of acetylcholinesterase⁽³⁰⁾. The olfactory impact of essential oils of lavender and rosemary on cognitive performance and mood of volunteers. They reported that rosemary produced a significant enhancement of performance in terms of overall quality of memory and secondary memory factors, but also impaired the speed component of memory compared to the control⁽³¹⁾.

Rhodiola rosea:

The effects of *Rhodiola rosea* are, firstly it stimulates the neurotransmitters such as epinephrine, dopamine, serotonin, and nicotinic cholinergic effects in the central nervous system, and secondly, it enhances the effects of these neurotransmitters on the brain by increasing the permeability of the blood brain barrier to precursors of DA and 5-HT⁽³²⁻³⁵⁾. The release of norepinephrine, serotonin, and dopamine in ascending pathways of brain stem activates the cerebral cortex and the limbic system. Consequently, the cognitive functions of the cerebral cortex and the attention, memory, and learning functions of the prefrontal and frontal cortex were found to be enhanced. Apart from this, the other neuronal systems such as the cholinergic system use the neurotransmitter acetylcholine (Ach) and contribute to the memory function via pathways ascending from the memory storage in the limbic system to various areas of the cerebral cortex (memory retrieval). Agents that block Ach suppress the activity of these ascending pathways and interfere with memory. *Rhodiola rosea* reversed this blockade⁽³⁶⁾.

CONCLUSION:

The human brain is one of the most complex organ ever made. One of the most interesting aspects of the brain is its power to retain memory. Memory is one of the aspects that differentiates humans from animal. But memory can become faulty due to several reasons, and that person is not able to make full use of his/her potentials. So some herbs help to better improve the memory. Researches were done on improvement of memory and there are findings that herbs were used as memory boosters. This article has discussed about how herbs are commonly used as memory booster and their biochemical actions in aiding memory improvement.

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