



Medhya Rasayana in Ayurveda as Brain Booster : A Review

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ABSTRACT

Today's era is the era of Competition and one can do competition with Super Brain Power Development only. Super power Brain means Excellent memory, extraordinary intelligence, great academic achievement, and successful carrier, and these are the dreams of every individual. A good memory power acts as a catalyst in all paths of life, be it academic success or maintenance of personal relationships. Fortunately, ancient Ayurvedic traditions offer natural solutions to enhance memory function and improve focus. Cognitive deficits that present with many of neuropsychiatric conditions and alone as developmental deficit demand use of Medhya rasayana to boost cognitive abilities of Brain. Recently there is a tremendous urge to explore medicinal plants globally for improving cognitive function owing to their less adverse effects. Ayurveda provides a list of herbs known for nootropic (Medhya Rasayana)activity as well as their multi-dimensional efficacy in various conditions. Present paper is a review to update knowledge on pharmacological properties, major chemical constituents, therapeutic actions, preclinical studies, safety and possible mode of action of the selected herbs from Different ayurvedic texts and ayurvedic pharmacopoeia.

Keywords: Ayurveda, Brain Power, Memory enhancer, Medhya Rasayana

INTRODUCTION

In Ayurveda , living in Harmony with the universe is the key to optimal health. Also Ayurveda science Life is the combination of Sharira, Indriya, Satva and Atma. And in living body Mind- Memory- Soul- Indriya is dependent on each other for knowledge gaining. Inputs received by Panch Dnyanendriyas are stored in the form of Memory and Recall at proper time. When Atma, Mann, Indriya, vishaya, they established a kind of co-ordinations and rise to knowledge about that subjects or the subject. As per Modern science, Memory is our ability to encode, store, retain, and recall information from our past experiences. To achieve this ,one must focus on what is the best for them and have Healthy Mind and Body. Drugs, diet and regimens, which promote longevity by delaying aging and preventing diseases, are called Rasayana.

Rasayana therapy is not a simple drug therapy but is a specialized therapeutic procedure implicating the fundamental concept of. It may leading to Comprehensive clinical effects designated as Vaya Sthapana, Ayushkara, Medhakara, Balakara and Jara Vyadhi Nashana effects. Medhya Rasayana promotes medha. This review suggests that Medha is a ability which co-ordinates sense organs, mind, intellect and motor organs. Medhya Rasayana therefore strengthens the functions of all these factors.

Medhya Rasayanas are group of medicinal plants described in different Ayurveda Samhitas with many and multi system benefits, specifically to improve memory and intellect by their Prabhava means specific action. Medha means intellect and Rasayana means therapeutic procedure or Drugs preparation that on regular use will boost Brain by nourishment, health, memory, intellect, immunity and hence longevity achieved properly. As per Charak Samhita Mentioned in Chikitsa sthan Medhya Rasayana is a group of 4 medicinal plants that can be used singly or in combinations. They are Mandukaparni (Centella asiatica) , Yastimadhu (Glycyrrhiza glabra) , Guduchi (Tinospora cordifolia) and Shankha pushpi (Convolvulus pleuricaulis) , specially mentioned with wide range of applications on different systems. Along with this concet few more efficacious drugs used with same proerties are mentioned elsewhere in the Ayurveda classical textbooks. They are Aindri (Bacopa monniera) , Jyothishmati (Celastrus paniculata), Kushmanda (Benincasa hispida), Vacha (Acorus calamus) and Jatamamsi (Nardostachys jatamamsi). Medhya Rasayana are used either in the form of Kalas or alone. As per Ayurveda Daily use of Medhya Rasayana is not only good for memory but also good for promotion of mental health means Manas swasth. The use and daily practices reduce stress in life and enhance lifespan along with increasing



memory. Hence, the present research work has been designed to know the relation between Prakriti and memory, intellectual power of children with short and long term memory of school-going children, to evaluate the effect of Medhya Rasayana on the improvement of short-term and long term memory and maintenance of Shariric and manas health of school-going children.

Evidence Based Approach

1) Mandukaparni

Mandukaparni is an ancient herb and the name has been derived from Sanskrit which means (the leaf resembles the feet of a Manduka (frog)). In Ayurveda, this is an important ingredient of several compound formulations. Mandukaparni belongs to the group of drugs known as Medhya Rasayanas. The presence of bioactive constituents makes the herb a potent memory enhancer, imparts anti-convulsant, anti-depressant, wound healing, anti-oxidant, anti-bacterial activity. Consumption of Mandukaparni also manages the risk of duodenal and gastric ulcers, central nervous system, skin and gastrointestinal disorders. Mandukaparni helps reduce anxiety due to its anxiolytic activity. It reduces the effect of certain mediators that induce anxiety. It also manages the function of neurotransmitters by balancing the behavioral changes and release of hormones.

Mandukaparni helps to improve mental alertness when used on a regular basis. According to Ayurveda, the nervous system is controlled by Vata. An imbalance of Vata leads to poor mental alertness. Mandukaparni helps improve mental alertness as well as enhances memory due to its Medhya (brain tonic) property. Anxiety is classified as a neurological disorder where an individual gets certain symptoms like anger, stress or a feeling of depression. According to Ayurveda, any neurological disorder like anxiety is controlled by Vata dosha. Mandukaparni helps reduce the symptoms of anxiety and gives a calming effect on the nervous system due to its Medhya (brain tonic) property.

Enough scientific evidence is not available to support the role of Mandukaparni in Mental alertness. However, taking Mandukaparni along with other herbs might (such as ashwagandha and vacha) help improve cognitive function. Mandukaparni is a prostrate, stoloniferous perennial herb rooting at nodes. Fresh whole plant juice is used for therapeutic purposes as Medhya (cognitive enhancer). Major constituents are saponin (medacoside, asiaticoside, medacassoside, asiatic acid, a new triterpenic acid). They act on behaviour besides being neuro protectives brain growth promoter. Dendritic arborization is supposed to be the neuronal basis for improved learning and memory. Anti seizure activity may result from direct or indirect modulation of ATPase activity. Centella asiatica inhibits the memory impairment induced by scopolamine through the inhibition of AChE. BR-16A (Mentat), a formulation containing Centella asiatica proved for its antistress effects. Extracts of Centella are used in a herbal cosmetic cream for the improvement of skin viscoelasticity and hydration. A study was conducted on Menotab, an effective herbomineral preparation

2) Yastimadhu

Yastimadhu (*Glycyrrhiza glabra*) is a hardy herb or under shrub belonging to Fabaceae family. Fine powder of dried root is used internally with milk for therapeutic purpose as Medhya. Active ingredients are glycyrrhizine, flavonones, isoflavones, glycyrrhetic acid, six phenolic compounds. Multidimensional activities of Yastimadhu may be attributed to glycyrrhizine and flavonones. Yastimadhu is cytotoxic and its prolonged use may lead to pseudo aldosteronism, hyperkalemia, and hypertension. The roots and rhizomes of *G. glabra* has been studied with respect to spatial learning and passive avoidance preliminary free radical scavenging cerebral ischemia and antioxidant capacity towards LDL oxidation. *Glycyrrhiza glabra* aqueous extract markedly improves antihypoxic effects induced by sodium nitrite in rats and this effect may be mediated by its antioxidant properties. The roots and rhizomes of *Glycyrrhiza glabra* is an efficient brain tonic; it increases the circulation into the CNS system and balance the sugar levels in the blood. Licorice has significant action on memory enhancing activity in dementia it significantly improved learning and memory on scopolamine induced dementia. Glycyrrhizin, a triterpenoid compound, accounts for the sweet taste of licorice root. These bioactive constituents contribute to the Yastimadhu roots anti-inflammatory and antioxidant activity. Antioxidant-based drugs or formulations are used for the treatment of complex diseases like stroke, diabetes, Alzheimer's disease and atherosclerosis. The neuroprotective effect root of Yastimadhu may be attributed to its antioxidant property as it possess many bioamines and active ingredients by the virtue of which susceptible brain cells get exposed to less oxidative stress resulting in reduced brain damage and improved neuronal function with improvement in memory (intelligence).

3) Guduchi

Guduchi is a large glabrous, deciduous, climbing shrub of Menispermaceae family found throughout tropical India. Juice of whole plant is used therapeutically as Medhya, Guduchi Dravya's Rasa – Tikta, Kashaya Guna – Laghu Virya – Usna Vipaka – Madhur Karma – Samgrahi, Balya, Dipana, Rasayana Parts used – stem leaves Internally Guduchi is one of the



most effective rasayana. It works well on seven dhatus & keeps the system in balance. The rasayana accords longevity, enhances memory, improves health & bestows youth.

It is also used in the form of decoction, powder and Satwa (starch extract of stem). Its root is known for its anti stress, anti-leptrotic and anti-malarial activities. Chemical constituents' classes are alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides. Neuroprotective and ameliorative properties are due to their antioxidant and trace element contents. *Tinospora cordifolia* is known to be a rich source of trace elements (Zinc and Copper) which act as antioxidants and protects cells from the damaging effects of oxygen radicals generated during immune activation. It increases the blood profile and has lead scavenging activity. *Tinosporacordifolia* has been claimed to possess learning and memory enhancing, antioxidant, and anti-stress activity. *Tinosporacordifolia* enhanced the cognition in normal and cognition deficits animals in behavioural test Hebb William maze and the passive avoidance task. Mechanism of cognitive enhancement is by immunostimulation and increasing the synthesis of acetylcholine, this supplementation of choline enhances the cognition. Myriad actions of Guduchi may be attributed to its antioxidant and immunomodulatory properties.

4) Shankhapushpi

Shankhapushpi (*Convolvulus pleuricaulis*) is a perennial, prostrate or sub erect spreading hairy herb, found throughout India. Recommended therapeutic form is fine paste of whole plant. Highly regarded as Medhya (intellect promoter). Important chemical principles are microphyllic acid, shankhapushpin, kaempferol-kaempferol-3-glucoside, 3, 4 dihydroxycinnamic acid, sitosterols. Neuroprotective and intellect promoting activity implicated to free radical scavenging and antioxidant property. BR-16A (Mentat), a poly herbal combination containing Shankhapushpi significantly reversed the social isolation stress-induced prolongation of onset and decrease in pentobarbitone-induced sleep, increased total motor activity and stress-induced antinociception in experimental model. Ayushman-8 (containing Shankhapushpi, Brahmi and Vacha) reported to be effective on Manasa-mandata (mental retardation). Shankhapushpin compound containing Shankhapushpi, Sarpagandha, and Gokshura in equal quantities studied to be effective in Chittodvega (anxiety disorders). Research reported that Shankhapushpi to be effective in relieving signs and symptoms of Chittodvega (anxiety disorders). Herbalists believe that Shankhapushpi calms the nerves by regulating the body's production of the stress hormones, adrenaline and cortisol. Few investigations reports that Shankhapushpi has potent depressive action in mice. *Convolvulus pleuricaulis* whole plant extract, shows the highest inhibitory activity against *Helicobacter muridarum*.

Shankhapushpi improves memory and concentration levels due to its Medhya (improves intelligence) property.

Shankhapushpi helps to manage stress and insomnia by relaxing the mind due to its Vata balancing and Medhya properties.

Shankhapushpi helps to lower the risk of epilepsy and other mental disorders due to its Medhya and Rasayana properties.

Shankhapushpi improves digestion and manages gastrointestinal disorders such as constipation, jaundice, dysentery, piles dyspepsia because of its mild laxative nature.

Shankhapushpi improves concentration and attention span in children suffering from ADHD (Attention deficit hyperactivity disorder) due to its Medhya (improves intelligence) property.

5) Aindri

Aindri (*Bacopamonniera*) commonly called as Brahmi belongs to Scrophulariaceae family. It is a small, creeping marshy herb grown throughout India. Most beneficial therapeutic form is macerated whole plant juice. *Bacopamonniera* is a well-known nootropic plant reported for its tranquilizing, sedative action, cognitive enhancer, hepatoprotective, memory enhancer and antioxidant actions. Neuroprotective activity may be ascribed to having its reactive oxygen species scavenging property. *Bacopamonniera* is a saponin rich plant. Bacosides are the main active nootropic principle present in the alcoholic extract of the plant. Isolation of a new saponin, a jujubogenin, named bacopasaponin G, and a new glycoside, phenylethyl alcohol was reported. Three new saponins designated as bacopasides III, IV and V isolated. Apart from memory enhancer activity these bacosides have the potential to modulate the activities of heat shock protein expression, cytochrome P450 and superoxide dismutase in the rat brain. On rats, alcoholic extract increases both cognitive function and retention capacity, decreases retrograde amnesia and protects from phenytoin-induced cognitive deficit. It is mainly utilized in the treatment of memory and attention disorders. Recent studies have indicated antioxidant effect of bacosides (triterpenoid saponin isolated from *Bacopamonniera*) against chronic toxin induced oxidative damage in rat brain and thyroid T₄ hormone stimulating activity in animals in high doses. Aging is inevitable and has its fair share of consequences. One of the significant side effects of aging is declining memory power. However, age-related brain degeneration can be delayed to



some extent by using Brahmi as a supplement. Brahmi is considered a brain tonic for people of all ages and genders. Whether you are a student trying to ace your exam or a corporate professional trying to stay focused at work, taking Brahmi as a supplement can help increase focus and support brain function. Brahmi has also been proven to show therapeutic effects against brain degeneration caused by Alzheimer's disease. However, more research is required in this area.

6) Jyotishmati

Jyotishmati (*Celastrus paniculata*) is a large, woody, climbing shrub with ovate or obovate leaves found all over India. Seeds are yellowish, ellipsoid or ovoid enclosed in a scarlet aril, Seed oil (Jyotishmati Taila) is known for Medhya action. This oil contains several terpenoids like paniculadiol, b-sitosterol, celastrol, b-amyirin, pristimerin, but its most investigated components are its many sesquiterpenoids, dihydroagarofuran-type polyols or esters.

7) Kushmand

Kushmanda (*Benincasa hispida*) belonging to Cucurbitaceae an extensive trailing or climbing herb cultivated throughout the plains of India as a vegetable. The fruit, broadly cylindrical, is covered with a waxy bloom. Phytochemical analysis of *Benincasa hispida* shows presence of alkaloids, flavinoids, saponins and steroids. *Benincasacerifera* serves as ROS scavenger and an antioxidant effective agent. It has a tissue protective preventive effect on colchicine induced Alzheimer's disease via direct and indirect antioxidant activity. Kushmandadi Ghrita showed significant results in the management of Chittodvega (anxiety disorders). It Improves the Memory, Intellect and health. This is effective in dullness in children due to undeveloped brain and seizures. Beneficial in autism and such other neurological deficits in children. It also Improves Focus, Attention, memory, speech and concentration. Positive implications for improved neurotransmission and repair of damaged neurons via enhanced regeneration of nerve synapses via changes in the hippocampus, cerebral cortex (areas critical to memory function) and hypothalamus regions of the brain. The fruit juice is useful in mercurial poisoning. It is also recommended for ailments like epilepsy, constipation, piles, dyspepsia, Syphilis and Diabetes. *Benincasa hispida* (Kushmanda) also possess anti-pyretic activity, nootropic activity, anti-Depressant activity, anti-ulcer activity and anticonvulsant activity.

8) Vacha

Vacha (*Acorus calamus*) of Araceae family is a semiaquatic, perennial, aromatic herb with its rhizome being horizontal, rounded, somewhat vertically compressed, spongy and leaves grass like and sword shaped; grown all over India. 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. Active chemical principles are α -asarone, elemicine, cis-isoelemicine, cis and trans isoeugenol and their methyl ethers, camphene, P-cymene, b-gurjunene, a-selinene, b-cadinene, camphor, terpinen-4-ol, atepineol and a-calacorene, acorone, acronone, acoragermacrone, 2-deca-4,7 dienol, shyobunones, linalool and preisocalamendiol. Acoradin, galangin, 2, 4, 5- trimethoxybenzaldehyde, 2,5-dimethoxybenzoquinone, calamendiol, spathulenol and sitosterol are also present. This might have a beneficial effect on memory disorder and learning performance. When combined with Polygala root, Vacha might help maintain the mental well-being and intellectual power of the elderly. It may also help with memory loss, confusion, consciousness loss and forgetfulness. Vacha plant may act as a rejuvenator, enhancing brain functions and building memory power. More human research is required to study the true scope of Vacha on mental health. Consult a qualified doctor for any mental health difficulties.

9) Jatamansi

Jatamansi (*Nardostachys jatamansi*) is an erect perennial aromatic herb with long, stout, woody, greyish, rhizomatous, tail-like rootstock covered with reddish-brown hairs or tufted fibrous remains of the petioles of withered radical leaves, and belongs to Valerianaceae family. Rhizome is used for medicinal purposes as it is Bhutaghna or Manasa Doshahara (relieves of psychiatric problems) and Medhya. Roots and rhizomes of *N. jatamansi* are used to treat hysteria, epilepsy, and convulsions. The decoction of the drug is also used in neurological disorders, insomnia and disorders of cardiovascular system. Rhizomes contain a terpenoid ester, nardostachysin I. It is proven to improve learning and memory in mice and also to enhance biogenic amine activity. An acetone extract of *N. jatamansi* has shown significant inhibition of benzoyl peroxide-induced cutaneous oxidative stress, toxicity, and ear oedema in mice.

Mode of Action of Medhya Rasayana

Medhya Rasayana in Brain Function

According to Arunadutta - Medha is a faculty of Buddhi and Buddhi is composed Dhi, Dhriti and Smriti. Medhya is made up of all three mental faculties, Dhee, Dhriti, and Smriti, which are all interconnected.



The following faculties can be subdivided into Medha:

1. Dhi - Power of Grasping
 2. Dhriti - Power of Retention
 3. Smriti - Power of recollection
- Relation between Tridosha and Medha

Vata Dosha

- Parana Vayu - controlling the function of Buddhi and
- Udana Vayu - Help in recalling the past experience.

Pitta Dosha

Sadhaka Pitta - Promote Medha

KaphaDosha: In their natural condition, Tarpaka and AvalambakaKapha confer wisdom and intellect. Kapha is also in charge of the better features of Dhriti, which regulates mental instability.

So, MedhyaRasayana drug shows his Medhya Karma while working on all the three Doshas.

RasayanaChikitsa nourishes the blood, lymph, meat, fat tissue, and sperm. This protects the person from developing chronic degenerative disorders. Dhatus, Agni, Srotansi and Ojas are the fundamental aspects of the body that are influenced by the therapy. The Bhesha (medicine) in Rasayana treatment is classified into two types:

1. Swasthasyaaurjaskara - Toning up the health of a healthy person
2. KinchitArtasyaRognut - Treating the ailments of the patients

Probable mode of action: MedhyaRasayana

According to Acharya P.V Sharma, Medhya drugs act in accordance with Prabhava. Medha will benefit from drugs that mostly contain Tikta Rasa, LaghuSnigdhaGuna, Sheet Virya, and MadhuraVipaka. Rasa, Srotas, and Agni will all be affected by the effects of these Prabhava and Rasadi.

MedhyaRasayana drug are two types

1. Sheet Virya and MadhuraVipakaDravya, it promotes Kapha and enhances Retention / Dharana Karma. Eg. - Yashtimadhu, Sankhpusphi.
2. UshanaVirya and Tikta Rasa Dravya, it promotes Pitta and enhances Grahana/Grasping, Smriti/Memory. Eg. - Guduchi
3. Medhya drugs acts at various level

1. Level of Rasa
2. Stimulating and improving the function of Agni
3. Improve Circulation of Rasa by opening and cleaning the micro channel and thus improving Medhya

The action of Medhya Rasayana can be explained in modern neurophysiology using neurons and neurotransmitters. Many studies have demonstrated that Medhya Rasayana improves learning, memory, and attention span via modulating cholinergic and GABAergic receptors. Neurons are protected from over excitation and energy depletion by their antioxidant characteristics.

They help neuromodulators function by maintaining the right ratio of excitatory and inhibitory neurotransmitters, according to research articles. Nootropics are thought to function by affecting the availability of neuro-chemicals (neurotransmitters, enzymes, and hormones) in the brain, inducing oxygen flow to the brain, or encouraging neuron growth.



DISCUSSION AND CONCLUSION

Data available so far support procognitive activity of herbs selected for discussion; at the same time demand substantial evidences and revalidation in humans. Mostly the above said herbs act on the basis of antioxidant, adaptogenic or essential trace elements present in them. Their activity on modulation of biological axis and neurotransmitters requires further investigation. Medhya Rasayana helps in improvement of memory power. Daily use of medhya rasayana help to improve the concentration and calm the mind, resulting in memory improvement and is most effective in improving short-term and long term memory of school-going children.

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