

**CRITICAL REVIEW OF MEDHYA RASAYANA DRUGS MENTIONED IN AYURVEDA – TRADITIONAL INDIAN MEDICINE****B. Mahadev^{1*}, G. Siva Ram², V. Subhose³, T. Maheswar³, G. Babu⁴**^{1*}Senior Research Fellow, ²Senior Consultant, ³Research Officer (Ayu.), ⁴Assistant Director In-charge, Regional Ayurveda Research Institute for Skin Disorders, New Rajiv Nagar, Payakapuram, Vijayawada, Andhra Pradesh, India.**ABSTRACT**

Ayurvedic system of medicine has mentioned several medicinal preparations under the category 'Medhya'. By virtue of inducing mental upliftment as major influence several medicinal plants mentioned as 'Rasayana drugs' in *Ayurveda* are primarily claimed as 'Medhya'. Further there is a special class of *Rasayana* drugs called 'Medhya Rasayana' which is supposed to be having specific influence on brain functions. Cognitive deficits like memory disorders are found in high prevalence among the aged. In *Ayurvedic* literature, impairment of memory is mentioned as *Smriti bhramsha* which occurs due to vitiation of *Rajo* and *Tamo doshas*. It has been noted that cognitive functions are thoroughly affected due to stress and other related psychological disorders. It is clearly emphasized that *Medha* (intellect) and *Buddhi* (wisdom) deteriorate in these conditions. People's lifestyle also has an additional influence on the intellectual capacity. Several *Medhya Rasayana* drugs mentioned in *Ayurveda* have multi-dimensional actions having influence on memory. They not only enhance the intellectual capacity but also rejuvenate the whole system and their pathways.

KEYWORDS: *Medhya Rasayana*, Memory, *Medha*.**INTRODUCTION**

The intellectual capability has naturally become a matter of concern for the scientific community. The analysis of the mind and intellect from different angles and their explanations are abundantly available in the *Ayurvedic* literature. The description regarding the concept of *Medhya Rasayana* (memory promoting rejuvenation therapy) is one among them. *Medha* means intellect and/or retention and *Rasayana* means therapeutic procedure or preparation that on regular practice will boost nourishment, health, memory, intellect, immunity and hence longevity. It requires reconsideration and application in present scenario, as it can be a powerful solution for many of the psycho-somatic problems.

The description of *Medhya Rasayana* found in *Samhita granthas* (authoritative scriptures) indicates the specific utility of this type of *Rasayana*. In *Charaka Samhita* there is no direct mentioning of *Medhya Rasayana* as an independent type. But there is mentioning of four drugs viz. *Mandookaparni svarasa* (juice), *Yashtimadhu choorna* (powder) with *Goksheera* (Cow's milk), *Guduchi svarasa* and *Shankhapushpi kalka* (paste) as *Medhya Rasayanas*. The properties ascribed to these formulations include *Medhya* (memory promoting), *Ayushya* (longevity enhancers), *Amaya nashana* (eradicate diseases) and *Balagni varna svara vardhana* (enhances strength, digestive fire, complexion and voice)¹.

In *Sushruta Samhita* more information pertaining to the *Medhya* drugs can be found such as different formulations with their mode of use etc. The chapter named '*Medhayushkameeyadhyaya*' is meant for the description of the same. In *Sangraha granthas* (compiled scriptures) and in *Bhava Prakasha*² and *Yoga Ratnakara*³

the four *Medhya* drugs are mentioned along with other *Medhya* formulations.

Aims and objectives

- An attempt has been made to look into the memory promotive aspect of *Medhya rasayana* drugs, their method, mode and time of administration; utility, mode of action and modern researches on some *Medhya* drugs.

Method of administration

According to *Acharya Charaka*, *Medhya rasayana* can be administered in the way of *Vatatapika rasayana* (rejuvenation therapy having no restrictions) and as per *Acharya Susruta*, *Kutipraveshika rasayana* (rejuvenation therapy involving specific rules) procedure is followed.

Mode of administration

- *Purva karma* (Pre-operative procedure) – *Koshta shuddhi* before the administration is essential like that of other *Rasayanas*.
- *Pradhana karma* (Operative procedure) - Different forms of *Medhya* drugs are explained such as *Svarasa* (juice), *Kalka* (paste) etc. Similarly the dose, duration and adjuvant will also vary depending upon the specific *yoga* (formulation). Ex: *Shveta Avalgujadi Rasayana* is taken along with *Ushna jala* (luke warm water) for 6 months whereas *Vacha Rasayana* is administered with *Goksheera* for 48 days⁴.
- *Paschat karma* (Post-operative procedure) – After the digestion of *Medhya rasayana pathyapathya* (do's and don'ts) should be followed. *Shashtika shali* (A variety of rice) with *Ghrita* (Cow's ghee) and *Ksheera* (milk) is the *Pathya* (wholesome) mentioned for many of the formulations.

Time of administration

Early morning before food is the ideal time for the administration of *Medhya Rasayana*⁵.

Utility of *Medhya rasayana*

Medhya Rasayana has a specific purpose of benefitting *Medha* in particular and they do not have broad spectrum of action like other *Rasayanas*. As per *Acharya Susruta*, the benefits derived from *Medhya Rasayana* and their applied aspects are enlisted below.

1. *Shruta Nigadi* (Power of retention of scriptures)
2. *Smrutiman* (Endowed with good memory)
3. *Medhavi* (Becomes genius)
4. *Grantham Ipsitam utpadayati* (Develops enthusiasm to read the scriptures)
5. *Nastam cha Pradurbhavati* (Power to recollect the forgotten)
6. *Dvirucchaaritam shatamapi avadharayati* (Capable of retaining 100 words spoken only twice)
7. *Moorthimatiscca enam vagdevyanupravishyati* (Goddess of speech enters one's body)
8. *Sarvaischa enam shrutayaupatishtanti* (All the srutis (Vedas and other scriptures) remain within)
9. *Shruta dharaya panchavarsha shatayur bhavati* (Power of remembering the scriptures and a life of 500 years)
10. *Shrotram vivriyate* (Endowed with good hearing capacity)
11. *Dvirabhyasat smrutiman bhavati* (Endowed with good memory)
12. *Trirabhyasat shrutamadatte* (Retains the scriptures in one's mind)
13. *Sarvam tarati kilvisham* (Gets rid of all blemishes)

Probable mode of action of *Medhya Rasayana*

The *Medhya* effect of *Rasayana* can be considered as *Prabhava janya* (unthinkable and unimaginable). This attribution holds good since the action of *Medhya dravya* cannot be related to a particular quality of the drug. Maintaining of normal functioning of *Sadhaka pitta* and *Tarpaka kapha* is the desired action of any *Medhya* drug.

Medhya drugs also act on *Manasika bhavas* (faculties of mind) there by relieving anxiety, stress etc. They are having *Mastishka balya* (nourishing brain) property. It is very difficult to conclude the mode of action of *Medhya Rasayanas* as the mechanism of *Medha* is very complex one and the properties of *Medhya Rasayana* are also not uniform.

Researches on *Medhya Dravyas****Mandukaparni (Centella asiatica Linn.)***

1. Major constituents of it are saponins, medacoside, asiaticoside, medacassoside and asiatic acid, a new triterpenic acid⁶.
2. They act on behavior besides being neuro-protectives⁷ and brain growth promoters⁸. Dendritic arborization is supposed to be the neuronal basis for improved learning and memory⁹.
3. Anti-seizure activity may result from direct or indirect modulation of ATPase activity¹⁰. *Centella asiatica* Linn. inhibits the memory impairment induced by scopolamine through the inhibition of AChE¹¹.

4. Methanol extract of *Centella asiatica* Linn. showed highest free radical scavenging activity that can be attributed to the presence of polyphenols and flavonoids as this fraction contains maximum amount of these secondary metabolites (0.07 mg/ml). These two namely poly phenols and flavonoids are responsible for potent anti-oxidant activity and terminate free radicals¹².
5. *Centella asiatica* Linn. extract selectively decreases amyloid beta levels in hippocampus of Alzheimer's disease animal model¹³.
6. *Centella asiatica* Linn. accelerates nerve regeneration upon oral administration and contains multiple active fractions increasing neurite elongation in-vitro¹⁴.

Yasthimadhu (Glycyrrhiza glabra Linn.)

1. The roots and rhizomes of *G. glabra* have been studied with respect to spatial learning and passive avoidance¹⁵, preliminary free radical scavenging¹⁶, cerebral ischemia¹⁷ and antioxidant capacity towards LDL oxidation¹⁸.
2. *Glycyrrhiza glabra* Linn. aqueous extract markedly improves anti-hypoxic effects induced by sodium nitrite in rats and this effect may be mediated by its antioxidant properties^{19,20}.
3. The roots and rhizomes of *Glycyrrhiza glabra* Linn. is an efficient brain tonic; it increases the circulation into the CNS system and balances the sugar levels in the blood²¹.
4. Licorice has significant action on memory enhancing activity in dementia. It significantly improved learning and memory on scopolamine induced dementia²².

Guduchi (Tinospora cordifolia (Willd) Miers.)

1. Its root is known for its anti-stress, anti-leprotic and anti-malarial activities^{23,24}.
2. Chemical constituents' classes are alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoids, phenolics, aliphatic compounds and polysaccharides²⁵.
3. Neuro-protective and ameliorative properties are due to their antioxidant and trace element contents²⁶.
4. *Tinospora cordifolia* (Willd) Miers. 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 activation²⁷.
5. It increases the blood profile and has lead scavenging activity²⁸.
6. *Tinospora cordifolia* (Willd) Miers. has been claimed to possess learning and memory enhancing²⁹ and antioxidant activities^{30,31,32}.
7. *Tinospora cordifolia* (Willd) Miers. enhanced the cognition in normal and cognition deficit animals in behavioural test Hebb William maze and the passive avoidance task³³. Mechanism of cognitive enhancement is by immune-stimulation and increasing the synthesis of acetylcholine, this supplementation of choline enhances the cognition³⁴.

8. Myriad actions of *Guduchi* may be attributed to its antioxidant^{35,36} and immune-modulatory properties³⁷.

Shankhapushpi (*Convolvulus pleuricaulis* Chois.)

1. Important chemical principles are microphylllic acid, shankhapushpin, kaempferol-kaempferol-3-glucoside, 3, 4 dihydroxycinnamic acid and sitosterols. Neuro-protective and intellect promoting activity is implicated to the free radical scavenging and antioxidant properties³⁸.
2. BR-16A (Mentat) a poly-herbal combination containing *Shankhapushpi* significantly reversed the social isolation stress-induced prolongation of onset and decrease in pento-barbitone-induced sleep, increased total motor activity and stress-induced antinociception in experimental model³⁹.
3. Ayushman-8 (containing *Shankhapushpi*, *Brahmi* and *Vacha*) reported to be effective on *Manasa-mandata* (mental retardation)⁴⁰.
4. *Shankhapushpi* compound containing *Shankhapushpi*, *Sarpagandha*, and *Gokshura* in equal quantities are studied to be effective in *Chittodvega* (anxiety disorders)⁴¹.
5. *Shankhapushpi* is effective in relieving signs and symptoms of *Chittodvega* (anxiety disorders)⁴².
6. Herbalists believe that *Shankhapushpi* calms the nerves by regulating the body's production of the stress hormones, adrenaline and cortisol⁴³.
7. Few investigations report that *Shankhapushpi* has potent depressive action in mice⁴⁴.
8. *Convolvulus pleuricaulis* Chois. whole plant extract, shows the highest inhibitory activity against *Helicobacter muridarum*⁴⁵.
9. *Convolvulus pleuricaulis* Chois. aqueous extract possesses neuro-protective potential, thus validating its use in alleviating toxic effects of scopolamine⁴⁶.

Brahmi (*Bacopa monnieri* (L.) Wettst.)

1. It is commonly called as *Brahmi* and it belongs to Scrophulariaceae family. *Bacopa monnieri* (L.) Wettst. is a well-known nootropic plant reported for its tranquilizing⁴⁷, sedative action⁴⁸, cognitive enhancer⁴⁹, hepato-protective⁵⁰, memory enhancer⁵¹ and antioxidant actions^{52,53}.
2. Neuro-protective activity may be ascribed to having its reactive oxygen species scavenging property⁵⁴.
3. *Bacopa monnieri* (L.) Wettst. is a saponin rich plant⁵⁵. Bacosides are the main active nootropic principles present in the alcoholic extract of the plant⁵⁶.
4. Isolation of a new saponin, a jujubogenin, named bacopasaponin G, and a new glycoside, phenyl-ethyl alcohol was reported⁵⁷. Three new saponins designated as bacopasides III, IV and V were isolated⁵⁸. Apart from memory enhancer activity, these bacosides have the potential to modulate the activities of heat shock protein (Hsp70) expression, cytochrome P450 and superoxide dismutase in the rat brain⁵⁹.
5. On rats, alcoholic extract increases both cognitive function and retention capacity, decreases retrograde

amnesia and protects from phenytoin - induced cognitive deficit⁶⁰.

6. It is mainly utilized in the treatment of memory and attention disorders⁶¹.
7. Recent studies have indicated antioxidant effect of bacosides (triterpenoidsaponin isolated from *Bacopa monnieri* (L.) Wettst.) against chronic toxin induced oxidative damage in rat brain⁶² and thyroid T₄ hormone stimulating activity in animals in high doses⁶³.
8. *Brahmi rasayana* might prove to be a useful memory restorative agent in the treatment of dementia seen in elderly⁶⁴.
9. *Brahmi* decreases the rate of forgetting of newly acquired information⁶⁵.

Jyotishmati (*Celastrus paniculatus* Willd.)

1. Seed oil (*Jyotishmati Taila*) is known for *Medhya* action⁶⁶.
2. This oil contains several terpenoids like paniculadiol, b-sitosterol, celastrol, b-amyrin, pristimerin, but its most investigated components are its many sesquiterpenoids, dihydro-agarofuran-type polyols or esters⁶⁷.
3. *Celastrus paniculatus* Willd. showed antioxidant activity by decreasing the lipid peroxidation⁶⁸ and anti-arthritis activity in rat model⁶⁹.
4. Seed oil of *Celastrus paniculatus* Willd. (*Malkangni*) reversed scopolamine-induced deficits in navigational memory task in young adult rats⁷⁰.

Kushmanda (*Benincasa hispida* (Thumb.) Cogn.)

1. Phytochemical analysis of *Benincasa hispida* (Thumb.) Cogn. shows presence of alkaloids, flavinoids, saponins and steroids⁷¹.
2. *Benincasa cerifera* Savi. serves as Reactive Oxygen Species scavenger and an antioxidant effective agent⁷².
3. It has a tissue protective preventive effect on colchicine induced Alzheimer's disease via direct and indirect antioxidant activity⁷³.
4. *Kushmandadi Ghrita* showed significant results in the management of *Chittodvega* (anxiety disorders)⁷⁴.

Vacha (*Acorus calamus* Linn.)

1. Rhizome is useful part having *Medhya* quality. It has been used in Indian and Chinese systems of medicine for hundreds of years to cure diseases especially the central nervous system (CNS) abnormalities⁷⁵.
2. 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, aterpineol 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.^{76,77}
3. It has been proved for its analgesic and anti-convulsant⁷⁸, hepato-protective⁷⁹, antioxidant^{80,81}, anti-mutagenic⁸², sedative and hypothermic effects⁸³.

4. Good in clearing speech to the children^{84,85} and useful in schizophrenic psychosis⁸⁶.
5. Food and Drug Administration banned usage of its oil in food formulations and in other therapeutic preparations⁸⁷ due to carcinogenic and toxic properties of β -asarone compound⁸⁸.

Jatamansi (*Nardostachys jatamansi* DC.):

1. Rhizome is used for medicinal purposes as it is *Bhutaghna* or *Manasa Dosha hara* (relieves psychiatric problems) and *Medhya*⁸⁹.
2. Roots and rhizomes of *N. jatamansi* DC. are used to treat hysteria, epilepsy, and convulsions⁹⁰.
3. The decoction of the drug is also used in neurological disorders, insomnia and disorders of cardiovascular system⁹¹.
4. Rhizomes contain a terpenoid ester, nardostachys inl⁹².
5. It is proven to improve learning and memory in mice⁹³ and also to enhance biogenic amine activity⁹⁴.
6. An acetone extract of *N. Jatamansi* DC. has shown significant inhibition of benzoyl peroxide-induced cutaneous oxidative stress, toxicity, and ear oedema in mice⁹⁵.

DISCUSSION

Regarding administration of *Medhya rasayana* Acharya Charaka suggests taking it as *Vatatapikarasayana*, as the description is found in '*Kara prachiteeya rasayana pada*' which mainly deals with *Vatatapika rasayana*. Whereas as per Acharya Susruta almost all *Medhya Rasayanas* mentioned are to be administered in *Kutipraveshika vidhi*. So both the methods of administration can be considered in the context of *Medhya Rasayana*.

Early morning before food is preferred as the ideal time for the administration of *Medhya Rasayana*. In *Yoga Ratnakara*, '*Prabhata*' is the word used for the time of administration for the four *Medhya* formulations.

Medhya drugs are mainly *Madhura* and *Sheeta dravyas*, but there are many *Medhya* drugs which do not possess these qualities. It is observed that main *Medhya Rasayanas* (*Mandukaparni*, *Yasthimadhu*, *Guduchi* and *Sankhapushpi*) are *Madhura vipaki dravyas*. Majority of them are *Seeta veerya dravyas*. *Medha* is the *karma* given to *Prakrita pitta*. This can be related to orientation and grasping power. *Guduchi*, being *Madhura vipaka* and *Ushna virya* can help in enhancing grasping power as its constitution is ideal for *Karma* of *Pitta*, especially *Sadhaka pitta*. It can stimulate neuronal functions due to the *Pachana karma*. The *Madhura vipaki* and *Seeta virya dravyas* can help the function of *Tarpaka kapha* to go on smoothly owing to its constitution that is favourable for *Kapha karma*. *Dhruti* i.e., *Dharana shakthi*, memory retention capacity can occur in the presence of only *Seeta virya*.

Pharmacological studies reveal that *Mandukaparni* has neuro-protective, brain growth promoter, anti-seizure activities and free radical scavenger (anti-oxidant) properties and is helpful in subsiding neuro-degenerative changes that occur with Alzheimer's disease

and also accelerates repair of damaged neurons; It has been found that *Yasthimadhu* is an anti-oxidant, memory enhancer and improves anti-hypoxic effects; *Guduchi* has got neuro-protective, anti-oxidant, memory enhancing, anti-stress, anti-leprotic and anti-malarial properties; It is observed that *Shankhapushpi* has got anti-stress, neuro-protective and anti-oxidant properties; *Brahmi* is a cognitive enhancer, hepato-protective, memory enhancer, anti-oxidant and a neuro-protective agent; *Jyotishmati* is a memory promoter, anti-oxidant and anti-arthritis; *Kushmanda* possesses anti-oxidant, anti-stress, neuro-protective and memory enhancing properties; *Vacha* has got memory enhancing, anti-convulsant, hepato-protective and anti-oxidant properties. *Jatamansi* has memory promotive action and is useful in insomnia, hysteria, epilepsy and convulsions.

CONCLUSION

Ayurveda a holistic science provides solutions for memory related disorders in a fruitful way. In the present scenario *Medhya Rasayana* drugs of *Ayurveda* can be used to obtain effective results in memory related disorders. Hence attempt has been made to think logically in the aspect of memory promotion in a view to seek greener pastures.

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