

## A CRITICAL REVIEW ON MEDHYA RASAYANA IN AYURVEDA

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**ABSTRACT**

*Ayurveda* has two main aims, one is to maintain health & the second is to cure disease. The branch *Rasayana* or rejuvenation is one of the eight specialised branches of *Ayurveda* that deals with maintenance of health. *Medhya Rasayanas* are group of medicinal plants described in *Ayurveda* with multi fold benefits, specifically to improve memory & intellect by *Prabhava*. Recently there is 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 activity as well as their multi dimensional utility in various conditions. Thus brief review was carried out by analysing classical text books and peer reviewed papers to focus on updates on

pharmacological properties, major chemical constituents, therapeutic actions & possible mode of action of selected herbs from *Medhya Rasayana* group and their evaluation and analysis according to *Ayurvedic* and Modern aspect.

**KEYWORDS:** *Medhya Rasayana, Ayurveda.*

**INTRODUCTION**

*Ayurveda* has two main aims - one is to maintain health and the second is to cure disease. The branch of *Rasayana* or rejuvenation is one of the eight specialized branches of *Ayurveda* that primarily deals with the maintenance of health. The focal basis of *Rasayana* is accelerated and appropriate nutrition to improve biological competence of body.

The *Rasayana* remedies of *Ayurveda* are essentially molecular nutrients and nutrition enhancing agents acting through three basic mechanisms.

1. *Rasa* enhancing or direct nutrient effect.
2. *Agni* enhancers or promoters of digestion and metabolism.
3. *Srotas* purifying agents or promoters of microcirculation and tissue perfusion.<sup>[1]</sup>

All these three events singly or jointly lead to improved nutritional status in body leading further to formation of best qualities of cells and tissues which sustain aging and stress.

*Rasayanas* could be age specific as they promote nutrition relevant to the natural bio losses occurring at different phases of life span. All *Rasayanas* are nutrition promoters in general but there are certain organ and tissues specific *Rasayanas* viz. *Medhya Rasayana* for brain, *Hridya Rasayana* for heart, *Cakshusya Rasayana* for eyes and so on. Those specific to brain tissues called *Medhya Rasayana*, are claimed to promote cognitive functions of the brain and helps in regeneration of neural tissues besides producing anti-stress and memory enhancing effect and retard brain ageing. Childhood is the period in which all body tissue or '*Dhatus*' are immature and are in the process of maturation i.e. growth & development, so giving *Medhya Rasayana* in this age is very effective to increase I.Q. of children.

### ***Rasayana***

*Rasayana* drugs are which diminishes ageing and diseases.<sup>[2]</sup> *Rasayana* is nutritional transportation in the body. It refers to acquisition, movement or circulation of nutrition to nourish the body and enrich tissue perfusion.

The procedure which imports superior type of *rasadi dhatus* (*prashasta dhatu*) in the body or the means by which an individual gets the excellence of *rasadi dhatus* is known as *Rasayana*. Commenting on this Chakrapani quotes that apart from *prashasta dhatu utpatti*, it is also responsible for *Smriti*. Dalhana describes it as one which stabilise youthfulness and prolongs life with activities through its *Rasa*, *Vipaka*, *Virya* and *Prabhava*.<sup>[3]</sup>

### **Concept of *Medha***

*Medha* is a faculty of *Buddhi*, which means unobstructed, uninterrupted perception, retention and very deep knowledge gained by all the senses.<sup>[4]</sup>

*Buddhi*- *Buddhi* is a phenomenon which motivates a person to work in a particular fashion. It gives an initiative to work, to come to final conclusions after proper analysis.<sup>[5]</sup>

*Smriti*- It is the term used to denote a wide array of higher intellectual faculties including memory, cognition, past sense perception, mastery in higher sciences hence is also used in metaphysics. It is explained by Chakrapani that it is one of the functional components of *Buddhi*. It directs oneself by recollecting the past experience. *Smriti* is recognised as one of the characteristic features of cognizance and it is inferred by recollection.<sup>[6]</sup> After critical examination of *Budhhi*, *Medha* and *Smriti* it could be pointed out that these are the steps of same process. One is incomplete without the rest. The process of recollection takes place properly only and only after the *Buddhi*, *Medha* and *Smriti* unites. So in this sense they are undifferentiated.

### ***Medhya Rasayana***

The term *Medhya* is defined as, which is beneficial for *medha*.<sup>[7]</sup> *Medhya Rasayanas* are group of medicinal plants described in *Ayurveda* with multi-fold benefits, specifically to improve memory and intellect by *Prabhava* (specific action). *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. Description of the *Medhya Rasayana* found in *Samhitas* indicates special utility of these types of *rasayanas* apart from *rasayana* in general. In *Charak samhita* there is no direct mentioning of *medhya rasayana* as an independent type. But there is mentioning of four drugs, they are *Mandukaparni* (*Centella asiatica* Linn.), *Yastimadhu* (*Gly-cirrhiza glabra* Linn.), *Guduchi* (*Tinospora cordifolia* (Wild) Miers) and *Shankhapushpi* (*Convolvulus pleuricaulis* Chois), specially mentioned with wide range of applications on different systems.<sup>[8]</sup> Among these *Shankhapushpi* (*Convolvulus pleuricaulis* Chois) is considered as *medhya vishesh*.

In *Sushruta Samhita* more information about *medhya* drugs are available such as different formulations with their mode of use etc. The chapter named '*Medhayushkamiya adhyaya*' is meant for description of same.

Yet in practice few more handful drugs used with same aim are mentioned elsewhere in the *Ayurveda* classical textbooks. They are *Aindri* (*Bacopa monniera*), *Jyothishmati* (*Celastrus panni-culata*), *Kushmanda* (*Benincasa hispida*), *Vacha* (*Acorus calamus*) and *Jatamamsi* (*Nardostachys jatamansi*). *Medhya Rasayana* is used either in polyherbal preparations or alone.

Evidence based review of *Medhya* drugs

### 1. *Mandukaparni*

This Plant is described in *Tikta skandh*, *Prajastapana* and *Vayasthapana mahakashaya* of *Charak Samhita* and *Tikta varga* of *Shusruta Samhita*. The Synonyms are *Manduki*, *Twastri*, *Divya*, *Mahausadhi*. *Dosha karma* – *Kapha-Pitta shamak*.<sup>[9]</sup> It is a prostrate, stoloniferous perennial herb rooting at nodes.<sup>[10]</sup> Fresh whole plant juice is used for therapeutic purposes as *Medhya* (cognitive enhancer).<sup>[11]</sup> Major constituents are saponin (medacoside, asiaticoside, medacassoside, asiatic acid, a new triterpenic acid.<sup>[12]</sup> They act on behaviour besides being neuroprotectives<sup>[13]</sup> brain growth promoter.<sup>[14]</sup> Anti seizure activity may result from direct or indirect modulation of ATPase activity.<sup>[15]</sup> *Centella asiatica* inhibits the memory impairment induced by scopolamine through the inhibition of AChE.<sup>[16]</sup>

### 2. *Yastimadhu*

This plant is described in *Kanthya*, *Jivaniya*, *Sandhaniya*, *Varnya*, *Sonitastha-pana*, *Kandughna*, *Chardinigrahana*, *Sne-hopaga*, *Vamanopaga*, *Asthanopanaga*, *Mutravirajaniya Mahakasaya* of *Charak Samhita* and *Kakolyadi*, *Sarivadi*, *Anjanadi*, *Brhatyadi*, *Ambasthadi*, *Utpaladi Gana*, of *Shusruta Samhita*. The Synonyms are *Yas-timadhuk*, *Klitaka*. *Dosha karma* – *Vata- pitta shamak*.<sup>[17]</sup> *Yastimadhu* (*Glycyrrhiza glabra* Linn.) is a hardy herb or under shrub belonging to Fabaceae family.<sup>[18]</sup> Fine powder of dried root is used internally with milk for therapeutic purpose as *Medhya*.<sup>[11]</sup> Active ingredients are glycyrrhizine, flavonones.<sup>[19]</sup> isoflavones, glycyrrhetic acid<sup>[20]</sup> six phenolic compounds.<sup>[21]</sup> Multidimensional activities of *Yashtimadhu* may be attributed to glycyrrhizine and flavonones. *Yashtimadhu* is cytotoxic and its prolonged use may lead to pseudoaldosteronism,<sup>[22]</sup> hyperkalemia,<sup>[23]</sup> and hypertension.<sup>[24]</sup> The roots and rhizomes of *G. glabra* has been studied with respect to spatial learning and passive avoidance<sup>[25]</sup> preliminary free radical scavenging<sup>[26]</sup> cerebral ischemia.<sup>[27]</sup> 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.<sup>[28]</sup> Liquorice has significant action on memory enhancing activity in dementia<sup>[29]</sup> it significantly improved learning and memory on scopolamine induced dementia.

### 3. *Guduchi*

This plant is described in *Vayahstha-pana*, *Dahaprashamana*, *Trishna-nigraha*, *Stanya*, *sodhana*, *Triptighna Mahakasaya* of *Charak Samhita* and *Guducyadi*, *Patoladi*, *Araghvadadi*, *Kakolyadi*, *Valli panchamula* of *Shusruta Samhita*. The Synonyms are *Amrita*,

*Madhuparni, Chinnamula, Cakra-lakshanika, Amrita-valli, Chinna, Chin-nodhbhava, Vatsadani, Jivanti, Tantrika, Soma, Somavalli, Kundali, Dheera, Vi-shalya, Rasayani, Candrasahsa, Vayastha, Mandali, Deva-nirmita, Dosha karma – Tri-dosha shamak.*<sup>[30]</sup> *Guduchi (Tinospora cordifolia* (Wild) Miers) is a large glabrous, deciduous, climbing shrub of Menispermaceae family found throughout tropical India.<sup>[31]</sup> Juice of whole plant is used therapeutically as *Medhya*.<sup>[11]</sup> 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-leprotic and anti-malarial activities.<sup>[32]</sup> Chemical constituents classes are alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides.<sup>[33]</sup> Neuroprotective and ameliorative properties are due to their antioxidant and trace element contents.<sup>[34]</sup> *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.<sup>[35]</sup> *Tinospora cordifolia* has been claimed to possess learning and memory enhancing<sup>[36]</sup> and anti-stress activity.<sup>[37]</sup> *Tinospora cordifolia* enhanced the cognition in normal and cognition deficits animals in behavioural test Hebb William maze and the passive avoidance task.<sup>[38]</sup> Mechanism of cognitive enhancement is by immunostimulation and increasing the synthesis of acetylcholine, this supplementation of choline enhances the cognition.<sup>[39]</sup>

#### 4. *Shankhapushpi*

The Synonyms are *Ksheerpushpi, Mangalyakusuma. Dosha karma – Vata- pitta shamak.*<sup>[40]</sup> *Shankhapushpi (Convolvulus pleuricaulis* Chois) is a perennial, prostrate or sub erect spreading hairy herb,<sup>[41]</sup> found throughout India. Recommended therapeutic form is fine paste of whole plant, highly regarded as *Medhya* (intellect promoter).<sup>[11]</sup> Important chemical principles are microphylllic acid, shankhapushpin, kaempferol-kaempferol-3-glucoside, 3, 4 dihydroxycinnamic acid, sitosterols. Neuroprotective and intellect promoting activity implicated to free radical scavenging and antioxidant property.<sup>[42]</sup> Ayushman-8 (containing *Shankhpushpi, Brahmi* and *Vacha*) reported to be effective on *Manasa-mandata* (mental retardation).<sup>[43]</sup> *Shankhapushpi* compound containing *Shankhapushpi, Sarpagandha,* and *Gokshura* in equal quantities studied to be effective in *Chittodvega* (anxiety disorders).<sup>[44]</sup> Herbalists believe that *Shankhpushpi* calms the nerves by regulating the body's production of the stress hormones, adrenaline and cortisol.<sup>[45]</sup>

### 5. Aindri

This Plant is described in *Balya, Prajasthapana mahakasaya* of *Charak Sam-hita*. *Dosha karma –Kapha-Vata shamak*. *Aindri (Bacopa monniera)* commonly called as *Brahmi* belongs to *Scrophulariaceae* family.<sup>[46]</sup> Most beneficial therapeutic form is macerated whole plant juice. Properties are said to be similar to that of *Mandukaparni*.<sup>[47]</sup> *Bacopa monniera* is a well-known nootropic plant reported for its tranquilizing,<sup>[48]</sup> sedative action,<sup>[49]</sup> cognitive enhancer,<sup>[50]</sup> hepatoprotective,<sup>[51]</sup> memory enhancer<sup>[52]</sup> and antioxidant actions.<sup>[53]</sup> *Bacopa monniera* is a saponin rich plant.<sup>[54]</sup> Bacosides are the main active nootropic principle present in the alcoholic extract of the plant.<sup>[55]</sup>

### 6. Jyotishmati

This Plant is described in *Shirovire-cana* of *Charak Samhita* and *Adhobhaghara* and *Shirovirecana* of *Shusruta Samhita*. The Synonyms are *Katabhi, Jyotishka, Kanguni, Paravatpadi, Pinya, Lata, Kakundani, Mal-kangani*. *Dosha karma – Vata-kapha sha-mak*.<sup>[56]</sup> *Jyotishmati (Celastrus panniculata)* 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<sup>[57]</sup>, Seed oil (*Jyotishmati Taila*) is known for *Medhya* action.<sup>[58]</sup> This oil contains several terpenoids like paniculatadiol, b-sitosterol, celastrol, b-amyrin, pristimerin, but its most investigated components are its many sesquiterpenoids, dihydroagarofuran-type polyols or esters.<sup>[59]</sup> Seed oil of *Celastrus panniculata (Malkangni)* reversed scopolamine-induced deficits in navigational memory task in young adult rats.<sup>[60]</sup>

### 7. Kushmanda

This Plant is described in *Sakavarga* of *Bhavaprakash Nighantu*. The Synonyms are *Puspaphala, Pitapushpa, Brihatphala*. *Dosha karma – Pitta shamak*.<sup>[61]</sup> *Kushmanda (Benincasa hispida)* belonging to *Cucurbitaceae* an extensive trailing or climbing herb cultivated throughout the plains of India as a vegetable.<sup>[62]</sup> Phytochemical analysis of *Benincasa hispida* shows presence of alkaloids, flavinoids, saponins and steroids.<sup>[63]</sup> *Benincasa cerifera* serves as ROS scavenger and an antioxidant effective agent.<sup>[64]</sup> It has a tissue protective preventive effect on colchicine induced Alzheimer's disease via direct and indirect antioxidant activity.<sup>[65]</sup> *Kushmandadi Ghrita* showed significant results in the management *Chittodvega* (anxiety disorders).<sup>[66]</sup>



### 8. Vacha

This Plant is described in *Virechan, Lekhniya, Arshoghna, Triptighna, Asthapa-nopaga, Sitaprashamana, Sangya-sthapana, Tikta Skandh, Sirovirechana Charak Sam-hita* and *Pippalyadi, Vachadi, Mustadi, Urdha- bhagkar* of *Shusruta Samhita*. The Synonyms are *Vacha, Ugragandha, Sadhgrantha, Golomi, Satparvika, Khudra-patri, Mangalya, Jatila, Ugra* and *Lomasha, Dosha karma – Kapha-Vata shamak*.<sup>[67]</sup> *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.<sup>[68]</sup> Active chemical principles are  $\alpha$ -asarone, elemicine, cis-isoelemicine, cis and trans isoeugenol and their methyl ethers, camphene, P-cymene, bgurjunene, a-selinene, b-cadinene, camphor, terpinen-4-ol, aterpineol and a-calacorene, acorone, acrenone, acoragermacrone, 2-deca-4,7 dienol, shyobunones, linalool and preisocalamendiol. Acoradin, galangin, 2, 4, 5- trimethoxy benzaldehyde, 2,5-dimethoxybenzoquinone, calamendiol, spathulenol and sitosterol are also present 2.<sup>[69]</sup> It has been proved for its anticonvulsant,<sup>[70]</sup> antioxidant,<sup>[71]</sup> sedative and hypothermic effects.<sup>[72]</sup> Good in clearing speech to the children<sup>[73]</sup> and useful in schizophrenic psychosis.<sup>[74]</sup>

### 9. Jatamamsi

This Plant is described in *Sangya-sthapana mahakasaya* of *Charak Samhita*. The Synonyms are *Bhutjata, Jatila, Tapas-vini* and *Mansi. Dosha karma – TriDosha shamak*.<sup>[75]</sup> *Jatamamsi (Nardostachys jatamamsi)* 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<sup>[76]</sup> and belongs to Valerianaceae family. Rhizome is used for medicinal purposes as it is *Bhutaghna* or *Manasa Doshahara* (relieves of psychiatric problems) and *Medhya*.<sup>[77]</sup> Roots and rhizomes of *N. jatamansi* are used to treat hysteria, epilepsy, and convulsions.<sup>[78]</sup> The decoction of the drug is also used in neurological disorders, insomnia and disorders of cardiovascular system.<sup>[79]</sup> Rhizomes contain a terpenoid ester, nardostachysin I.<sup>[80]</sup> It is proven to improve learning and memory in mice.<sup>[81]</sup>

### CONCLUSION

*Medhya* function is related with *Mana*, and due to *Nadi-sansthan* is the *visistha adisthana* of presence of *Mana*; this *Medhya Karma* is related with *Nadisansthan*. *Nadisansthan* are connected with Brain that's why the *Medhya dravya* also known as brain tonic. The *medhya*

*karma* is considered as *Prabhava janya* because some *medhya dravya* are *sita virya*, *madhura rasa* and *madhur vipaka* e.g. *Yastimadhu*; and some are *tikta rasa* and *usna virya* e.g. *Guduchi*. These *medhya dravya* have more *medhya karma* present rather than a *samanya dravya*, so *medhya karma* is *prabhava janya*.<sup>[82]</sup>

*Graham shakti* (power of acquisition), *Dharan shakti* (power of retention) and *Smriti* (power of recollection) all three are included in *Medha*. *Pitta* is *ashu* and *tikshna* so it is helpful in *vishaya graham* and *Smriti*, that's why *Medha* is included in *prakrit karma* of *Pitta*.<sup>[83]</sup> *Vata* is also necessary for association of ideas in the process of *smriti*. *Kapha* provides *Dhriti* (*Dharan*) and stability that's why *Sthirita* and *Dhriti* are included in *prakrit karma* of *Kapha*.<sup>[84]</sup> Due to all these reasons the *usna virya* and *sita virya dravya* should be *medhya*. But *usna virya dravya* mainly for *vishaya graham* and *Smriti* rather than *sita virya* for *Dharan shakti*.

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.

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