

## A CRITICAL REVIEW OF CONCEPT OF MEDHA AND MEDHYA DRUGS MENTIONED IN AYURVEDA

\*<sup>1</sup>Dr. Megha Gupta and <sup>2</sup>Prof. Mithilesh Verma

<sup>1</sup>MD Scholar, PG Department of Kaumarabhritya, State Ayurvedic College Lucknow (U.P.).

<sup>2</sup>HOD, PG Department of Kaumarabhritya, State Ayurvedic College Lucknow (U.P.).

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### \*Corresponding Author

**Dr. Megha Gupta**

MD Scholar, PG

Department of

Kaumarabhritya, State

Ayurvedic College

Lucknow (U.P.).

### ABSTRACT

In Present Scientific era, memory demand for school age children are much greater than adults as well as overcome this problem many memory enhancer drugs available in markets but some drugs have adverse effect so keeping this view in mind, reduce the adverse effect *medhya* drugs is only choice. In *Ayurvedic* literature so many drugs mentioned as *medhya* drug. The word *Medhya* refers to specific pharmacological activity of a drug, which is used to improve the efficiency of mental faculties like grasping, memory etc. Hence this article is an attempt to update the concept of *Medhya* drugs mentioned in *Ayurveda* with major chemical constituents, pharmacological properties and mode of action.

**KEYWORDS:** Ayurveda, Medhya drugs.

### INTRODUCTION

According to Ayurveda, definition of swastha is based on three characteristics Prasannatma, Prasannamana and Prasannaindriya which are relevant to the physical and mental health.<sup>[1]</sup> A Child's physical and mental health both is important. Children good mental health is necessary for think properly, develops socially and learns new skill. In Ayurveda the description of Medhya drugs found in various Samhitas, In Kashyapa Samhita Achrya kashyapa described some medhavardhak Lehas such as suwarnprashan, KalyanakaGhrita, BrahmiGhrita, PanchagavyaGhrita and samvardhana leha etc to improve the mental ability.<sup>[2]</sup> Acharya Charaka has mentioned four *Medhya* drugs which are *Mandukaparni*, *Yashtimadhu*, *Guduchi* and *Shankhapushpi*.<sup>[3]</sup> In *Sushruta samhita*, Acharya Sushruta has mentioned four *yog*.<sup>[4]</sup>

1. Swarna bhasma with Kustha, Vacha, Brahmi, Madhu & Ghrita.
2. Swarna bhasma with Brahmi, Shankhpushpi, Madhu & Ghrita
3. Swarna bhasma with Arkapushpi, Vacha. Madhu & Ghrita.
4. Swarna bhasma with Kaidarya, Shweta durva, Madhu & Ghrita to promote the *Medha* and *Smruti*.

Some *Medhya* drugs also mentioned in chapter '*Medhayushkameeyaadhya*'. In *Bhava Prakasha*<sup>[5]</sup> and *Yoga Ratnakara*<sup>[6]</sup> describe four *Medhya* formulations.

### What Is *Medha* And *Medhya* Drug

*Medha* (Intelligence) is a unique characteristic possessed by human beings. The word *Medha* implies higher intellectual functions. *Medha* has four components i.e. *Viveka Shakti* (power of discrimination), *Grahana Shakti* (power of grasping), *Dharana Shakti* (power of retention) and *Smarana Shakti* (power of recollection).

The concepts of '*Medha*' described by different *aacharya* are as follows: Acc. To *Chakrapani* - '*Dharanvati dhi medha*' (Cha.Su.26), *Medha* is equated to *Dhee*, which mean having the power of retention of knowledge. Acc to *Dalhana* - *Medha* is very deep knowledge gained for the long period (Su.Chi.28/1-5). Acc to *Arunadatta* - '*Buddhi vishesa medha*' which means *medha* is a faculty of *buddhi*.<sup>[7]</sup>

In *Shabdakalpadruma*- *Medha* is equivalent to *Buddhi* and *Pragna*, because *Pragna* and *Medha* are the two synonyms of *Buddhi* among other names like *Mati*, *Chitta*, *Dharana* etc. *Medhya* drugs are those drugs which are used to improve comprehension, grasping ability.<sup>[8]</sup>

### Probable Mode of Action of *Medhya* Drugs

The *Medhya* effect of a Drug can be considered as *Prabhavajanya*. Normal function of *Sadhaka pitta* and *Tarpaka kapha* is maintain the desired action of *Medha*. *Medhya* drugs act on *Manasika bhavas* by relieving anxiety, stress etc. They are having *Mastishka balya* (nourishing brain) property. These drugs promote the Intellect (*Dhi*) Retention power (*Dhriti*), memory (*Smriti*). In fact they produce *Nueuronutrient* effect by improving cerebral metabolism. *Medhya* drugs are known to have specific effect on mental performance by promoting the functions of "*Buddhi*" and "*Manas*" by correcting the disturbances of "*Rajas*" and "*Tamas*"<sup>[9]</sup> *Medhya* drugs have *Shita Virya* and *Madhura Vipaka*- it promotes *kapha* and enhances "*Dharana Karma*" (i.e. retention of cognition) e.g. *Yastimadhu*, *Bramhi*,

Sankhpushpi etc. and some have Ushna Virya and Tikta Rasa- it promotes pitta and enhances Grahana and Smarana shakti (i.e. grasping power and Memory) e.g. Guduchi, Vacha, Jyotishmati etc.

### Medhya Drugs In Ayurveda

Medhya Drugs	Properties				Parts used	Main Constituents
	Guna	Rasa	Vipaka	Virya		
<b>Mandukaparni</b> ( <i>Centella asiatica</i> )	Laghu	Tikta	Madhur	Sita	Whole plant	Medacosides, asiaticoside, asiatic acid etc
<b>Yastimadhu</b> ( <i>Glycyrrhiza glabra</i> )	Guru, Snigdha	Madhur	Madhur	Sita	Root	Glycyrrhizine, flavonones, isoflavones, glycyrrhetic acid, six phenolic compound.
<b>Shankhapushpi</b> ( <i>Convolvulus pluricaulis</i> )	Snigdha, Picchil	Tikta	Madhur	Sita	Whole plant	Microphylllic acid, shankhpushpin, kaempfero-kaempferol-3-glucoside, 3,4dihydroxycinnamic acid
<b>Brahmi</b> ( <i>Bacopa monniera</i> )	Laghu	Tikta	Katu	Usna	Whole plant	Bacoside A & B, bacopasaponin G
<b>Jyotishmati</b> ( <i>Celestrus panniculata</i> )	Tikshna	Katu, Tikta	Katu	Usna	Seeds	Alkaloids-celestrine, paniculatin, celapagine
<b>Guduchi</b> ( <i>Tinospora cordifolia</i> )	Guru, Snigdha	Tikta, Kasaya	Madhur	Usna	Whole plant extract	Diterpenoids lactones, steroids, glycosides, phenolics sesquiterpenoids, etc
<b>Kushmanda</b> ( <i>Benincasa hispida</i> )	Laghu, Snigdha	Madhur	Madhur	Sita	Fruit	Alkaloids, flavonoids
<b>Vacha</b> ( <i>Acorus calamus</i> )	Laghu Tikshna	Katu, Tikta	Katu	Usna	Rhizomes	p-cymene, bgrurjunene acorone
<b>Jatamamsi</b> ( <i>Nordostachys jatamamsi</i> )	Laghu, Snigdha	Tikta, Kasaya Madhur	Katu	Sita	Whole plant	Jatamansone & nardostachone
<b>Ashwagandha</b> ( <i>Withania somnifera</i> )	Laghu, Snigdha	Tikta, Katu Madhur	Madhur	Usna	Root	Cuseohygrine, anahygrine, tropine, anaferine, Glycosides

### Mandukaparni (*Centella asiatica* Linn.)

Major constituents are saponin (medacoside, asiaticoside, medacassoside, asiatic acid, a new triterpenic acid.<sup>[10]</sup> Dendritic arborization is supposed to be the neuronal basis for improved learning and memory.<sup>[11]</sup> Important indications for *C. asiatica* in *Ayurveda* include its use for cognitive properties as a brain tonic, in the treatment of mental disorders, and as a memory-enhancing agent.<sup>[12]</sup> *C. asiatica* was shown to improve neuronal morphology and learning performance and enhance memory retention in animal models.<sup>[13]</sup> Learning and memory improvements facilitated by asiatic acid have been observed in passive and active avoidance tests.<sup>[14]</sup>

**Aindri (*Bacopa monniera*)** *Bacopa monniera* is a nootropic plant reported for its tranquilizing, hepatoprotective, memory enhancer, sedative action, cognitive enhancer and antioxidant actions. *Bacopa monniera* is a saponin rich plant. Bacosides are the main active nootropic principle present in the alcoholic extract of the plant.<sup>[15]</sup> Memory-enhancing effects have been attributed to saponins (bacosides, bacopasides, or bacopasaponins). Bacopasaponin constituents have been shown to facilitate mental retention in avoidance response in rats<sup>[16]</sup>, and to reverse amnesic effects of neurotoxin, scopolamine, phenytoin, electroshock, and immobilization stress.<sup>[17]</sup> Animal studies of *B. monnieri* whole plant or alcohol extracts have reported cognition-enhancing effects including improved motor learning and acquisition, consolidation, and retention of memory in rats.<sup>[18]</sup>

**Guduchi (*Tinospora cordifolia*)** is a large glabrous, deciduous, climbing shrub. Chemical constituent's classes are alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides.<sup>[19]</sup> Neuroprotective and ameliorative properties are due to their antioxidant and trace element contents.<sup>[20]</sup> *Tinospora cordifolia* has been claimed to possess learning and memory antioxidant, enhancing, and antistress activity. *Tinospora cordifolia* enhanced the cognition in normal and cognition deficits animals in behavioral test Hebb William maze and the passive avoidance task.<sup>[21]</sup> Mechanism of cognitive enhancement is by immunostimulation and increasing the synthesis of acetylcholine, this supplementation of choline enhances the cognition.<sup>[22]</sup>

**Jatamamsi (*Nardostachys jatamansi*)** Rhizome of *N. jatamansi* is used for medicinal purposes as it is *Bhutaghna* or *Manasa Doshahara* (relieves of psychiatric problems) and *Medhya*. *N.jatamansi* also used to treat hysteria, epilepsy, and convulsions. Rhizomes contain a terpenoid ester, nardostachysin I.<sup>[23]</sup> It is proven to improve learning and memory in mice<sup>[24]</sup> and also to enhance biogenic amine activity.<sup>[25]</sup> A comparative study between water and methanolic extract was conducted for acetylcholine esterase inhibition activity. The authors conclude that methanolic extract is more effective in improving memory and cognition as compared to water extract. It was observed that *Nj.Cr* reversed the amnesia and learning impairment induced by scopolamine and diazepam indicating that *Nj.Cr* could be a useful agent for restoration of memory in elderly people or in dementia.<sup>[26]</sup>

**Jyotishmati (*Celastrus panniculata*)** The seeds of the plant used in *ayurvedic* medicine for *Medhya* action. This seeds oil contains several terpenoids like paniculatadiol, b-sitosterol, celastrol, b-amyrin, pristimerin, but its most investigated components are its many

sesquiterpenoids, dihydroagarofurantype polyols or esters.<sup>[27]</sup> Seed oil of *Celastrus panniculata* (*Malkangni*) reversed scopolamine-induced deficits in navigational memory task in young adult rats.<sup>[28]</sup> *Celastrus paniculatus* seeds are used to alleviate cognitive issues and promote intestinal health. The seeds oil, which is sometimes used during massage. The oil is used to alleviate skin inflammation and has a mild sedative effect.

***Shankhapushpi* (*Convolvulus pleuricaulis*)** is a perennial, spreading hairy herb, regarded as *Medhya* (intellect promoter). Important chemical principles are microphyllic acid, *shankhapushpin*, kaempferol-kaempferol-3 glycoside, 3, 4 dihydroxycinnamic acid, sitosterols.<sup>[29]</sup> *Shankhapushpi* to be effective in relieving signs and symptoms of *Chittodvega* (anxiety disorders).<sup>[30]</sup> Herbalists believe that *Shankhapushpi* calms the nerves by regulating the body's production of the stress hormones, adrenaline and cortisol.<sup>[31]</sup> Effect Pre-clinical studies Learning, memory and behaviour Significant improvement was noted in paradigms and active avoidance tests in rats using different laboratory models to evaluate learning and memory assessment using ethanolic extract and ethyl acetate and aqueous fractions of CP.<sup>[32]</sup> Tablets made with three *bhavana* (levigation) of *Shankhapushpi* juice in its powder affected the potency of tablet to improve memory.<sup>[33]</sup> Highly significant improvement was observed in long-term memory of healthy volunteers of 16-25 years age-group with CP tablets made with three *bhavana* of its juice.<sup>[34]</sup>

***Vacha* (*Acorus calamus*)** Rhizome is useful part having *Medhya* quality. Active chemical principles are  $\alpha$ -asarone, elemicine, cis isoelemicine, cis and trans isoeugenol and their methyl ethers. Camphene, P-cymene, bgrjunene, a selinene, acorone, acronone, acoragermacrone, linalool and preisocalamendiol. Acoradin, galangin, 2, 4, 5- trimethoxy benzaldehyde, 2,5- dimethoxybenzoquinone, calamendiol, spathulenol and sitosterol are also present.<sup>[35]</sup> *Acorus Calamus* is regarded in *Ayurvedic* medicine as promoting *rasayana* effects and has been used to treat memory loss.<sup>[36]</sup> AC extract has also been used as traditional Chinese prescription, and its beneficial effects on memory disorder, on learning performance, lipid peroxide content, and anti-aging effects in senescence have been reported.<sup>[37]</sup>

***Yastimadhu* (*Glycyrrhiza glabra*)** Active ingredients are isoflavones, six phenolic compounds, glycyrrhetic acid, glycyrrhizine, flavonones. Multidimensional activities of *Yastimadhu* may be attributed to glycyrrhizine and flavonones.<sup>[38]</sup> Liquorice has significant action on memory enhancing activity in dementia. it significantly improved learning and memory on scopolamine induced dementia.<sup>[39]</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>[40]</sup> The glabridin from *Yashtimadhu* oral supplementation remarkably reduced the brain cholinesterase activity. It appears to be a promising candidate for memory improvement.<sup>[41]</sup> Additionally, aqueous extract of *Yashtimadhu*, administered systemically has spatial effect on memory retention and memory retention enhancement.<sup>[42]</sup> It helps in improving memory and can be explore the potential of this plant in the management of impaired learning, dementia, Alzheimer's disease and other neurodegenerative disorders.<sup>[43]</sup>

*Ashwagandha* (*Withania somnifera* ) used in enhancing memory and overall brain functioning. Several studies indicated that *Withania somnifera* possesses antioxidant, anti-tumor, anti-stress, anti-inflammatory, immunomodulatory, hematopoietic, anxiolytic, anti-depressive, rejuvenating properties and was found to play a significant role in the prevention of different CNS disorders, especially in the conditions of stress and neurodegenerative diseases.<sup>[44]</sup> The active principles of *Withania somnifera* sitoindosides VII-X and Withaferin A (glycowithanolides) have shown an antioxidant effect in the brain. *Withania somnifera* has been used to promote physical and mental health, to provide defense against disease and adverse environmental factors, and to arrest the aging process. It has a cognition promoting effect and was found to be useful in children with memory deficit and old age people with memory loss. In a study, Schliebs *et al.* reported that *Withania somnifera* aimproves the cognitive capabilities of the brain by increasing the Capacity of Muscarinic Receptors.<sup>[45]</sup>

## CONCLUSION

Many medhya drugs and its combinations are available in our *Ayurvedic* literature which enhances *Medha* and *Smriti*. To achieve accurate action of drug it is necessary to choose an appropriate drug by the *Yukti* of the physician. These drugs help the children to grow up with better intellectual performance, memory and school performance.

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