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A Scientific Review on Selected Herbal Medhya Rasayanas from Sushruta Samhita

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Background: Ancient Acharyas have well documented Medhya Rasayanas (Ayurvedic Nootropics) for neurocognitive enhancement. An elaborated reserve of herbs indicated as Medhya (intellect promoting), Buddhivardhak (wisdom gaining), Smritisheel (memory generating), Smritivardhak (memory enhancing), etc. can be traced from Sushruta Samhita, a classical textbook of Ayurveda.

Aim: This review study delves into the documentation and therapeutic attributes of Medhya Rasayanas (Ayurvedic Nootropics) explained by Sushruta in the light of recently reported contemporary proof.

Materials and Methods: Sushruta Samhita was reviewed in terms of description of herbs/ compounds possessing nootropic potential. Important Medhya Rasayanas (Ayurvedic Nootropics) mentioned by Sushruta were reviewed. The electronic database such as Google Scholar and PubMed was searched for related literary published from time of their launch to April 2025.

Results: Documenting the scattered knowledge on herbs or compounds assigned with Medhya (nootropic) effect is a key for further research & development. These herbs/drugs have a positive effect on memory, intellect, learning, language, and speech. Furthermore, these drugs have shown potential therapeutic actions on cognition, sedation, depression, stress, antiepileptic effect, antianxiety effect, antioxidant, adaptogenic and tranquilizer effect.

Clinical significance: Medhya Rasayanas (Ayurvedic Nootropics) mentioned by Sushruta are having evidence for providing better mental health and neurocognitive increase.

Conclusion: An alarming rise in cases of mental upset & unmet medical necessitates, there is a need felt to augment the mental health resources. Medhya Rasayanas (Ayurvedic nootropics) mentioned in Sushruta Samhita is a unique endowment towards cognitive betterment and in recent times these drugs are scientifically justified in pre-clinical and clinical trials.

Keywords: Ayurveda, Medhya, Rasayanas, Smritivardhak

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Introduction

Rasayana in *Sushruta Samhita*

According to *Dalhana* commentary on *Sushruta Samhita*, *Rasayana* is the one that nourishes various *Dhatu* (bodily tissues) of the body and also improves the *Rasa* (taste), *Virya* (potency), *Vipaka* (post digestive effect) and *Prabhava (*effect on body), which affects the age, strength and stability of an individual.**[1]**

Two types of *Rasayana* therapy have been mentioned in *Sushruta Samhita*

1. Sadharana (Simple)
2. Kutipraveshika (Special)

Three types of *Rasayana* (life promoters) have been told by *Dalhana* commentary-

1. Kamya Rasayana (To achieve the desired purpose like youth, memory etc.)

2. Naimaittika Rasayana (To treat a particular disease)

3. Ajasrika Rasayana (To maintain an individual's health by using milk, ghee, etc.)

The 29th chapter of *Chikitsasthana* derived from *Sushruta Samhita* comprises of 24 types of *Soma Aushadha* (extract of medicinal plants). It has been mentioned there, individual who uses *Soma* achieves new body and intelligence along with life of 10,000 years. Fire, water, poison or weapon cannot cause any type of harm to such body. Prolonged use of *Rasayana* gives juvenility, charm, memory, strength like lion, sound and life of 2000 years to an individual. The word *Rasayana* refers to tissue nutrition along with its transportation in body which can later be used for restoration and rejuvenation of bodily *Dhatus*.**[2]** Therefore, drugs mentioned under *Medhya Rasayanas* may be satisfying in improving intellect, cognitive function, learning, language, speech, and memory.**[3,4,5]** The results of varied preclinical and clinical studies are accountable of memory increase, intellect promotive, antiepileptic, antianxiety, sedative, transquilizer, antidepressant, antioxidant, antistress, and adaptogenic effects of these *Rasayanas.* Moreover, neurological and psychiatric disorders are generally associated with deficits in cognitive function, learning, memory, language, speech, social communication and overall impaired mental function as per contemporary evidence.**[6,74]**

List of Herbal *Medhya Rasayanas* mentioned in *Sushruta Samhita*

Name of Medhya Rasayana	Composition & type of formulation	Anupana	Specific therapeutic effect in Sushruta Samhita for its indication	Textual References [56-74]
Vidangatandula Rasayana Yoga	Vidanga & Yashtimadhu Churna (powder)	Madhu (Honey) Sheetal Jala (Cold water)	Arsha (Piles), Krimi (Worm infestation), Medhya (intellect promoting), Smriti (memory boosting), Ayuvardhak (Longevity)	Su.Sa.Chi.27/7
Bakuchi Beeja (seed) Rasayana Yoga	Bakuchi Beej (seed) Churna (powder)	Ushna Jala (Warm water)	Ayurvardhak, Medhya (intellect promoting), Shrutdhar (good listener)	Su.Sa.Chi.28/3
Mandukparni Swarasa (Juice)Rasayana Yoga	Mandukparni Swarasa (juice)	Dugdha (Milk)	Medhya (intellect promoting), Ayuvardhak (longevity)	Su.Sa.Chi.28/4
Brahmi Swarsa (Juice) Rasayana Yoga	Brahmi Swarasa (juice)	-	Strong Dharan shakti (retention abilities), Memory, Ayuvardhak (Longevity)	Su.Sa.Chi.28/5
Brahmi Ghrita (clarified butter) Rasayana Yoga	Brahmi Swarasa (juice), Vidangatandula, Ghrita (clarified butter), Vacha, Giloy, Trifala Ghrita (clarified butter)	-	Varnya (complexion), Krimi, Ayu-sthirta, Medhya, Kushtha (Skin disorder), Visham Jwara (Malaria), Unmada, Apasmara (Epilepsy), Grahadosha (infectious diseases)	Su.Sa.Chi.28/6
Vacha Rasayana Yoga	Shweta Vacha Pind	Dugdha (Milk)	Shrutdhara, Smriti, Sudrishti (good vision), Ayuvardhak	Su.Sa.Chi.28/7
Medhavardhak (intellect promoting) Vachadi Yoga	Vacha, Suvarn Bhasma (incinerated), Bilva Churna	Ghrita (clarified butter)	Medhya, Ayuvardhak, Vyadhikshamatva Vardhan (immunity enhancer)	Su.Sa.Chi.28/27
Vasa Mool (root) Rasayana Yoga	Vasa-Mool (root) Decoction	-	Medhya, Ayuvardhak	Su.Sa.Chi.28/18
Yavaka Rasayana Yoga	Yavaka Churna (powder)	Madhu (honey) & Pippali	Medhya	Su.Sa.Chi.28/19

Buddhi-Medhavardhak (wisdom gaining) Gana	Consistent reading, Vada, knowledge of other literary books & respecting teachers	-	Medhya, Smriti	Su.Sa.Chi.28/27
Eranda			Medhya	Su.Sa.Su.45/100
Palandu			Medhya	Su.Sa.Su.46/247
Rasona			Medhya	Su.Sa.Su.46/244
Tila			Medhya	Su.Sa.Su.46/40
Shatavari			Medhya	Su.Sa.Su.46/322
Haritaki			Medhya	Su.Sa.Su.46/199
Kushmanda			Chitudvega (Anxiety)	Su.Sa.Su.46/213
Gambhari			Medhya	Su.Sa.Su.46/184

***Medhya Rasayanas* and their evidence-based activities**

Plant name	Latin name	Active constituent	Activity
Brahmi	Bacopa monierri	Bacoside A, Bacoside B, Saponins[9] Heraponins, Glycosides[10] Bacoside A[11] Methanolic extract[12] Hersaponin[13] Aqueous ethanolic extract, Bacoside[14,19]	Improves cognition[9] Sedative effect[10] Anxiolytic activity[11] Anti-depressant activity [12] Protection against seizures[13] Antistress and antioxidant effect[14,19]
Mandukparni	Centella asiatica.	Aqueous extract[21,23] Brahmoide, Brahminoside[24] Hydroalcoholic extract of C. asiatica leaves[25] Asiatic acid derivatives[28]	Enhances memory & learning[21,22] Antidepressant activity [23] Reduces serum corticosterone level[23] Sedative & anxiolytic effect[24] Protective action against increase in intracranial electric stimulation (ICES) and chemo convulsions[25] Neuroprotective activity[28]
Vacha	Acorus calamus	Rhizome extract[31] Methanol and acetone extract [32]	Neuromodulatory effect[31] Reduced the stereotype induced by apomorphine[32] Neuroprotection[35]
Shatavari	Asparagus racemosus	Methanolic extract[36] Methanolic extract[37]	Antidepressant activity[36] Antiamnesic & nootropic activity[37]
Bakuchi	Psoralea corylifolia	Psoralin[41]	Neuroprotective and anti-neuroinflammatory[41]
Vasa	Adhatoda vasica	Vasicinol[42]	Anticholinesterase and nootropic[42]
Palandu	Allium cepa	Quercitin[45] Chlorogenic acid	Cognition and memory[45]
Kushmanda	Benincasa hispida		Cognition[47]
Tila	Sesamum indicum	Methanolic extract[48]	Memory[48]
Haritaki	Terminalia chebula	Fruit extract[52] Luteolin[53]	Learning and memory[52] Noise induced depression[53]

Observations and Results

Evidence based Scientific studies on some *Medhya Rasayanas*

Brahmi (*Bacopa monnieri*)

B.monnieri is having cognitive, sedative, tranquillizing, antidepressant, antianxiety, antiepileptic, antioxidant, and adaptogenic properties as per the contemporary evidence.**[6,8]**

B.monnieri shows cognitive property by virtue of its potentials like reversing the depletion of acetylcholine, reducing choline acetylase activity, and decreasing muscarinic cholinergic receptor binding in the hippocampus and frontal cortex due to Bacoside A and Bacoside B, saponins.**[9]** Further heraponins, glycosides present in *B. monnieri* shown sedative effect, which is better than pentobarbitone.**[10]** Bacoside A has better anxiolytic activity than lorazepam without causing side effects and also having memory-enhancing activity.**[11]**

B. monnieri extract in a dose of 20−40 mg/kg for 5 days has shown significant antidepressant activity, comparable to standard antidepressant drugs like imipramine in rodent animals.**[12]***B. monnieri* has protective effect against seizures in mice models. **[13]** Further, studies have shown antiepileptic activity in higher doses and long-term use of *B. monnieri* extract and bacosides have antistress and antioxidant activity mainly noted in frontal cortex, striatum, and hippocampus.**[14,19]**

In a 28-day, randomised, double-blind, placebo-controlled trial in 100 adults with self-reported poor sleep received either a placebo or a standardised *Bacopa monnieri* extract (150 mg twice daily). Based on the Bergen Insomnia Scale, *B. monnieri* did not improve sleep patterns more than the placebo; however, it was associated with greater improvements in emotional well-being, general health, and pain-related symptoms. *B. monnieri* was also associated with greater reductions in sIgA and sAA compared to the placebo.**[20]**

***Mandukaparni* (*Centella asiatica*)**

Assessing the effect of *Mandukparni* in 30 mentally retarding children of 7-18 years age, a double-blind study was conducted using Binet Kamat scale as an assessment tool, an improvement in IQ level was found in study group when compared to placebo group. However, it was observed that there was no significant difference in improvement in IQ level after 3 & 6 months.**[21,22]**

C. asiatica aqueous extract has shown significant effect on enhancing memory and learning,**[23]** anti-depressant activity,**[24]** and also reduces serum corticosterone level.**[25]** Brahmoside and brahminoside constituents of *C. asiatica* have shown sedative effect and the anxiolytic activity due to binding to cholecystokinin receptors.**[26]** In one another study, it has shown antiepileptic property as well as ability to prevent cognitive impairment induced by seizure activity.**[27]** Protective action against increase in intracranial electric stimulation (ICES) and chemo-convulsions was observed by use of hydroalcoholic extract of *C. asiatica* leaves.**[28]** Crude methanol extract of *C. asiatica* has shown significant increase in the antioxidant enzymes in lymphoma-bearing mice.**[29]** Asiatic acid derivatives have shown neuroprotective effects on cultured cortical cells by their potentiation of the cellular oxidative defense mechanism.

Therefore, these agents are proved to be efficacious in protecting neurons from the oxidative damage caused by exposure to excess glutamate.**[30]**

***Vacha* (Acorus calamus)**

A. calamus is a very good promoter of higher mental function. *Acharya* has mentioned that it has various properties including *Medhya* (intellect promoting), *Vak-Suddhikara* (improves speech), and *Apsmarahara* (anti-epileptic).**[31]** It especially improves higher function and speech. *A. calamus* has shown anticonvulsant activity against pentylenetetrazol-induced seizures.**[32]** *A. calamus* rhizome extract has shown neuromodulatory effect in mice. *Further*, in a study, it is found that methanol and acetone extract significantly reversed the stereotypy induced by apomorphine in mice.**[33]**

In another study, treatment of 50 cases of Depression with *A. calamus* in a dose of 500 mg 2 tablets 3 times a day for 6 weeks showed reduction in the degree of severity of depression & better rehabilitation & also a significant improvement in assessment based on the rating of symptoms in Hamilton Depression Scale.**[34]**

In one study to check neuroprotective potential of *A. calamus* in rodents, *A. calamus* (hydro-alcoholic 1:1) 600 mg/kg p.o. and the combination (*Acorus calamus* 600 mg/kg p.o. + *Cordia dichotoma* 750 mg/kg p.o.) group showed significant results as compared to *Cordia dichotoma* 750 mg/kg p.o.in behavioural as well as in biochemical parameters. Histological studies showed significant neuroprotection in the *A. calamus*-treated group and the combination-treated groups.**[35]**

***Shatavari* (*Asparagus racemosus*)**

Methanolic extract of *A. racemosus* has shown significant antidepressant activity.**[36]** Further, it has also shown significant antiamnesic and nootropic activity in experiment models. This may be due to its anticholinesterase, antioxidant, and neuroprotective activity of *A. racemosus*.**[37]** Methanolic extract of *A. racemosus* has also shown significant anticonvulsant activity.**[38]**

In a study, investigating memory enhancing & anti amnesic effect of *Asparagus recemosus* in rodent models, Ojha et al found rats pre-treated with MAR (50, 100 and 200 mg/kg, p.o) for 7 days showed significant decrease in escape latency in the MWM test indicating nootropic activity.

MAR(Methanolic extract of *A.racemosus*) also significantly reversed scopolamine and sodium nitrite-induced increase in transfer latency on EPM indicating anti-amnesic activity**.[39]**

***Bakuchi* (*Psoralea corylifolia*)**

Chen et al, studied the antidepressant activity of total furanocoumarins present in *P. corylifolia* (TFPC) in the chronic mild stress model of depression in mice. The results revealed that TFPC possess potent and rapid antidepressant properties that are mediated via MAO, the hypothalamic–pituitary–adrenal axis, and oxidative symptoms. Xu and co-workers also proved psoralen's antidepressant effects, using forced swimming test model of depression in male mice.**[40]** On assessing the role of Psoralin as neuroprotective and anti-neuroinflammatory, the LPS-induced mice model was used to test anti-neuroinflammatory and neuroprotective effects. These results indicated that psoralen inhibited the M1 microglial phenotype and promoted the M2 microglial phenotype. Furthermore, psoralen reduced oxidative stress, neuronal damage, and apoptosis via inhibition of neuroinflammation.**[41]**

***Vasa* (*Adhatoda vasica*)**

As per Unani texts, *A. vasica* was reported for its therapeutic use in the treatment of loss of memory to improve this condition. EERAV and AQERAV have shown a significant nootropic activity in the active and passive avoidance models (Shuttle Box and Shock Box). Vasicinol was reported to possess anti-cholinesterase activity and the same constituents were present in the EERAV and AQERAV. Hence these phytoconstituents can be accounted for the observed nootropic activity.**[42]**

***Rasona* (*Allium sativum*)**

In a study on determining the effect of *A. sativum* in improving Visual Memory and Attention in Healthy Human Volunteers, Tasnim et al came out with statistically significant difference ($p < 0.05$) in several parameters of visual memory and attention due to AS ingestion. They also found statistically nonsignificant ($p > 0.05$) beneficial effects on verbal memory and executive function within a short period of time among the volunteers.**[43]**

***Palandu* (*Allium cepa*)**

To signify the role of A. cepa bulb in attenuating stress-produced anxiety, Depression and improves memory in male mice, Samad Noreen suggested a role of antioxidant enzymes in the attenuation of 2-h stress induced anxiety and depression, and enhanced cognitive function as well by *A. cepa*. Highest memory performance was observed in stressed mice that were pre-treated with AC in Morris water maze (MWM). The findings therefore suggest that supplementation of *A. cepa* may be beneficial in the treatment of anxiety, depression and enhancement of memory function.**[44]** The amounts of quercetin, sinigrin, and chlorogenic acid in the extracts estimated by TLC-densitometry. The combination extracts enhanced cognition in scopolamine-induced CD in mice during behavioral test. Furthermore, the combination extracts blocked PDE4B activity and exhibited memory potential by elevating hippocampal biomarkers.**[45]**

***Gambhari (Gmelina arborea*)**

While evaluating effect of *G. arborea* on learning & memory in amnesia-induced & non-amnesia groups of albino wistar rats, Sori et al found statistically significant activity in EPM, MWM, & SDA tests for assessing learning & memory paradigms when compared to control group in amnesia-induced & non-amnesia groups of rats.**[46]**

***Kushmanda* (*Benincasa hispida*)**

In an observational clinical study, where *Kushmanda Ghrita* was administered in elderly cognitive decline, statistically significant results in pre & post treatment score were obtained. The value of WBI score was also improved from 19 to 22. It suggests that *Kushmanda Ghrita* (clarified butter) is effective in age-associated cognitive decline.**[47]**

***Tila* (*Sesamum indicum*)**

Kim et al had reported an improvement in learning and memory using M74 extract in scopolamine-induced memory impaired mice model.**[48]**

***Yashtimadhu* (*Glycyrrhiza glabra*)**

G. glabra granules showed statistically highly significant results in improving functional aspects of *Buddhi*, IQ, several aspects of quality-of-life parameters and health. The number needed to treat (NNT) with *G. glabra* granules for children achieving an IQ score of 90 and above was 3.38, suggesting one in every 3.38 patients had achieved this target and for children achieving an IQ score of 110 and above the NNT was 6.66.**[49]**

In another study, the overall NVIT results indicate that oral consumption of *G. glabra* tablets BID improves the intelligence level among the student when compared to students who received placebo treatment. In both classes, mild memory improvement with *G. glabra* treatment was observed as compared to control students. The present study concludes that *G. glabra* consumption improves the general intelligence rather than STM (short term memory).**[50]**

In this open-labeled, randomized, placebo-controlled study, 100 assenting healthy students between 13-16 years of age were enrolled to evaluate the effect of *Yashtimadhu Kalpa* (YK). These assessments were done on randomization visits (Day 0) and end-of-study visits (Day 90). Both groups showed significant improvement in cognition and memory after 90 days of treatment duration. However, YK group showed more significant improvement in cognition of figural classes and cognition of figural system in cognitive ability and memory of figural transformations, the memory of symbolic transformations, total memory, and mental ability among memory test parameters when compared to the control group.**[51]**

Haritaki (Terminalia chebula)

The learning and memory enhancing activity of *T. chebula* fruit extracts were investigated in rats by using the ethanol- induced cognitive impairment and diazepam induced amnesia and its effects on learning and memory were examined by using Morris water maze (MWM) test. All the groups showed significantly (P value is<0.01 and <0.05) decrease transfer latency at all periods as compared to ethanol and diazepam inducing group. Therefore, Fruit extracts of *T. chebula* exhibited significant learning and memory activity in Alzheimer's disease. **[52]** In a study to determine the effect of luteolin derived from *Trifala*, in a mouse model, it was explored luteolin treatment significantly increased the contents of serum 5-hydroxytryptamine and norepinephrine in noise-induced mice. In sum, luteolin exerts antidepressant effects in depression like mice caused by noise, which can serve as a potential agent for the treatment of chronic noise-induced depression.**[53]**

Vidanga (Embelia ribes)

The study aimed to evaluate the anxiolytic activity of embelin that was isolated from *Embelia ribes.* It significantly increased the percentage of time spent and number of entries in open arm in elevated plus-maze apparatus. On the basis of result, embelin showed its anxiolytic effect in dose-dependent manner.**[54]**

The preliminary study was intended to evaluate antipsychotic activity of embelin against apomorphine-induced climbing behaviour in mice and stereotyped behaviour in rats. Embelin pre-treatment significantly inhibited apomorphine-induced climbing and stereotyped behaviours in mice and rats, respectively. Further, embelin also statistically reversed elevated levels of dopamine, noradrenaline and serotonin neurotransmitters in the brain of mice and rats. Considering the present pharmacological profile of embelin, it is suggested that embelin possesses antipsychotic activity in the treatment of psychotic disorders.**[55]**

Discussion

Ayurveda has well explained the concept of *Rasayana* where various *Medhya* herbs are designated for cognition & longevity. *Aacharya Sushruta* has lined up such drugs under reference of *Medhya*. Furthermore, the recent pre-clinical/clinical studies have shown that each *Medhya* drug in addition to *medhya* effect, is also having its specific effects on nervous system. Based on the declarations of its use in cognitive disorders, anxiety, depression, poor memory, *B. monnieri* also acts as neuroprotective drug. Preventive use of *C. asiatica* in seizure induced cognition delay has been observed in preclinical studies. The efficacy of *A. calamus* in speech delay, epilepsy & neurological mishaps has been reported in some of the pre-clinical studies. Research work suggests anti-depressive and anti-convulsive activity of A. *racemosus*. The antidepressant potency of psoralin present in *P. corylifolia* makes the herb a potentially valuable drug for the treatment of depression in adults. Improving visual memory and attention span in healthy human volunteers with *A. sativum* is another feather in the cap of traditional nootropics. The effect of *G. arborea* on learning and memory in albino rats proves the herb as an effective *Medhya Rasayana*. The cognitive effect of *Kushmanda Ghrita* makes the herb popular among *Medhya Rasayanas*. The nootropic and antineurotoxic effect of *S. indicum* makes the herb a potent neurocognitive enhancer.

Yashtimadhu granules showed statistically highly significant results in improving functional aspects of *Buddhi*, IQ, several aspects of quality-of-life parameters and health. In another study, NVIT (Non-verbal intelligence test) results indicate that oral consumption of *Yashtimadhu* tablets BID improves the intelligence level among the student when compared to students who received placebo treatment. This study concludes that *Yashtimadhu* consumption improves the general intelligence rather than STM (short term memory). In one study, it was found that fruit extracts of *Terminalia chebula* exhibited significant learning and memory activity in Alzheimer's disease. Further, it is observed that most of the studies included in the review are pre-clinical, in which extract of these nootropic drugs have been used to explore their effect and these effects cannot be directly compared with the crude drug as used in clinical practice. However, these studies may provide further evidence to *Medhya* drugs, which are in practice since ancient time. Including herbs such as *Brahmi, Mandukparni, Vasa, Vacha, Haritaki, Yashtimadhu, Palandu, Lashuna and Kushmanda* under *Medhya* drugs, is the remarkable and path breaking judgement by *Sushruta*.

Conclusion

An alarming rise in cases of mental upset & unmet medical necessitates, there is a need felt to augment the mental health resources. Together with, botanical nootropics are generally considered safe and potential therapy in neurocognitive disorders. Taking care of it, Ayurveda has profound plant sources attributed with diversified action and potential to combat mental pathies. *Medhya Rasayanas* mentioned in S*ushruta Samhita* is a unique endowment towards cognitive betterment and in recent times these drugs are scientifically justified in pre-clinical and clinical trials. Moreover, most of the pre-clinical/clinical studies have proved that *Medhya* herbs/drugs are useful in many diseases like epilepsy, attention deficit hyperactivity disorder, intellectual disability, autism spectrum disorders, speech disorders, etc. Taking routes from informal and pre-clinical evidence, more clinical research work may be outlined on cerebral health issues. This is to create a sturdy existential proof which can be used to encourage superior somatic and psychological health.

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