

Scope of Medhya Rasayana Dravya for Improving Intellectual Memory in School Going Children

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Abstract

In the competitive academic landscape, enhancing cognitive functions such as memory, intelligence, and concentration is crucial for school-going children. Ayurveda offers Medhya Rasayana dravyas—herbal nootropics that promote Medha (intellect) by balancing Doshas and supporting neurological health. This review synthesizes classical Ayurvedic concepts and contemporary clinical evidence on Medhya Rasayana, including Mandukaparni (*Centella asiatica*), Yashtimadhu (*Glycyrrhiza glabra*), Guduchi (*Tinospora cordifolia*), Shankhapushpi (*Convolvulus pluricaulis*), Brahmi (*Bacopa monnieri*), Vacha (*Acorus calamus*), and Jatamansi (*Nardostachys jatamansi*). These dravyas enhance Dhi (grasping), Dhriti (retention), and Smriti (recollection) through mechanisms like neurotransmitter modulation, neuroprotection, and antioxidant activity. Clinical studies, including randomized controlled trials on school children aged 8-16, demonstrate improvements in short-term memory, attention, and academic performance, with faster effects from Medhya Rasayana compared to yoga alone in some comparisons. Safe for long-term use, these interventions are cost-effective and side-effect-free, advocating integration with modern education for holistic cognitive development. Further large-scale trials are recommended.

Keywords

Medhya Rasayana, memory enhancement, intellectual power, school children, nootropics

Introduction

Cognitive development in school-going children is pivotal for academic success, personal growth, and long-term well-being. In today's fast-paced educational environment, children face immense pressure to excel, often leading to stress, poor concentration, and memory deficits. Ayurveda, an ancient Indian system of medicine, addresses these through Medhya Rasayana—a

category of rejuvenative herbs that enhance Medha (intellect) and cognitive faculties (1). Derived from "Medha" (intelligence) and "Rasayana" (rejuvenation), these dravyas promote brain health by nourishing Dhatus (tissues), balancing Tridosha (Vata, Pitta, Kapha), and optimizing mental functions like Dhi (acquisition of knowledge), Dhriti (retention), and Smriti (recollection) (2,3). Classical texts like Charaka Samhita describe four primary Medhya Rasayana: Mandukaparni Swarasa, Yashtimadhu Churna with Ksheera, Guduchi Swarasa, and Shankhapushpi Kalka, administered with Ghrita or Ksheera for better absorption (1,4). These are particularly relevant for children, as Ayurveda emphasizes early intervention to build strong cognitive foundations (5). Modern challenges, such as digital distractions and nutritional deficiencies, exacerbate cognitive issues, making Medhya Rasayana a promising adjunct (6).

This narrative review explores the scope of Medhya Rasayana in Ayurvedic perspective, pharmacological mechanisms, clinical evidence, safety profile, and recommendations for improving intellectual memory in school children aged 8-16 years, drawing from classical literature and original researches.

Ayurvedic Perspective on Medhya Rasayana

In Ayurveda, intellect (Medha) is governed by Sadhaka Pitta, which facilitates cognitive processing, while Vata ensures nerve conduction and Kapha provides stability (1). Imbalances, such as Vata aggravation from stress or Kapha excess from poor diet, impair memory and learning (2). Medhya Rasayana counter this by possessing Tikta Rasa (bitter taste), Laghu-Snidhga Guna (light-unctuous qualities), Sheeta Virya (cool potency), and Madhura Vipaka (sweet post-digestion effect), stimulating Agni (digestion), improving Rasa Dhatu circulation, and nourishing Majja Dhatu (nervous tissue) (3,4).

Charaka Samhita classifies Medhya Rasayana as promoters of Ojas (vital essence), enhancing immunity and mental resilience (1). For children, these are recommended during growth spurts to support brain development, prevent mental disorders, and boost academic performance (5).

Specific Medhya Rasayana Dravyas

Mandukaparni (Centella asiatica)

Mandukaparni is one of the primary Medhya Rasayana described in Charaka Samhita, renowned for its profound intellect-promoting (Medhya) effects. It possesses Tikta-Madhura Rasa, Laghu-Snidhga Guna, Sheeta Virya, and Madhura Vipaka, making it ideal for nourishing Majja Dhatu (nervous tissue) and balancing Vata-Pitta while countering Kapha-induced mental dullness (1). Its neuroprotective properties stem from asiaticoside and madecassoside, which enhance dendritic arborization in the hippocampus, improve synaptic plasticity, and promote neurogenesis—key for memory consolidation and learning (7).

In children, Mandukaparni excels in improving short-term memory, attention, and cognitive processing speed. It reduces oxidative stress in brain tissues, enhances cerebral blood flow, and modulates neurotransmitters like dopamine and serotonin, leading to better focus during studies and reduced anxiety from academic pressure (2). Clinical observations and Ayurvedic texts highlight its quick action in enhancing Dhi (grasping power) and Smriti (recall), making it suitable for school-going children facing learning challenges or mild cognitive delays (3). Regular intake as Swarasa (fresh juice) or powder with milk supports overall brain growth, prevents mental fatigue, and fosters emotional stability.

Conceptually, Mandukaparni acts as a brain tonic by stimulating Agni at the cellular level and promoting Ojas, aligning with Ayurveda's emphasis on preventive cognitive health (4). Its cooling nature suits Pitta-dominant Prakriti, where overheating impairs intellect. No significant

adverse effects are reported in pediatric use, emphasizing its safety for long-term administration (5).

Yashtimadhu (*Glycyrrhiza glabra*)

Yashtimadhu, a classical Medhya Rasayana from Charaka Samhita, is valued for its Madhura Rasa, Guru-Snidha Guna, Sheeta Virya, and Madhura Vipaka. These attributes make it nourishing, demulcent, and calming, particularly for Vata and Pitta aggravation that disrupts mental clarity (1). Glycyrrhizin and glabridin inhibit acetylcholinesterase, elevating acetylcholine levels essential for memory formation and retrieval. Its anxiolytic effects reduce cortisol, mitigating stress-induced cognitive impairment common in school children (3).

In pediatric contexts, Yashtimadhu enhances retention (Dhriti), verbal memory, and attention span. It alleviates academic stress, improves learning efficiency, and supports overall mental resilience. Studies show its granules significantly boost IQ and concentration without side effects, making it palatable when mixed with milk or honey (8). Ayurvedically, it pacifies aggravated Doshas in the Manovaha Srotas, promoting balanced Buddhi (intellect) and preventing Jadatva (mental dullness) (4).

Yashtimadhu's adaptogenic and antioxidant actions protect neurons from free radical damage, aligning with modern nootropic concepts (5). Its sweet taste aids compliance in children, while Snidha quality nourishes brain tissues. It is especially beneficial for Kapha-Vata types prone to sluggish cognition. Long-term use strengthens Ojas, fostering sustained intellectual growth and emotional equilibrium. Caution is advised in high doses for Pitta conditions due to potential heat accumulation (6).

Guduchi (*Tinospora cordifolia*)

Guduchi stands as a potent Medhya Rasayana in Charaka Samhita, with Tikta-Kashaya Rasa, Laghu Guna, Ushna Virya, and Madhura Vipaka. It balances all Tridosha while primarily pacifying Vata and Kapha, making it versatile for cognitive enhancement (1). Its stem juice (Swarasa) nourishes Majja Dhatu, protects the hippocampus from stress-induced damage, and stimulates neuromodulators like dopamine and serotonin (3).

In school children, Guduchi improves verbal learning, logical memory, and adaptability under pressure. Its antioxidant (e.g., tinosporin, berberine) and immunomodulatory effects reduce oxidative stress and inflammation in the brain, supporting sustained focus and recall (2). Ayurvedically, it acts as a Rasayana by enhancing Ojas and Agni, preventing mental fatigue and promoting resilience against environmental stressors (4).

Guduchi's adaptogenic properties normalize the HPA axis, reducing cortisol-related cognitive decline. It is particularly effective in children with recurrent infections or stress affecting concentration (5). Regular use as juice or powder fosters neuroprotection and intellect promotion without dependency. Its Ushna Virya suits Kapha-dominant types, while moderation prevents Pitta aggravation. No major adverse effects are noted in pediatric applications, reinforcing its safety for long-term cognitive support (6).

Shankhapushpi (*Convolvulus pluricaulis*)

Shankhapushpi is regarded as the supreme Medhya Rasayana in Charaka Samhita, with Madhura-Tikta Rasa, Snidha Guna, Sheeta Virya, and Madhura Vipaka (1). It excels in calming the mind (Manas Shanti), enhancing focus, and modulating GABAergic receptors for anxiety reduction without sedation. Shankhapushpin and other alkaloids promote synaptic activity, improving concentration and quick retention (3).

In children, it is ideal for academic stress, hyperactivity, or poor attention. It enhances alertness,

motor coordination, and emotional stability, supporting better classroom performance. Ayurvedically, it clears mental fog (Chitta Vikshepa), strengthens Medha, and nourishes Majja Dhatu, preventing disorders like Chittodvega (anxiety) (4).

Its neuroprotective and free radical-scavenging properties protect developing brains. Shankhapushpi is superior for intellect promotion, often called "Medhya par excellence" (2). Used as Kalka or powder with milk, it is highly palatable and safe. It suits all Prakriti but especially Vata-Pitta types with overactive minds. Long-term administration fosters sustained cognitive gains, emotional balance, and mental resilience without side effects (5).

Brahmi (*Bacopa monnieri*)

Brahmi is a widely acclaimed Medhya Rasayana, with Tikta-Kashaya Rasa, Laghu Guna, Sheeta Virya, and Madhura Vipaka (1). Bacosides enhance synaptic transmission, boost dendritic growth, and improve long-term memory consolidation. It modulates serotonin and acetylcholine, reducing anxiety and supporting cognitive stability (3,9).

In school children, Brahmi excels in alleviating ADHD-like symptoms, improving recall, and enhancing learning efficiency. It reduces forgetfulness, boosts concentration, and promotes mental clarity under academic demands (10). Ayurvedically, it nourishes Majja Dhatu, pacifies Vata-Kapha, and strengthens Dhi-Dhriti-Smruti triad (4).

Its antioxidant and neuroprotective effects combat oxidative stress in the developing brain (5). Brahmi is highly effective for retention and recall, making it ideal for exam preparation. As powder or extract, it is safe with no dependency. It suits Kapha-Vata Prakriti prone to dullness or distraction. Long-term use supports holistic cognitive development, emotional regulation, and intellectual growth without adverse effects (11).

Vacha (*Acorus calamus*)

Vacha is recognized as a powerful Medhya Rasayana in classical Ayurvedic texts like Charaka Samhita and Kashyapa Samhita, valued for its ability to enhance higher mental functions, intellect (Medha), and speech clarity (1). It possesses Tikta-Katu Rasa, Laghu-Tikshna Guna, Ushna Virya, and Katu Vipaka, making it a sharp, penetrating herb that clears mental fog (Manas Vikshepa), stimulates Agni at the neuronal level, and balances Vata-Kapha while invigorating the mind (3). Its rhizome is the primary part used, rich in β -asarone and other volatile oils that contribute to its neuroprotective, anticonvulsant, and neuromodulatory effects (7).

In school-going children, Vacha is particularly beneficial for improving cognitive functions such as memory, concentration, speech development, and learning ability. It acts as a brain tonic by enhancing synaptic transmission, clearing obstructions in Manovaha Srotas, and promoting Vak-Suddhi (speech purification) (4). Traditional use includes giving Vacha powder or paste with honey/ghee to children for speech delays, stuttering, or poor articulation, as it sharpens intellect and supports verbal expression (2). Modern evidence supports its role in reversing amnesia models, improving learning in animal studies, and acting as an anticonvulsant, which indirectly aids focus by reducing neurological disturbances (6).

Ayurvedically, Vacha's Tikshna property "cuts through" mental dullness, making it ideal for Kapha-dominant children with sluggish cognition or Vata-aggravated issues like anxiety affecting memory (5). It also exhibits sedative and hypothermic effects, calming the mind without heavy sedation, thus aiding concentration during studies. Safety in children is generally good at low doses (500 mg–1 g powder), but caution is advised due to its Ushna and Tikshna nature—avoid in high Pitta or acute inflammation, as excessive use may cause irritation (8). Long-term, moderated administration promotes sustained cognitive enhancement, speech fluency, and

mental alertness, aligning with Ayurveda's preventive approach to brain health in growing children.

Jatamansi (*Nardostachys jatamansi*)

Jatamansi is a highly regarded Medhya Rasayana in Ayurvedic classics, including Charaka Samhita and Sushruta Samhita, celebrated for its calming yet intellect-promoting properties (1). It features Tikta-Kashaya Rasa, Laghu Guna, Sheeta Virya, and Katu Vipaka, rendering it cooling, grounding, and nourishing for the mind (3). Its rhizome, rich in sesquiterpenes like nardostachysin and valerenone, acts as Bhutaghna (mind-calming) and Manasa Doshahara (relieves psychic disturbances), while enhancing Medha through neuroprotection and neurotransmitter modulation (4).

For school-going children, Jatamansi excels in reducing stress, anxiety, and emotional instability that impair memory and focus. It improves learning, memory retention, and cognitive performance by upregulating acetylcholine in hippocampal regions, protecting against stress-induced deficits, and balancing the HPA axis to lower cortisol (5). Animal studies demonstrate significant enhancement in learning curves and memory tasks, with protective effects against chronic stress-related amnesia (7). In pediatric contexts, it supports emotional stability, better sleep (indirectly aiding daytime cognition), and overall mental resilience amid academic pressures (2).

Ayurvedically, Jatamansi pacifies Vata and Pitta aggravation in the mind, prevents Chittodvega (mental agitation), and promotes Ojas for sustained intellectual vigor (6). It is particularly suited for Vata-Pitta Prakriti children prone to overthinking or anxiety-related forgetfulness. Administered as powder (500 mg–1 g with milk), it is safe with no major adverse effects reported in traditional use or studies (8). Its calming action without drowsiness makes it ideal for concentration during studies. Long-term use fosters emotional balance, memory consolidation, and intellectual sharpness, embodying Ayurveda's holistic approach to nurturing a stable, sharp mind in children.

Pharmacological Mechanisms

Medhya Rasayana exert nootropic effects via:

- Neurotransmitter Enhancement: Increase acetylcholine by inhibiting acetylcholinesterase; modulate GABA for anxiety reduction (3).
- Neuroprotection: Antioxidants like asiatic acid (Mandukaparni) and glycyrrhizin (Yashtimadhu) combat free radicals, preventing neuronal damage (7).
- Cerebral Blood Flow: Improve oxygenation and nutrient delivery to the brain (4).
- Adaptogenic Action: Balance HPA axis, reducing cortisol and stress-induced cognitive decline (6).

These align with modern neuroscience, positioning Medhya Rasayana as natural cognitive enhancers (5).

Clinical Evidence

Several RCTs validate efficacy:

A study on 90 children (10-16 years) compared Medhya Rasayana (Mandukaparni, Yashtimadhu, Guduchi, Shankhapushpi) with yoga and control. The Medhya group showed highly significant improvements in short-term memory tests ($p<0.001$), with quicker onset than yoga (1).

Yashtimadhu granules in 110 children improved IQ and attention ($p<0.05$) (8).

A systematic review on Bacopa monnieri in children showed consistent improvements in cognition and behavior (2).

These studies confirm dose-dependent, safe improvements in memory domains (3).

Safety and Dosage Considerations

Medhya Rasayana are generally safe for children, with no reported adverse effects in trials (1,2).

Dosage: 1-3 g/day for powders, 5-10 ml for juices, adjusted by age and Prakriti (4).

Contraindications include acute illnesses; consult practitioners. Long-term use promotes sustained benefits without dependency (5).

Discussion

Ayurveda's approach to enhancing cognitive functions through Medhya Rasayana offers a holistic framework that addresses root causes like Dosha imbalances, rather than symptoms alone. These dravyas nourish Majja Dhatu, stimulate Agni, and promote Ojas, supporting intellectual growth in children amid modern stressors (3,6).

Comparatively, Ayurveda's personalized approach (considering Prakriti) surpasses generic supplements, which often overlook constitutional factors (4). Evidence from RCTs shows Medhya Rasayana improve short-term memory and attention more rapidly than non-pharmacological methods like yoga alone in some groups (1). Benefits include reduced academic stress, better retention, and enhanced learning without side effects, making them cost-effective for widespread use (2).

Limitations include reliance on smaller-scale trials and narrative reviews, with variability in formulations and dosages complicating standardization (5). Integration with modern education (e.g., combined with structured study habits) remains under-explored, and larger multicenter RCTs are needed for broader validation (7).

Future research should focus on longitudinal studies assessing sustained academic outcomes, biomarkers of cognitive enhancement, and synergies with lifestyle practices. Ultimately, Medhya Rasayana promote holistic mental resilience, empowering children to thrive intellectually (6).

Conclusion

Medhya Rasayana dravyas offer a holistic, evidence-based approach to enhancing intellectual and memory power in school-going children. By addressing Dosha imbalances and supporting neurobiological mechanisms, they improve academic performance and mental resilience. Integrated with yoga and lifestyle modifications, they provide a safe alternative or complement to conventional interventions. Future research should focus on larger, longitudinal studies to standardize protocols and explore synergies.

Table : Medhya Rasayana Dravya

Sr . N o.	Dravya (Sanskrit / English)	Botanica l Name	Part Used	Key Proper ties (Rasa, Guna, Virya, Vipaka)	Primary Benefits for Intellect / Memory	Approxi mate Dosage for School Children (Consult Practitio ner)	Classical Reference / Notes
1	Mandukap arni (Gotu Kola)	Centella asiatica	Whole plant / Fresh	Tikta, Madhura;	Enhances memory consolidation,	2–5 ml fresh juice or 1–2 g	Charaka Samhita (primary

			juice (Swara sa)	Laghu, Snigdh a; Sheeta; Madhur a	neurogenesis, dendritic arborization; neuroprotectiv e; improves attention, learning, and reduces oxidative stress	powder daily with milk/ghee	Medhya Rasayana); Promotes quick action on short-term memory; Brain growth promoter
2	Yashtimad hu (Licorice / Mulethi)	Glycyrrhi za glabra	Root (Mool a) / Powde r (Churn a)	Madhur a; Guru, Snigdh a; Sheeta; Madhur a	Inhibits acetylcholines terase (increases acetylcholine); improves retention, verbal memory; anxiolytic (reduces academic stress)	1–2 g powder with milk or honey, 1–2 times daily	Charaka Samhita; Anxiolytic; Often used for palatability in combinations; Calms mind
3	Guduchi (Giloy / Amrita)	Tinospor a cordifolia	Stem (Kand) / Juice (Swara sa)	Tikta, Kashay a; Laghu; Ushna; Madhur a	Protects hippocampus from stress; enhances verbal/logical memory; adaptogenic; reduces oxidative stress and supports neuromodulat ors	5–10 ml juice or 1–2 g powder daily	Charaka Samhita; Antioxidant and immunomodul atory; Brain tonic for long- term use
4	Shankhapu shpi	Convolvu lus pluricauli s	Whole plant / Paste (Kalka)	Madhur a, Tikta; Snigdh a; Sheeta; Madhur a	Considered superior for intellect (Medhya par excellence); calms mind, improves focus/concentr	3–6 g paste or 1–3 g powder daily with milk	Charaka Samhita (superior among the four); Enhances quick retention and alertness

					ation; modulates GABA for calm alertness		
5	Brahmi (Water Hyssop)	Bacopa monnieri	Whole plant	Tikta, Kashay a; Laghu; Sheeta; Madhur a	Boosts synaptic transmission (via bacosides); excellent for long-term memory, concentration; reduces forgetfulness and ADHD- like symptoms	250–500 mg extract or 1–3 g powder daily	Commonly added in practice; High nootropic activity; Supports retention, recall, and cognitive stability
6	Vacha (Sweet Flag)	Acorus calamus	Rhizo me	Tikta, Katu; Laghu, Tikshna ; Ushna; Katu	Clears mental fog; improves speech, cognition, and focus; neuroprotectiv e; enhances memory and intellect	500 mg–1 g powder (use cautiously due to Tikshna property)	Additional Medhya; Used in polyherbal formulations for mental clarity and speech improvement
7	Jatamansi	Nardosta chys jatamansi	Root	Tikta, Kashay a; Laghu; Sheeta; Katu	Calms mind, reduces anxiety and emotional instability; enhances memory and overall mental stability	500 mg–1 g powder with milk	Additional Medhya; Adaptogenic; Useful for stress-related cognitive decline in children

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