

"MEDHYA RASAYANA FORMULATIONS (SARASWATARISHTA, BRAHMI GHRITA, KALYANAKA GHRITA): A REVIEW OF COMPOSITION, PHARMACOLOGY AND CLINICAL USE"

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FUNDING

INFORMATION:

Not Applicable

How to cite this article:

Gandhi A, "Medhya Rasayana formulations (Saraswatarishta, Brahmi Ghrita, Kalyanaka Ghrita): a review of composition, pharmacology and clinical use" International Journal of Ayurvedic Medicine and Mental Health. 2026;3(3):21-25. Sri. 2026.1004.ijamh.03.05

ABSTRACT:

Background: Although single Medhya herbs such as Brahmi and Ashwagandha have been studied extensively, Ayurvedic practice relies mainly on compound formulations. Saraswatarishta, Brahmi Ghrita and Kalyanaka Ghrita are among the most widely prescribed classical formulations for memory, anxiety, insomnia, epilepsy and psychosis.

Objective: To review the classical sources, composition, dosage forms, pharmacological studies and clinical use of these three formulations, and to identify gaps in evidence. **Methods:** Narrative review of classical texts, the Ayurvedic Formulary of India and published experimental and clinical studies. **Results:** Brahmi Ghrita, described by Charaka for Apasmara and Unmada, combines Brahmi juice with Vacha, Kushtha and Shankhapushpi in ghee; it reversed scopolamine-induced amnesia in rats, and one commercial preparation showed anticonvulsant activity in mice, with quality varying between brands. Kalyanaka Ghrita, prescribed by Charaka for Unmada, contains about two dozen herbs; a standardised preparation improved memory and reduced oxidative stress, inflammation and acetylcholinesterase activity in a beta-amyloid rat model, with intranasal administration more effective than oral. Saraswatarishta, a fermented preparation from later texts, showed anticonvulsant activity in the maximal electroshock model, with heavy metals within limits in a laboratory batch. Controlled clinical trials of all three formulations are lacking, although some are now registered. **Conclusion:** These formulations have plausible pharmacology and some encouraging preclinical results, but their clinical efficacy has not been established. Standardisation, quality control and randomised trials are urgently needed.

Keywords: Medhya Rasayana; Saraswatarishta; Brahmi Ghrita; Kalyanaka Ghrita; polyherbal formulation; standardisation; Unmada; Apasmara

INTRODUCTION:

Ayurveda rarely prescribes single herbs in isolation. Its pharmacology (Bhaishajya Kalpana) is built on compound formulations designed to combine complementary actions, reduce adverse effects and suit the patient's condition. In mental disorders, three classes of formulation are particularly important: medicated ghees (Ghrita), fermented preparations (Asava and Arishta), and powders and tablets.

Most modern research, however, has focused on single herbs, especially in standardised extract form. This creates a gap between research and practice: clinicians prescribe classical formulations, while the evidence base concerns extracts of individual plants. Reviewing the evidence for commonly used formulations is therefore important for both practitioners and researchers.

This review focuses on three widely used Medhya formulations: Brahmi Ghrita, Kalyanaka Ghrita and Saraswatarishta. It summarises their classical sources and composition, pharmaceutical characteristics, experimental studies and clinical use, and highlights research priorities.

METHODS:

Classical sources were Charaka Samhita (Chikitsa Sthana 9 and 10) and Bhaishajya Ratnavali, with the Ayurvedic Formulary of India as the reference for official formulas^[1-3]. Experimental and clinical studies were identified through PubMed, Google Scholar, the Digital Helpdesk of Indian Medicine, the Clinical Trials Registry of India and Ayurveda journals using the formulation names and terms such as memory, anxiety, epilepsy, standardisation and clinical trial. This is a narrative review.

THE ROLE OF GHEE AND FERMENTATION IN MEDHYA FORMULATIONS:

Ghee (Ghrita) as a vehicle

Ghee is described in Ayurveda as Medhya (intellect-promoting) and as having the special property of taking on the qualities of the herbs processed in it without losing its own (Yogavahi)^[1]. Charaka prescribes medicated ghee extensively for Unmada and Apasmara. Old ghee (Purana Ghrita) is particularly

recommended for mental disorders.

From a pharmaceutical perspective, ghee is a lipid medium that can extract and carry fat-soluble plant constituents. Many neuroactive constituents, including some triterpenoid saponins and withanolides, are relatively lipophilic. Ghee-based formulations may therefore improve the extraction and absorption of these compounds, although this has not been demonstrated in human pharmacokinetic studies. Concerns about ghee and blood lipids have been raised, but an experimental study suggested that dietary ghee did not adversely affect serum lipids at moderate intake in animals^[4].

Fermentation (Asava and Arishta)

Asavas and Arishtas are prepared by fermenting herbal decoctions or juices with sugar or jaggery and fermentation initiators such as Dhataki (*Woodfordia fruticosa*) flowers. The process produces a small amount of self-generated alcohol, which acts as a preservative and solvent for constituents, and may alter their chemistry. Arishtas are generally considered quicker in action and easier to digest than ghee preparations, and are suitable when digestion is weak.

RATIONALE FOR POLYHERBAL FORMULATION:

Ayurveda's preference for compound formulations rests on the principle of Samyoga (combination): ingredients are chosen to add to each other's actions, to balance each other's adverse qualities, and to direct the formulation to particular tissues or channels. Modern pharmacognosy recognises several types of interaction in herbal mixtures, including pharmacodynamic synergy (constituents acting on different targets in the same pathway), pharmacokinetic enhancement (one constituent improving absorption or reducing metabolism of another) and attenuation of adverse effects^[5]. Piperine from Pippali, an ingredient of Saraswatarishta, is a well-known example of a constituent that increases the bioavailability of other compounds. The ingredients of the three formulations reviewed here include several herbs with independent evidence relevant to mental health:

Table 1: Independent evidence for key ingredients of the three formulations

Ingredient	Present in	Independent evidence
Brahmi (Bacopa)	Brahmi Ghrita, Saraswatarishta	Improved attention and processing speed in a meta-analysis of RCTs ^[6]
Brahmi (Centella)	Saraswatarishta (some traditions)	Distinct plant often confused with Bacopa ^[7]
Vacha (Acorus)	Brahmi Ghrita, Saraswatarishta	Anticonvulsant effects in rat models ^[8]
Ashwagandha	Saraswatarishta	Strongest evidence for stress and anxiety among Ayurvedic herbs ^[9]
Triphala, Haridra	Kalyanaka Ghrita	Antioxidant and anti-inflammatory markers used for standardisation ^[10]

This evidence supports the plausibility of the formulations, but it does not prove that the formulations themselves are effective. Doses of individual herbs in compound formulations are often lower than those used in single-herb trials, and processing in

ghee or fermentation may change their chemistry. Only trials of the formulations themselves can answer the clinical question.

BRAHMI GHRITA:

Classical source and composition

Charaka describes Brahmi Ghrita in the treatment of Apasmara^[1]. It is prepared by cooking old ghee with the fresh juice of Brahmi and a paste of Vacha, Kushtha and

Shankhapushpi. The same formulation is included in the Ayurvedic Formulary of India^[3].

Table 2: Composition of Brahmi Ghrita

Ingredient	Botanical name	Part	Traditional role
Brahmi	Bacopa monnieri	Whole plant juice	Medhya, Rasayana
Vacha	Acorus calamus	Rhizome	Medhya, clears channels,
Kushtha	Saussurea lappa	Root	Pacifies Vata and Kapha
Shankhapushpi	Convolvulus pluricaulis	Whole plant	Medhya, calming
Ghrita	Cow's ghee (old)	—	Vehicle, Medhya

Pharmacological studies

In a rat model of scopolamine-induced amnesia, Brahmi Ghrita at 400 and 800 mg/kg improved performance in the modified elevated plus maze, passive avoidance and active avoidance tests in a dose-dependent manner, suggesting that it counteracts the memory-impairing effects of scopolamine^[11].

A 2024 study compared six marketed polyherbal ghees used for epilepsy, including three brands of Brahmi Ghrita, Panchagavya Ghrita, Mahapanchagavya Ghrita and Nirgundyadi Ghrita^[12]. Physicochemical and phytochemical parameters varied between products. In the pentylenetetrazol seizure model in mice, one brand of Brahmi Ghrita delayed the onset and shortened the duration of convulsions more effectively than the other products. This highlights both the potential of the formulation and the problem of quality variation in the market.

Clinical use

Brahmi Ghrita is used for memory problems, anxiety, insomnia, epilepsy and psychosis, typically in doses of 5 to 10 g with warm milk or water, and is also used for Nasya. Published clinical studies are mainly small and uncontrolled. Evidence from trials of Bacopa extract (reviewed elsewhere) cannot be directly transferred to Brahmi Ghrita, because the formulation contains other herbs and uses a different vehicle and preparation method.

KALYANAKA GHRITA:

Classical source and composition

Charaka describes Kalyanaka Ghrita in the treatment of Unmada^[1]. It contains about two dozen herbs, including Triphala (Haritaki, Bibhitaki, Amalaki), Haridra, Daruharidra, the two Sarivas, Manjishtha, Vidanga, Devadaru, Ela, Chandana, Priyangu, Nilotpala, Dadima, Shalaparni, Prishniparni and others, processed in ghee^[1,3]. It is indicated for Unmada, Apasmara, poor memory, infertility, cough and several other conditions. Mahakalyanaka Ghrita is an enhanced version with additional nourishing ingredients.

Pharmacological studies

A 2022 study developed an HPLC method to standardise Kalyanaka Ghrita using marker compounds (curcumin, gallic acid, tannic acid, chebulagic acid and berberine) and tested it in a rat model of beta-amyloid-induced memory impairment^[10]. Kalyanaka Ghrita improved learning and memory, increased brain-derived neurotrophic factor and antioxidant status, and reduced acetylcholinesterase activity, oxidative stress and inflammatory cytokines in the brain. Intranasal administration

produced more marked effects than oral administration, which is notable in light of the classical use of medicated ghees for Nasya. This study is a good model for formulation research because it combined chemical standardisation with a disease-relevant animal model and tested two routes of administration.

Clinical use

Kalyanaka Ghrita is used for anxiety, depression, psychosis, cognitive impairment and childhood developmental and behavioural problems. Trials of Kalyanaka Ghrita Nasya with Saraswatarishta in anxiety disorder, and of Mahakalyanaka Ghrita and Panchagavya Ghrita in Chittodvega, have been registered in the Clinical Trials Registry of India in 2024, but results are not yet available. Published controlled clinical trials are otherwise lacking.

SARASWATARISHTA:

Classical source and composition

Saraswatarishta is described in Bhaishajya Ratnavali in the chapter on Rasayana^[2] and is included in the Ayurvedic Formulary of India^[3]. The main ingredient is Brahmi; in some traditions, including Kerala, Centella asiatica is used. Other decoction ingredients include Shatavari, Vidari, Haritaki, Ushira, Ardraka and Shatapushpa. The decoction is fermented with honey, sugar and Dhataki flowers, and a group of spices and herbs, including Vacha, Kushtha, Ashwagandha, Pippali, Vidanga, Twak and Ela, is added. Some classical versions include gold leaf.

Pharmacological studies

A study prepared Saraswatarishta according to pharmacopoeial specifications, standardised it using FTIR and HPTLC fingerprinting with asiaticoside as a marker, tested heavy metals, alcohol content and microbial load, and evaluated it in the maximal electroshock seizure model^[13]. Heavy metal levels in the laboratory batch were within WHO limits. The formulation produced a dose-dependent reduction in seizure episodes in the electroshock model.

Clinical use

Saraswatarishta is used for memory, speech disorders, anxiety, insomnia and as a general nervine tonic, commonly in doses of 10 to 20 ml with an equal volume of water after meals. It is widely used for students and older adults. Controlled clinical trials are lacking.

COMPARATIVE SUMMARY:

Table 3: Comparative summary of Brahmi Ghrita, Kalyanaka Ghrita and Saraswatarishta

Feature	Brahmi Ghrita	Kalyanaka Ghrita	Saraswatarishta
Classical source	Charaka (Apasmara)	Charaka (Unmada)	Bhaishajya Ratnavali (Rasayana)
Dosage form	Medicated ghee	Medicated ghee	Fermented liquid
Number of herbs	4 plus ghee	About 25 plus ghee	About 20
Main Medhya herb(s)	Brahmi, Vacha, Shankhapushpi	Multiple; Triphala, Haridra prominent	Brahmi (or Centella), Vacha, Ashwagandha
Key preclinical finding	Anti-amnesic (scopolamine) ^[11] ; anticonvulsant (PTZ) ^[12]	Neuroprotective in beta-amyloid model; intranasal > oral ^[10]	Anticonvulsant (MES) ^[13]
Clinical trials	Small uncontrolled studies	Registered trials, results awaited	None published
Quality issues	Brand variation shown ^[12]	Requires multi-marker standardisation ^[10]	Alcohol content; gold and metal testing

QUALITY AND SAFETY:

The main safety and quality concerns with these formulations are:

- Variation between manufacturers: the 2024 comparison of medicated ghees showed significant differences between brands of the same named formulation^[12].
- Identity of herbs: confusion between Bacopa and Centella as Brahmi affects both Brahmi Ghrita and Saraswatarishta.
- Heavy metals: some Ayurvedic products, particularly those containing minerals or metals, have been found to contain lead, mercury or arsenic^[14]. Testing should follow recognised standards for contaminants in herbal medicines^[15]. Formulations with gold leaf or other metals should be tested.
- Alcohol: Arishtas contain self-generated alcohol, usually within regulatory limits, but this should be considered for patients with alcohol use disorders, liver disease, pregnancy and those taking interacting medicines.
- Lipid load: ghee formulations add dietary fat, which may need consideration in patients with obesity, dyslipidaemia or fatty liver, although usual doses are modest.
- Interactions: Vacha, Ashwagandha and Brahmi may have additive effects with sedatives and anticonvulsants.

DISCUSSION:

Classical Medhya formulations are central to Ayurvedic psychiatry, yet their evidence base lags far behind that of single herbs. The few available studies show that these formulations have measurable effects in animal models of memory impairment, neurodegeneration and seizures, and that they can be standardised using modern analytical methods. The Kalyanaka Ghrita study shows how chemical standardisation and disease-relevant pharmacology can be combined, and its finding that intranasal administration was more effective than oral provides an interesting link to the classical practice of Ghrita Nasya.

However, there are no completed, adequately powered randomised controlled trials of any of these formulations in mental disorders. This is the most important gap. Registered trials of Kalyanaka and Mahakalyanaka Ghrita in anxiety are encouraging and their results should be published regardless of outcome.

Formulation research presents special challenges. Polyherbal products contain many constituents, so it is difficult to identify active principles and to ensure batch consistency. A practical approach is to standardise each formulation using several marker compounds representing its major ingredients, to document the manufacturing process in detail, and to use the same batch throughout a trial.

Research priorities include: development of pharmacopoeial multi-marker standards for each formulation; comparative quality surveys of marketed products; pharmacokinetic studies of key constituents from ghee and Arishta vehicles; and randomised, placebo-controlled trials in specific conditions such as generalised anxiety disorder, mild cognitive impairment and drug-resistant epilepsy (as adjunct). Placebo ghee and placebo syrup can be prepared to resemble the active products for blinding.

CONCLUSION:

Brahmi Ghrita, Kalyanaka Ghrita and Saraswatarishta are classical Medhya formulations with long-standing clinical use in Ayurvedic psychiatry. Preclinical studies support anti-amnesic, neuroprotective and anticonvulsant effects, and modern methods can standardise these complex products. Their clinical efficacy remains unproven. Quality control and well-designed randomised trials are needed to establish their place in mental health care.

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