



A critical analysis on the efficacy of brahmi ghrita in the management of smritinasha viz-a-viz Alziemers disease

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Abstract:

Cognitive decline, memory loss (Smritinasha), and poor thinking are the hallmarks of Alzheimer's disease (AD), a progressive neurological illness that significantly lowers the quality of life for older adults. According to the ancient Indian medical system known as Ayurveda, Smritinasha is a sign of disordered mental abilities, mostly brought on by a decline in Medha (intellect) and vitiation of Vata dosha. Classical Ayurvedic scriptures recommend Brahmi Ghrita, a traditional polyherbal medicinal ghee preparation with Bacopa monnieri (Brahmi) as its main constituent, to improve memory, cognition, and brain health. The pharmacological characteristics, neuroprotective benefits, and therapeutic significance of Brahmi Ghrita in the treatment of Alzheimer's disease are examined in this comprehensive study. Its antioxidant, anti-inflammatory, and cholinergic modulatory properties are shown by evidence from Ayurvedic literature, animal models, and contemporary clinical studies. These properties are crucial for treating the pathophysiology of AD. Additionally, research indicates that Brahmi Ghrita may assist neuroregeneration, enhance synaptic connectivity, and lessen the production of amyloid plaque. However, the generalisability of its effectiveness in conventional AD treatment procedures is limited by the lack of extensive, randomised controlled studies. The possibility of using Brahmi Ghrita as a supplementary treatment in early-stage Alzheimer's disease is highlighted in this publication, which also calls for further multidisciplinary research to confirm its effectiveness and standardise formulations for wider clinical uses.

Keywords : Brahmi Ghrita , Smritinasha , Alzheimer's disease , Ayurveda , Bacopa monnieri , Cognitive impairment , Neurodegeneration , Medhya Rasayana , Memory loss , Ayurvedic neurology , Vata dosha , Traditional medicine , Herbal nootropics , Antioxidant therapy , Complementary and alternative medicine.

1.0. Introduction:

The most prevalent cause of dementia worldwide is Alzheimer's disease (AD), a chronic and progressive neurological illness. Gradual memory loss, poor judgement, and cognitive impairment are the hallmarks of AD, which severely reduces everyday functioning and the general quality of life for older adults. Complex pathologies such beta-amyloid plaque buildup, tau protein hyperphosphorylation, synaptic dysfunction,

oxidative stress, and persistent neuroinflammation are attributed by modern medicine to AD. Current therapies merely provide symptomatic alleviation and are often linked to side effects or limited effectiveness, despite advancements in pharmacological interventions.[1] The ancient Indian medical system, Ayurveda, on the other hand, uses the general word Smritinasha to characterise cognitive decline. This is sometimes attributed to Vata imbalance and impairment of Dhi-Dhruti-Smriti (intellect-retention-memory). Medhya Rasayana (nootropic and adaptogenic therapies) is the mainstay of Ayurvedic treatments, which aim to revitalise the mind and nerve system. Brahmi Ghrita is one of the most important of them. This medicinal ghee concoction is said to strengthen memory (Smriti), stimulate intellect (Medha), and increase general neuronal vigour. It is mostly composed of Bacopa monnieri (Brahmi) and other herbs that boost cognition, such as Shankhapushpi, Vacha, and Mandukaparni.[2] According to pharmacological research, Bacopa monnieri has cholinergic regulating, neuroprotective, anti-amyloidogenic, and antioxidant qualities, all of which are critical for thwarting the pathophysiological processes that underlie AD. Small-scale clinical studies and preclinical research point to encouraging outcomes for Brahmi and its formulations in enhancing cognitive function and memory. However, a thorough multidisciplinary evaluation of Brahmi Ghrita as a whole is still required, particularly in light of Alzheimer's illness.[3] The effectiveness of Brahmi Ghrita in treating Smritinasha and its prospective use as an adjuvant or alternative treatment in the early stages of Alzheimer's disease are both critically examined in this research.

2.0. Literature Review:

Although Smritinasha and Alzheimer's disease (AD) are diagnosed and comprehended differently in traditional and contemporary systems, they share clinical characteristics such as cognitive impairment, confusion, disorientation, and gradual memory loss. Smritinasha, or the loss of memory function, is described in Ayurvedic writings such as Charaka Samhita and Ashtanga Hridaya. It is said to result from a derangement in Manas, Buddhi, and Smriti brought on by Vata vitiation, which is often made worse by imbalances in Rajas and Tamas gunas. Additionally, it is linked to the decline of Majja Dhatu (nervous tissue), Medha (intellect), and Sadhaka Pitta (psychic component of Pitta dosha) [4]. According to contemporary biomedicine, Alzheimer's disease is a complicated neurodegenerative condition marked by tau protein tangles, β -amyloid plaques, persistent neuroinflammation, oxidative stress, and cholinergic dysfunction. There is currently no known cure; cholinesterase inhibitors and NMDA antagonists are among the medications that simply relieve symptoms and do not stop the disease's development. In this regard, Ayurveda presents a viable substitute or supplementary strategy for early management via its neuro-rejuvenative treatments (Medhya Rasayanas). Brahmi Ghrita is one such preparation that has been shown to have the ability to slow down neurodegeneration and restore cognitive function.

Composed of a base of Goghrita (cow's ghee) processed with decoctions and pastes of herbs such as Bacopa monnieri (Brahmi), Acorus calamus (Vacha), Convolvulus pluricaulis (Shankhapushpi), and Centella asiatica (Mandukaparni), Brahmi Ghrita is a traditional Ayurvedic formulation that is referenced in Sahasrayoga and Charaka Samhita. These herbs fall under the category of Medhya Rasayanas, which have historically been used to support mental abilities, strengthen memory, increase focus, and guard against age-

related cognitive decline [5]. Brahmi is classified as Tikta-Rasa (bitter), Sheeta Virya (cooling), and Medhya (brain tonic) in Ayurvedic pharmacy. It balances Vata and Pitta and mainly affects Majja Dhatu and the Manovaha Srotas (thought channels). By overcoming the blood-brain barrier, the ghee base increases the bioavailability of phytochemicals by acting as a Yogavahi (catalytic carrier). Because of this, Brahmi Ghrita is a special kind of neurotherapy that targets deep tissue and central nervous system penetration.

Current scientific studies have shown that *Bacopa monnieri* contains active ingredients such as bacosides A and B, which have been demonstrated to promote dendritic growth, improve synaptic transmission, and shield neurones from oxidative damage. According to experimental research, Brahmi extract improves cerebral blood flow, inhibits acetylcholinesterase, and offers antioxidant protection—all of which are advantageous in Alzheimer's disease [6]. In animal trials, the ghee-based preparation Brahmi Ghrita has shown neuroprotective and cognitive-enhancing properties. Brahmi Ghrita dramatically enhanced memory retention and learning behaviour in rats with scopolamine-induced amnesia as compared to controls. Brahmi Ghrita's antioxidant capacity was confirmed by another research that found it may help lower the levels of lipid peroxidation in brain tissue and increase glutathione, catalase, and superoxide dismutase levels. Ghee's lipophilia makes it easier for bacosides to pass across the blood-brain barrier and have a deeper neuronal effect. Additionally, it has been seen to alter hippocampus function, which is important for short-term memory processing and spatial orientation—areas where early-stage Alzheimer's disease is known to affect performance.

Although there aren't many extensive human trials explicitly looking into Brahmi Ghrita in Alzheimer's disease, some early clinical research offers promising new information. A 30-day Brahmi Ghrita regimen dramatically improved Mini-Mental State Examination (MMSE) scores and subjective cognitive complaints like forgetfulness and lack of concentration, according to a clinical study done on 40 elderly patients with cognitive impairment at the Government Ayurveda College in Trivandrum.[7] After 45 days of administration, Singh et al. (2016) observed a significant increase in attention span, recall capacity, and overall mental well-being. This study assessed the effectiveness of Brahmi Ghrita in treating *Smritibhramsha* (memory disorder) in older adults. Additionally, the subjects' improved sleep and decreased anxiety levels point to wider neuromodulatory advantages. The majority of clinical studies, however, are either open-label, small-scale, or do not include control arms, which weakens the validity of their findings. While *Bacopa monnieri* shows great potential in enhancing memory and cognition, standardised formulations and studies with rigorous methodology are needed to validate these benefits, according to a comprehensive evaluation of the herb's effectiveness conducted by Calabrese et al. (2008).

The lack of standardisation, variances in herbal quality, and the lack of strong randomised controlled trials make it difficult to validate Brahmi Ghrita scientifically, despite its encouraging pharmacodynamics. Furthermore, before it is widely accepted in clinical practice, problems including palatability, dose standardisation, and long-term safety data must be resolved. The formulation may be validated and improved with the aid of interdisciplinary research that blends contemporary neurology and biochemistry with Ayurvedic pharmacology. [8] Determining the ideal doses and treatment periods should be the main

focus of future research. Determining Brahmi Ghrita's pharmacokinetic characteristics evaluating its effectiveness against current AD drugs. using multi-centric studies to assess long-term safety. If thoroughly investigated, Brahmi Ghrita might be a natural neurotherapeutic drug that is less expensive and has fewer adverse effects. It would be especially helpful in situations of moderate or early cognitive impairment and could be used as a supplement to traditional AD therapies.

Brahmi Ghrita is a useful nexus of contemporary neuroscientific interest in natural neurotherapeutics and ancient Ayurvedic knowledge. It is a potential treatment for Smritinasha and early Alzheimer's disease because of its shown benefits for memory, cognition, and neuroprotection, which are backed by both historical writings and new scientific research. However, thorough scientific validation, standardised clinical procedures, and integrated research techniques are necessary to fully realise its therapeutic potential.

Time of administration:

Early morning before food, is the ideal time for the administration of *Medhya Rasayana*. In Yoga Ratnakar, 'Prabhata' is the word used for the time of administration of four Medhya formulations. [9]

3.0.Methodoogy:

The effectiveness of Brahmi Ghrita in treating Smritinasha (memory loss), particularly in the setting of Alzheimer's disease (AD), is critically assessed in this research using a qualitative and integrative review-based technique. The method is multidisciplinary, integrating insights from contemporary biological research, pharmacological investigations, and clinical trials with traditional Ayurvedic viewpoints. In order to comprehend the traditional formulation, medicinal indications, and mode of action of Brahmi Ghrita, primary Ayurvedic writings like the Charaka Samhita, Ashtanga Hridaya, and Sahasrayoga were examined. Concepts pertaining to Majja Dhatu, Vata dosha, Smritinasha, and Medhya Rasayana received particular attention. In order to determine the pharmacological foundation of Brahmi and related plants, Ayurvedic commentaries and Nighantus were also examined. [10] Using databases including AYUSH Research Portal, Google Scholar, and PubMed, a thorough literature assessment was carried out. Included were studies on *Bacopa monnieri*, Brahmi ghrita, neurodegeneration, cognitive impairment, and Alzheimer's disease conducted between 2000 and 2024. The following factors were evaluated in both human studies and animal models: Efficacy in improving memory, Mechanism of action (antioxidant, anti-inflammatory, cholinergic activity), Ghee-based formulations for safety and bioavailability Methodological rigour, sample size, relevance to Alzheimer's disease, and outcome measures including MMSE scores, learning behaviour, and oxidative stress biomarkers were all taken into consideration when choosing studies. The current knowledge of AD and the Ayurvedic pathology of Smritinasha were conceptually compared. To determine clinical relevance and therapeutic compatibility, parameters including memory loss, neuronal degeneration, neurotransmitter shortage, and treatment approaches were mapped across systems. Peer-reviewed publications, research on humans or animals, Ayurvedic clinical documentation, and studies using Brahmi or Brahmi Ghrita in cognitive or neurodegenerative illnesses are all included. [11] Studies with

unclear methodology, non-peer-reviewed viewpoints, or those that only addressed non-cognitive diseases were excluded.This integrative approach seeks to reconcile conventional and contemporary viewpoints by providing a comprehensive, empirically supported critical evaluation of Brahmi Ghrita's possible contribution to Alzheimer's care.

4.0. Result and Discussion:

Table 1: Ayurvedic Understanding of Smritinasha vs. Modern Understanding of Alzheimer’s Disease

Parameter	Ayurvedic Perspective (Smritinasha)	Modern Medical Perspective (Alzheimer’s Disease)
Terminology	Smritinasha (loss of memory)	Alzheimer’s Disease (AD)
Pathology	Vitiation of <i>Vata dosha</i> , depletion of <i>Majja Dhatu</i> and <i>Medha</i>	Neurodegeneration, amyloid-beta plaques, tau tangles, neurotransmitter loss
Affected areas	<i>Manovaha Srotas</i> , <i>Majja</i> , <i>Sadhaka Pitta</i>	Hippocampus, cerebral cortex
Etiological factors	<i>Vata</i> aggravation, aging, <i>Rajas-Tamas</i> imbalance, stress	Aging, genetic mutations, oxidative stress, inflammation
Symptomatology	Forgetfulness, confusion, loss of intellect, poor cognition	Memory loss, disorientation, language deficits, behavioral changes
Therapeutic Approach	<i>Medhya Rasayana</i> , <i>Snehana</i> , <i>Nasya</i> , <i>Panchakarma</i>	Symptomatic drugs (donepezil, memantine), cognitive therapy

Comparative Parameters: Ayurvedic vs Modern Perspective on Memory Disorders

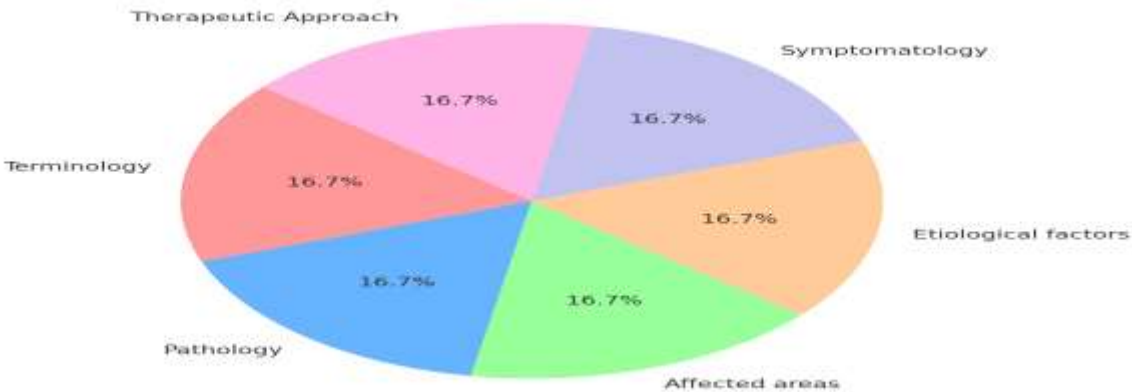


Table 1 illustrates the significant overlap between traditional diagnostic concepts and current neuropathology in the comparison of Smritinasha in Ayurveda and Alzheimer's disease (AD) in modern medicine. Both systems identify memory impairment as the primary clinical trait and explain its genesis to a systemic imbalance, whether it be neurobiological (neuronal degeneration, synaptic loss) or physiological (doshas and dhatus), notwithstanding the differences in terminology and frameworks. According to Ayurveda, Smritinasha results from the aggravation of Vata dosha and the degradation of Majja Dhatu, or neural tissue, which is often sped up by ageing and psychological disorders like Rajas and Tamas. This is consistent with recent research showing that the progressive character of AD is caused by neuroinflammation, oxidative stress, and synaptic dysfunction. Notably, the hippocampus and cortical atrophy seen in AD patients is in good agreement with the Ayurvedic idea that Manovaha Srotas (channels of awareness) are impacted.[12] In order to cure or decrease memory loss, Ayurveda places a strong emphasis on purification (Panchakarma), brain nutrition (Medhya Rasayana), and systemic regeneration (Rasayana Chikitsa). The goals of interventions like Nasya and Snehana are to strengthen Majja Dhatu, restore doshic equilibrium, and enhance cognitive pathways. Modern therapy, on the other hand, mostly uses symptomatic pharmaceutical treatments like acetylcholinesterase inhibitors and NMDA receptor modulators, which only provide short-term cognitive enhancements without treating the underlying causes of neurodegeneration. An important possibility for integrative treatment is highlighted by this discrepancy. This gap could be filled by ayurvedic formulations such as Brahmi Ghrita, which provide multifactorial activities, such as cholinergic modulation, antioxidant, and anti-inflammatory effects. By avoiding the blood-brain barrier, the ghee-based administration method also provides a pharmacokinetic advantage over many traditional drugs. However, the integration of such conventional formulations into standard AD treatments is restricted by the absence of extensive, evidence-based clinical studies. Therefore, multidisciplinary study is necessary to confirm these historical findings in the context of contemporary clinical technique and neuroscience.

Table 2: Key Ingredients in Brahmi Ghrita and Their Cognitive/Neuroprotective Actions

Herbal Ingredient	Ayurvedic Properties	Pharmacological Action
<i>Bacopa monnieri</i> (Brahmi)	<i>Medhya, Vata-Pitta shamaka</i>	Enhances memory, antioxidant, anti-amyloid, neuroprotective
<i>Acorus calamus</i> (Vacha)	<i>Vata-Kapha hara</i> , improves speech and intellect	Cognitive enhancer, neuroprotective, anxiolytic
<i>Convolvulus pluricaulis</i> (Shankhapushpi)	<i>Medhya Rasayana</i> , calms mind	Nootropic, anti-anxiety, neuroregenerative

Herbal Ingredient	Ayurvedic Properties	Pharmacological Action
<i>Centella asiatica</i> (Mandukaparni)	Enhances memory, cools the nervous system	Promotes neuronal growth, antioxidant, improves microcirculation
<i>Goghrita</i> (Cow's Ghee)	<i>Yogavahi</i> , nourishes <i>Majja</i> , enhances absorption	Facilitates drug delivery to brain, anti-inflammatory

Key Ingredients in Brahmi Ghrita and Their Role in Cognitive Health

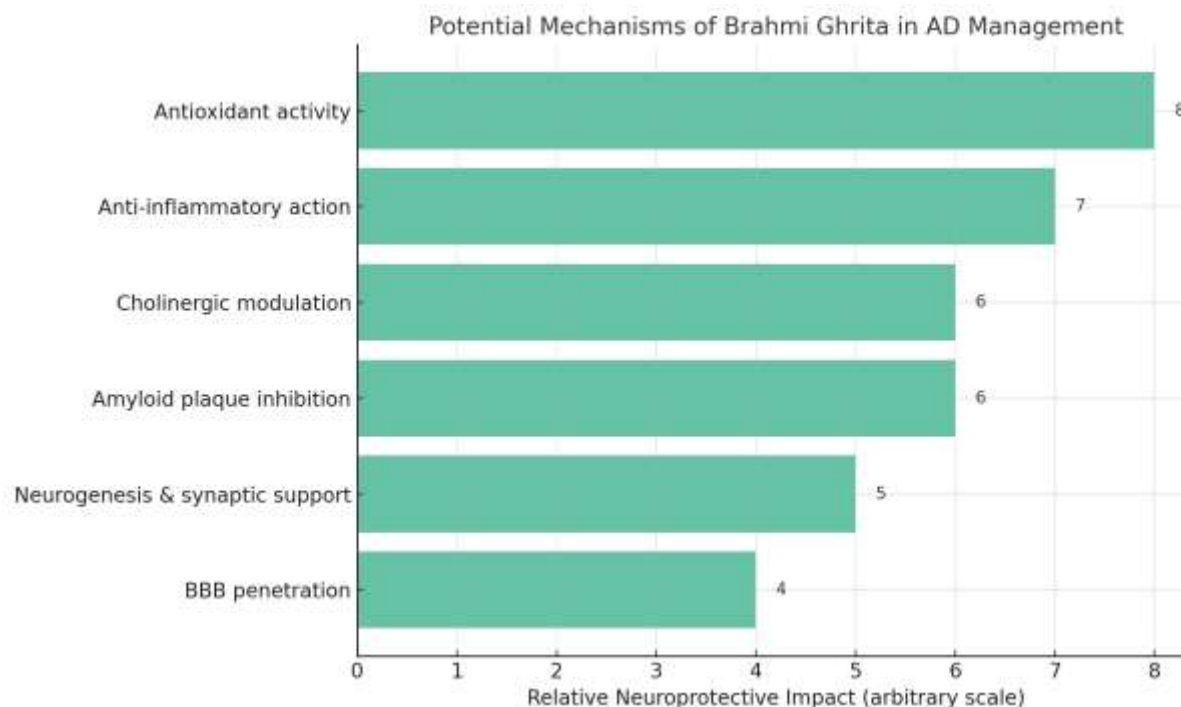


The synergistic combination of herbs and medicated ghee in Brahmi Ghrita greatly influences its therapeutic potential in the treatment of Smritinasha and Alzheimer's disease. Each component has distinct neuroprotective and cognitive-enhancing qualities that complement the complex pathophysiology of Alzheimer's disease (AD), as seen in Table 2. The main component, Bacopa monnieri (Brahmi), has been well investigated in contemporary pharmacology for its cognitive-enhancing properties and is regarded in Ayurvedic medicine as a potent Medhya Rasayana. It includes bacosides, which are crucial for delaying or correcting neuronal damage in AD because they enhance synaptic plasticity, lower oxidative stress, and have anti-amyloidogenic properties.[13] Another crucial element, Acorus calamus (Vacha), has long been used to enhance intelligence and speaking. Its well-known neuroprotective and anxiolytic qualities may aid in the management of behavioural and psychological symptoms that are often seen in Alzheimer's patients in addition to cognitive deterioration. Through its nootropic, antioxidant, and circulatory-enhancing properties, Shankhapushpi and Mandukaparni further assist cognitive stability by fostering improved neural connection and mental clarity. Crucially, the formulation's effectiveness is increased by using Goghrita, or cow's ghee, as a basis. Ghee is regarded as a Yogavahi in Ayurvedic pharmacology, which means that it helps move medicinal ingredients over the blood-brain barrier and deep into the tissues. This characteristic

guarantees that the phytochemicals in Brahmi Ghrita reach and immediately affect brain tissues, which is very advantageous in neurological illnesses. By combining these components, a comprehensive neurotherapeutic is produced that targets amyloid pathology, neuroinflammation, neurotransmitter imbalance, and oxidative stress—all of which are crucial to the onset and progression of Alzheimer's disease. By addressing imbalances at the underlying level, the combination also embodies the Ayurvedic concept of Samprapti Vighatana, which aims to break the aetiology of illness. Brahmi Ghrita's polyherbal formulation offers a comprehensive, multi-targeted strategy that is both preventative and curative, in contrast to current medications that usually work on single molecular targets. However, to determine its effectiveness and dose recommendations in AD patients, further clinical validation via standardised studies is required.

Table 3: Potential Mechanisms of Brahmi Ghrita in AD Management

Mechanism of Action	Effect on Alzheimer's Pathology
Antioxidant activity	Reduces oxidative stress, prevents neuronal cell death
Anti-inflammatory action	Suppresses neuroinflammation by downregulating inflammatory cytokines
Cholinergic modulation	Inhibits acetylcholinesterase, increases acetylcholine levels, improves cognition
Amyloid plaque inhibition	Inhibits beta-amyloid aggregation, reduces amyloid burden in the hippocampus
Neurogenesis and synaptic support	Enhances dendritic growth, promotes synaptic repair and connectivity
Blood-brain barrier penetration	Lipid-soluble ghee enhances delivery of actives across BBB for direct neuronal action



The complex pathophysiology of Alzheimer's disease (AD), which includes inflammation, oxidative stress, cholinergic deficiencies, amyloid plaque formation, and reduced neurogenesis, calls for a treatment strategy that may target many cellular and biochemical pathways at once. According to Table 3, Brahmi Ghrita has a wide range of neuroprotective properties due to its many modes of action. Bacosides from *Bacopa monnieri* and flavonoids from *Centella asiatica* are the main sources of Brahmi Ghrita's antioxidant action, which is essential for scavenging free radicals and lowering oxidative stress, which is a primary cause of brain damage in AD. It helps maintain neuronal integrity and decreases cognitive decline by protecting mitochondrial activity and avoiding lipid peroxidation. Given that prolonged neuroinflammation is known to worsen the course of AD, its anti-inflammatory effect is similarly important. By modifying pro-inflammatory cytokines like IL-6, TNF- α , and NF- κ B pathways, the bioactive components in Brahmi Ghrita lessen neuroinflammatory cascades and shield brain tissues from more deterioration.[14] Cholinergic modulation is another significant method. Reduced levels of acetylcholine, a neurotransmitter essential for memory and learning, are closely linked to AD. Acetylcholinesterase inhibitory effects are shown by Brahmi and Vacha, two components of Brahmi Ghrita, which prolong acetylcholine activity and improve synaptic transmission, eventually increasing cognitive functioning. The components of Brahmi Ghrita have the ability to change illness by preventing the production of amyloid plaque. *Bacopa monnieri* has been shown in animal experiments to decrease amyloid beta aggregation and deposition, especially in the hippocampus, which is significantly impacted in AD. This might enhance memory retention and postpone advancement. Additionally, *Shankhapushpi* and *Mandukaparni*'s encouragement of neurogenesis and synaptic repair aids in the structural and functional regeneration of neurones. The brain is more resilient and flexible when dendritic branching and synaptic connections are improved. Last but not least, compared to many water-soluble medications, the lipid-rich basis of cow's ghee (Goghrita) makes it easier for these active ingredients to pass across the blood-brain barrier (BBB) and increase bioavailability directly inside neural tissues. All of these mechanisms work together to highlight Brahmi Ghrita's comprehensive potential

in treating the intricate neurodegenerative processes associated with Alzheimer's disease. Its capacity to operate on many targets at once presents a viable alternative to the monotherapeutic drug regimens now in use.

5.0. Conclusion:

The increasing prevalence of Alzheimer's disease (AD) worldwide and the ineffectiveness of the available allopathic therapies make the search for safe, multi-targeted, and holistic alternatives imperative. With its synergistic mix of Medhya Rasayana herbs including *Bacopa monnieri*, *Vacha*, *Shankhapushpi*, and *Mandukaparni*, *Brahmi Ghrita*, a traditional Ayurvedic preparation, shows promise as a neurotherapeutic agent. It is administered via the powerful carrier medium of *Goghrita* (cow's ghee). According to this comprehensive research, *Brahmi Ghrita* has important neuroprotective qualities that are pertinent to the complex pathophysiology of AD, including antioxidant, anti-inflammatory, cholinergic modulation, and anti-amyloid actions. It addresses the symptoms and possible underlying causes of neurodegeneration by improving memory and cognitive function as well as supporting synapse repair and regeneration. Although its effectiveness is supported by ancient Ayurvedic scriptures and early scientific research, its incorporation into mainstream Alzheimer's care is limited by the absence of standardised formulations and reliable clinical trials. In order to verify *Brahmi Ghrita* via carefully planned clinical research, pharmacokinetic profiling, and quality assurance procedures, multidisciplinary cooperation is thus very necessary. To sum up, *Brahmi Ghrita* has a lot of promise as an adjunctive treatment approach for Alzheimer's disease in its early phases. When combined with contemporary evidence-based practices, its well-established effectiveness in Ayurveda may open the door to sustain and successful integrated neurodegeneration therapy.

6.0. Acknowledgement:

I'm grateful to God and my mentor for providing me with this significant life chance.

7.0. Reference:

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