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Review Article

Rational of Medicinal Ghrita on Treatment of CNS Disorders

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ABSTRACT

Ghrita is a clarified butter mostly used in formulations mentioned in different ayurvedic texts for its effectiveness in treatment of different dosha. It acts as excellent base in which different herbs can be incorporated for treatment of various CNS disorders. Potential protective nature of cow ghee proves to be safe for use indifferent CNS disorders including Memory loss and intellectual property. CNS protective and nootrophic action has made ghrita formulation a better choice as compared to other conventional drugs due to established Blood brain barrier penetrability, increase in the absorption and transportation of essential phytoconstituent to the target site. Due to lipid nature of cell membrane. Ghrita formulations facilitates passive diffusion of lipid soluble drugs, non-ionized nature of fat soluble drugs that helps in attaining highest concentration of drug inside cell. Psychiatric illness treatment with traditional ghrita formulation has been effective in revitalizing degenerative neuronal disorders. Herbal drugs which have enhanced lipid solubility can be administered scientifically regardless of its bimolecular characteristics in favor of its clinical importance. Clinical conditions of most nervous system disorders have been effectively managed by traditional herbs cited in ayurvedic literatures by this preparation. In this review an attempt has been done to rationalize the use of various medicated ghrita which can minimize the adverse effect and help in treatment outcome of different CNS ailments like epilepsy, mood disorders and degenerative disorders.

Keywords: Ghrita, Central Nervous System (CNS) disorders, Nootrophic, Blood brain barriers

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INTRODUCTION

Ayurveda consider gau ghrita (cow's ghee) as an inventory choice for both food and medicinal uses. Ghrita contains guna sanskarsaya which gives it the property of other phytochemicals that are added during the paka of sneha without losing its own properties. In Rigaveda there are descriptions of ghrita used as a food source for the digestive power. In the literature of Atharava Veda importance of ghrita and its effectiveness for medicinal use is explained. Due to the ability of the ghee to reach the deeper tissues and deliver the phytochemicals to the target organs, it can be used as excellent base for manufacture of ayurvedic medicines. Due to its better penetrability ghee has the property of transporting herbal substances deep into all seven dhatus. There are many other uses of cow ghee such as anti-aging, anti-oxidant, detoxification, reduce gastric acid secretion, lowering intestinal cholesterol and toxic effects of drugs.

Cow ghee can be used for skin complications, allergies and lung disorders, reduce body toxins and delay toxic effects of drugs. The lipophilic effect of cow ghee facilitates the transport to the body and final release into the cell, since the cell wall contains the Lipid which can allow ghee to enter into cells easily. However, cow ghee is used in its optimal volume and forms the effectiveness of ayurvedic preparations. Ghee based formulations in ayurveda are aimed at treating diseases of nervous system the gastrointestinal system and also in case of mental illness. It also lubricates and moisturizes the membranes and tissues. It protects tissues from damage, helps in the proper outflow of waste and toxins from the body. This review emphasizes use of some ghrita in several CNS disorders.

Ghee and its significance in traditional therapies

Cow ghee is a traditional diary product that contains clarified butter which is composed of

various ingredients that containing complex lipid of glycerides (mainly triglycerides), free fatty acids, phospholipids, sterols, sterol esters, fat soluble vitamins, carbonyls, hydrocarbons, carotenoids, vitamins, magnesium and calcium. In ayurveda, cow ghee is mentioned as medhya, smritivardhaka or memory enhancer. Modern scientific research shows that ghritha significantly improves the cognitive performance and plays a distinct role in learning and memory. Herbal decoction are infused into cow ghee and administered to patients after the condition is diagnosed and consumed as a pious food. Ghee is made from cow and buffalo milk with a significant difference in color. Cow ghee is yellow while buffalo ghee is white, sattik (pure and detoxifying).

Ghee contains approximately 8% less saturated fatty acids which makes it easy to digest. Ghee also contains vitamins A, D, E and K. Ghee also contains 4%-5% linoleic acid, carboxylic acid that promotes proper growth of physical body.

Ghee resists spoilage by microorganisms or chemical processes. The digestibility coefficient or absorption rate is 96% which is highest of all oils and fats. Digestion, absorption and delivery to focus on organ system are critical in obtaining the formulation. The lipophilic nature of ghee facilitates entry of the formulation into the cell and its delivery to mitochondria, microsomes and nuclear membranes. It has been found by the research that the ghee preparation greatly improves the activity and benefits of natural compounds.

Medicinal value of cow ghee

Cow ghee used as an ayurvedic medicine, cow ghee contains many vital nutrients which help in making the body healthy and immune to diseases. The antioxidant properties of ghee help prevent damage of nervous and brain tissues besides retarding the progress of degenerative diseases cow ghee is the richest source of fat soluble vitamins. The cow ghee which has been kept for 10 years termed as "Purana Ghrita (PG)" and has following benefits:

- Promotes digestion by facilitating motility
- Provides nourishment by replenishing nutrients and vitamins
- Improves bone development and bone density by calcium mobilization
- Protects arteries from calcification
- Improves weight management by removing excess fat

- Helps in healing wounds
- Reduces aging process
- Stimulates brain and prevents neurological disorders
- Improves cognitive functions, intelligence, learning skills
- Improves eyesight and prevents irritation

Overall, cow ghee is an integral part of the ayurvedic health science and is considered a premium rasayana, food that helps maintains good health, vitality and longevity. It is ideal for balancing vata (air) and pitta (fire) related doshas (humors). It is satvic (healthy) food, that has a pure influence on the mind, body and soul. Yata type people can enjoy more ghee than pitta (fire) type who in turn can enjoy more ghee than kapha (water) types.

LITERATURE REVIEW

Ghrita in ayurvedic text for treatment of CNS disorders

Brahmi Ghrita (BG): BG is an ayurvedic medicinal preparation that is used to improve memory and treating stress disorders, epilepsy, poor concentration, mental illness and impotence (Manu P, *et al.*, 2017). It also improves intelligence, cognitive functions and learning skills. It is polyherbal formulation of ayurveda representing the group of Snehakalpa contain Brahmi (*Bacopa monneri*), Vacha (*Acorus calamus*), Kushta (*Sassurea lappa*), Shankhapushpi (*Convolvulos pluricalis*), and purana ghrita. The potential of BG is due to the active principle Bacoside A and B. BG causing elevation of cerebral glutaminic acid and transient increase in gamma aminobutyric acid, which improves the learning method. The improvement of memory related functions, attributed to the power to reinforce the efficiency of the transmission of nerve impulse by strengthening memory and cognition. *Bacopa monneri*, well-known nootropic herb and a proven remedy for improving memory. Bacosides are an active nootropic principle present in plant that is responsible for memory enhancement activity. Bacosides have the potential to modulate the activities of Heatshock protein (Hsp70) expression, cytochrome P450 and Superoxide Dismutase (SOD) in rat brain (Chowdhuri DK, *et al.*, 2002). The bacosides from *Bacopa monneri* thus act as an antistress buffers in the brains of rodent. *Bacopa monneri* is one of the component of BG. BG can also act as protective agent, and offer a buffer against the rapid age-related decline in mental Performance (Giramkar SA, *et al.*, 2013).

Ashwagandha Ghrita (AG): It is made from processed juice of aswagandha herbs mixed with ghee and is mainly used as aphrodisiac drug ashwagandha is stated as a medhya rasayan drug that it promotes longevity and is beneficial for cognitive functions. AG contains adaptogenic, antistress activity and memory enhancing property. Increased neuron activity can lead to restlessness and insomnia, but GABA inhibits the activity of nerve cells in the brain and helps to sleep, uplift the mood prevents anxiety. Ashwagandha has more acetylcholine receptor activity and thereby causes the increase of activity resulting in cognitive ability and memory which is attributed to chemical constituents namely; withanine, withananine, somnine, somniferine, somniferinine, pseudowithanine tropane, pseudo-tropine, choline, anaferine, anahydrine and isopelletierine ashwagandha (Mirjalili MH, *et al.*, 2009) is widely claimed to possess hepatoprotective, anxiolytic, antidepressant, nootropic, anti-microbial, anti-inflammatory, anti-oxidant, anti-stress, anticonvulsant, cardio-protective anti-tumor anti-parkinsonism and immune modulatory properties (Devkar ST, *et al.*, 2016; Bhattacharya A, *et al.*, 2000; Girish KS, *et al.*, 2006; Sahni YP and Srivastava DN, 1993 Gupta M and Kaur G, 2016; Kaurav BP, *et al.*, 2012; Kulkarni SK and George B, 1996; Mohanty IR, *et al.*, 2008; Mondal S, *et al.*, 2008; Gu M, *et al.*, 2014; Ziauddin M, *et al.*, 1996). AG is an efficient ghrita formulation beneficial for treatment of weakness, gynecological disorders, general debility and infertility. It provides potent antioxidant protection, activates the system cells like lymphocytes and phagocytes, counteracts the consequences of stress and promotes general well-being (Narinderpal K, *et al.*, 2013).

Triphala Ghrita: TG is an ayurvedic medicine, in herbal ghee form. This medicine has ghee as its base. It's used for preparatory procedure for panchakarma and also as medicine, used mainly for eye diseases. Triphala refers to group of three fruits-haritaki, vibhitaki and amla. TG commonly used externally in an eye fixed procedure called as tarpana. It's employed by adding eye drops. It should be advised 2 drops of ghrita in morning and within the evening. It consists of three ingredients *Terminalia chebula* (haritiki), *Terminalia bellirica* (vibhitaki), *Phyllanthus emblica* (amala). Triphala consists of equal parts of the *Emblica officinalis* Gaerth, *Terminalia chebula* Retzr. and *Terminalia belerica* Linn. Triphala is medicinally been used as laxative in chronic constipation, colon cleansing, digestion problems and poor food assimilation. It is also been utilized in disorder, high vital sign disease, serum cholesterol reduction, poor liver function, intestine inflammation, and colitis. TG also possess anti-inflammatory, alleviates itching, promotes hair growth, antioxidant properties. *Emblica officinalis* is reported to possess anti-inflammatory, cytoprotective (Ram MS, *et al.*, 2003), gastroprotective (Al-Rehaily AJ, *et al.*, 2002) hypolipidaemic activity (Mathur R, *et al.*, 1996).

Terminalia chebula possesses anti-bacterial, anti-cancer, Anti-caries, anti-mutagenic potential (Malekzadeh F, *et al.*, 2001; Saleem A, *et al.*, 2002; Jagtap AG and Karkera SG, 1999; Kaur S, *et al.*, 1998). TG has inhibitory potential on pancreatic glycolytic enzymes, namely alpha-amylase and alpha-glycosidase, which break down larger polysaccharides into glucose molecules that enter the blood stream (Gurjar S, *et al.*, 2012). Studies suggests triphala protected against cold-induced stress and reversed stress-induced behavioral alterations and biochemical changes like increased lipid peroxidation and corticosterone levels (Dhanalakshmi S, *et al.*, 2007) triphala also prevented noise-induced stress (Srikumar R, *et al.*, 2006). In rats, triphala prevented the noise-induced metabolic changes by mediating the antioxidant and cell-mediated immune reaction, and it had been hypothesized that the biological mechanism is said to its antioxidant properties (Rasool M and Sabina EP, 2007).

Panchagavya Ghrita (PG): PG is prepared from cow milk, cow urine, curd, and dung. It is recommended for treatment of apasmara (epilepsy), jvara (fever), and kamala (jaundice) in charaka samhita. It is also known to possess hepato-protective and immunostimulant properties. It is effective in improving the cognition of children's, autism where it causes an irreversible damage for cognitive functions. It also proves its importance in efficacy of the this ghrita in conditions like Obsessive Compulsive Disorder (OCD), which is multidimensional disorder. PG is effective in the management of a psychiatric conditions like schizophrenia, cognitive function in down's syndrome, Obsessive Compulsive Disorder It is also very effective in organic brain dysfunctions like post stroke dementia and irreversible damage for cognitive functions *(Figure 1)*.

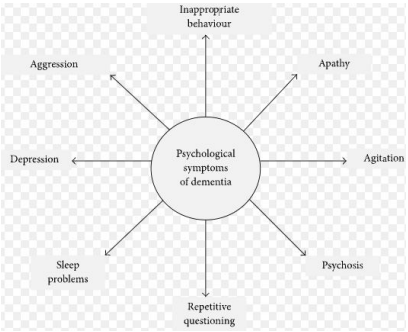

Figure 1: Ayruvedic treatment for dementia

Kushmandadi Ghritha (KG): KG which comprises of kushmanda (*Benincasa hispida*), yashtimadhu (*Glycyrrhiza glabra*). Yashtimadhu is one among the most rasayana drug mentioned by charaka in goghritha.

KG is act as a memory booster by its "prabhava" effect. KG may be a uttam sneha is consider as a best for memory booster. As per its rasa, virya, vipaka kushmnda ghrita is act as a medhya and balya also. In ayurvedic texts, *Benincasa hispida* used for unmada-apasmaar. trishna-daha-jwara, rajyakshma-kshya, madatyaya, raktapitta, amla pitta-parinamshuala, mutraghata-mutrakrichha-ashmari-bastishula, asmarirogadhikara, prameha. It also found to point out its efficacy as anti-convulsant activity, bronchospasm, and nootropic (Kumar A and Ramu P, 2004; Gill NS, *et al.*, 2011; Kumara N, *et al.*, 2004).

Vachadi Ghrita (VG): VG was prepared from 8 herbs Vacha (*Acorus calamus*), Guduchi (*Tinospora cordifolia*), Shati (*Hedychium spicatum*), Haritaki (*Terminalia chebula*), Shankhapushpi (*Convolvulus pluricaulis*), Vidanga (*Embelia ribes*), Shunti (*Zingiber officinale*) and Apamarga (*Achyranthes aspera*) and therefore the mixture of cow ghee consistent with the classical ayurvedic preparative methods old sneha kalpana. It's are proven its efficacy as anti-depressant, antipsychotic, anti-oxidant, anti-stress and nootropic by different researchers. VG as a compound formulation could be having potential to extend cognitive functions of human brain and useful to treat cognitive disorders. Earlier research works also confirmed beneficial effect of (VG) on healthy individual's memory. In sight of that, VG would be utilized in patients of learning disorders and memory impairment. Eight herbal drugs of VG are reported antioxidant (Kannadhasan R and Venkataraman S, 2013) antipsychotic, anti-stress (Debnath J, *et al.*, 2011), antidepressant, memory enhancer and nootropic activities. Ayurveda described that various mental disease such as; depression, parkinson's disease, anxiety, amnesia, migraine, insomnia and alzheimer's disease could also be treated by using various indigenous herbs helps boost memory, improve mental function and restore cognition. Ghritha formulations with herbs recommended for the management of mental disease.

Traditional approaches for CNS disorders

Preliminary evidence suggests that herbal medicines has multiple benefits if the active principles of herbs are extracted with cow ghee. Mental disorders which are extensively described in ayurveda are e.g., nervous disorders [vata vyadhi], epilepsy [apasmara], insanity, psychosis [unmada], loss of consciousness, fainting [murccha, moha, tamaka], impairment in functioning of mind [pramoha], amnesia [vismriti]. Variety of Indian medicinal plants are attributed with brain tonic and memory enhancing effects. Plants like brahmi, sankapushpi, aswagandha are extensively used in different formulation as brain tonics. In ayurvedic formulation to attain the synergistic effect polyherbal formulations are generally preferred over single herbs. In traditional therapies combination of different plant and animal products consider for enhance activity and mitigate side effects of individual components.

CONCLUSION

Ghrita formulations have better bioavailability and medicinal properties for treatment of different illness mostly in neurological disorders. It increases in the absorption and transportation of essential phytoconstituent and access their availability to the brain and other target site. It is requires to establish pharmacodynamic and pharmacokinetic properties which can rationalize the use of this formulation in Modern system of medicine. The extensive use ghritas for management of CNS disorders in traditional therapy with low toxicity and habituation potential makes it a possible alternative for conventional allopathic medications.

REFERENCES

1. Manu P, Shetty SK, Savitha HP. Critical review on effect of brahmi ghrita in psychiatric disorders. Int J Res Ayurveda Pharm. 2017; 8: 16-18.
2. Chowdhuri DK, Parmar D, Kakkar P, Shukla R, Seth PK, Srimal RC. Antistress effects of bacosides of *Bacopa monnieri*: Modulation of Hsp70 expression, superoxide dismutase and cytochrome P450 activity in rat brain. Phytother Res. 2002; 16(7): 639-645.
3. Giramkar SA, Kulkarni OP, Jagtap SD, Kuvalekar AA, Mukherjee S, Jagtap RR, *et al.* Anticonvulsant potential of commonly practiced formulations of Brahmi (*Bacopa monnieri* Linn.) in wistar rats. J Pharm Res. 2013; 7(9): 787-791.
4. Mirjalili MH, Moyano E, Bonfill M, Cusido RM, Palazón J. Steroidal lactones from *Withania somnifera*, an ancient plant for novel medicine. Molecules. 2009; 14(7): 2373-2393.
5. Devkar ST, Kandhare AD, Zanwar AA, Jagtap SD, Katyare SS, Bodhankar SL, *et al.* Hepatoprotective effect of withanolide-rich fraction in acetaminophen-intoxicated rat: Decisive role of TNF-α, IL-1β, COX-II and iNOS. Pharm Biol. 2016; 54(11): 2394-2403.
6. Bhattacharya A, Ghosal S, Bhattacharya SK. Antioxidant activity of tannoid principles of *Emblica officinalis* (amla) in chronic stress induced changes in rat brain. Indian J Exp Biol. 2000; 38: 877-880.
7. Girish KS, Machiah KD, Ushanandini S, Harish Kumar K, Nagaraju S, Govindappa M, *et al.* Antimicrobial properties of a non-toxic glycoprotein from *Withania somnifera* (Ashwagandha). J Basic Microbiol. 2006; 46(5): 365-374.
8. Sahni YP, Srivastava DN. Anti-inflammatory activity of *Withania somnifera*: Possible mode of action. J Appl Anim Res. 1993; 3(2): 129-136.
9. Gupta M, Kaur G. Aqueous extract from the *Withania somnifera* leaves as a potential anti-neuroinflammatory agent: A mechanistic study. J Neuroinflammation. 2016; 13(1): 1-7.
10. Kaurav BP, Wanjari MM, Chandekar A, Chauhan NS, Upmanyu N. Influence of *Withania somnifera* on obsessive compulsive disorder in mice. Asian Pac J Trop Med. 2012; 5(5): 380-384.
11. Kulkarni SK, George B. Anticonvulsant action of *Withania Somnifera* (Aswaganda) root extract against pentylenetetrazol-induced kindling in mice. Phytother Res. 1996; 10(5): 447-449.
12. Mohanty IR, Arya DS, Gupta SK. *Withania somnifera* provides cardioprotection and attenuates ischemia-reperfusion induced apoptosis. Clin Nutr. 2008; 27(4): 635-642.
13. Mondal S, Roy S, Maity R, Mallick A, Sangwan R, Misra-Bhattacharya S, *et al.* Withanolide D, carrying the baton of Indian rasayana herb as a lead candidate of antileukemic agent in modern medicine. Adv Exp Med Biology. 2012; 295-312.
14. Gu M, Yu Y, Gunaherath GK, Gunatilaka AL, Li D, Sun D. Structure-Activity Relationship (SAR) of withanolides to inhibit Hsp90 for its activity in pancreatic cancer cells. Investig New Drugs. 2014; 32(1): 68-74.
15. Ziauddin M, Phansalkar N, Patki P, Diwanay S, Patwardhan B. Studies on the immunomodulatory effects of ashwagandha. J Ethnopharmacol. 1996; 50(2): 69-76.
16. Narinderpal K, Junaid N, Raman B. A review on pharmacological profile of *Withania somnifera* (Ashwagandha). Res Rev: J Bot Sci. 2013; 2(4): 6-14.
17. Ram MS, Neetu D, Deepti P, Vandana M, Ilavazhagan G, Kumar D, *et al.* Cytoprotective activity of Amla (*Emblica officinalis*) against chromium (VI) induced oxidative injury in murine macrophages. Phytother Res. 2003; 17(4): 430-433.

18. Al-Rehaily AJ, Al-Howiriny TS, Al-Sohaibani MO, Rafatullah S. Gastroprotective effects of 'Amla' *Emblica officinalis* on *in vivo* test models in rats. Phytomed. 2002; 9(6): 515-522.
19. Mathur R, Sharma A, Dixit VP, Varma M. Hypolipidaemic effect of fruit juice of *Emblica officinalis* in cholesterol-fed rabbits. J Ethnopharmacol. 1996; 50(2): 61-68.
20. Malekzadeh F, Ehsanifar H, Shahamat M, Levin M, Colwell RR. Antibacterial activity of black myrobalan (*Terminalia chebula* retz.) against *Helicobacter pylori*. Int J Antimicrob Agent. 2001; 18(1): 85-88.
21. Saleem A, Husheem M, Härkönen P, Pihlaja K. Inhibition of cancer cell growth by crude extract and the phenolics of *Terminalia chebula* retz. fruit. J Ethnopharmacology. 2002; 81(3): 327-336.
22. Jagtap AG, Karkera SG. Potential of the aqueous extract of *Terminalia chebula* as an anticaries agent. J Ethnopharmacology. 1999; 68(3): 299-306.
23. Kaur S, Grover IS, Singh M, Kaur S. Antimutagenicity of hydrolyzable tannins from *Terminalia chebula* in *Salmonella typhimurium*. Mutat Res Genet Toxicol Environ Mutagen. 1998; 419(3): 169-179.
24. Gurjar S, Pal A, Kapur S. Triphala and its constituents ameliorate visceral adiposity from a high-fat diet in mice with diet-induced obesity. Altern Therapy of Health Med. 2012; 18(6).
25. Dhanalakshmi S, Devi RS, Srikumar R, Manikandan S, Thangaraj R. Protective effect of triphala on cold stress-induced behavioral and biochemical abnormalities in rats. Yakugaku Zasshi. 2007; 127(11): 1863-1867.
26. Srikumar R, Parthasarathy NJ, Manikandan S, Narayanan GS, Sheeladevi R. Effect of triphala on oxidative stress and on cell-mediated immune response against noise stress in rats. Mol Cell Biochem. 2006; 283(1): 67-74.
27. Rasool M, Sabina EP. Anti-inflammatory effect of the Indian ayurvedic herbal formulation triphala on adjuvant-induced arthritis in mice. Phytother Res. 2007; 21(9): 889-894.
28. Kumar A, Ramu P. Anti-convulsant activity of *Benincasa hispida* fruit, methanol extract. J Nat Remedies. 2004; 4(2): 195-198.
29. Gill NS, Dhiman K, Sharma P, Bajwa J, Sood S, Sharma PD, *et al.* Evaluation of free radical scavenging and antiulcer potential of methanolic extract of *Benincasa hispida* seeds. Res J Med Plant. 2011; 5(5): 596-604.
30. Kumara N, Kumar A, Nirmala V. Methanol extract of *Benincasa hispida* fruit. Ind Pharmacol Society. 2004; 14(3): 55-59.
31. Kannadhasan R, Venkataraman S. *In vitro* capacity and *in vivo* antioxidant potency of sedimental extract of *Tinospora cordifolia* in streptozotocin induced type 2 diabetes. Avicenna J Phytomed. 2013; 3(1): 7.
32. Debnath J, Prakash T, Karki R, Kotresha D, Sharma P. An experimental evaluation of anti-stress effects of *Terminalia chebula*. J Physiol Biomed Sci. 2011; 24(2): 13-19.