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REVIEW ARTICLE

THERAPEUTIC POTENTIAL OF *VACHADI GHRITA* (A MEDICATED GHEE) ON CNS AND OTHER AILMENTS - A REVIEW

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ABSTRACT:

Vachadi Ghrita (VG) is a medicated ghee (a clarified butter) ayurvedic formulation, recommended to improve cognition. VG has these ingredients as follows-*Goghrita* (Cow ghee), *Vacha* (*Acorus calamus*), *Guduchi* (*Tinospora cordifolia*), *Shankhapushpi* (*Convolvulus pluricaulis*), *Haritaki* (*Terminalia chebula*), *Shati* (*Hedychium spicatum*), *Vidang* (*Embelia ribes*), *Shunthi* (*Zingiber officinale*) *and Apamarg (Achyranthes aspera).* The use of *Vachadi Ghrita* and its ingredients has been well defined in ancient Ayurvedic texts like *Charak samhita, Ashtang hridaya, Bharat Bhaishajya Ratnakar* and *Bhav prakash bighantu* etc. The ingredients of VG have been assessed for various activities. *Vacha* showed Antidepressant potential, *Guduchi* showed anti oxidant activity. *Haritaki* and *Shankhapushpi* have been experimentally assessed for Anti-stress, anti-anxiety, and memory enhancer activities. *Vidanga* showed Anti depressant activity and *Shunthi* showed nootropic-neuroprotective activity. Antiepileptic, anti oxidant, anti-depressant actions of *Apamarga* has been confirmed in experimental studies. Anti oxidant and nootropic activity of *Shati* has been proved. Ingredients of VG maximally have action on CNS as Nootroipc, Antidepressant, Anticonvulsant, Antiepileptic, Antipsychotic and antioxidant etc. This study is to gather the scientific research findings supporting the use of *Vachadi Ghrita* and its ingredients.

KEY WORDS: *Vachadi Ghrita*, Medicated ghee, *Goghrita*, Nootropic, Antidepressant, Antioxident.

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INTRODUCTION:

Well-planned, representative epidemiological surveys published report estimate that 24·3 million people have dementia today, with 4·6 million new cases of dementia every year. Most of the people with dementia live in developing countries and it is estimated that 60% in 2001 rising to 71% by 2040. [1] Mild cognitive impairment [MCI] is seen without dementia and crude prevalence of MCI ranged from 0.8% to 4.3% in India. [2] WHO reported that worldwide 121 million people and 18 million people are suffering from Depression [3] and Alzheimer disease respectively. It is estimated that the number may increase three folds by 2050. Hence diagnosis and treatment of these conditions is a big challenge in front of medical fraternity. Modern system of medicine provides medicaments to treat cognitive deficits still limitations are seen in these treatment modalities, thus it is worthwhile to search for different medicines which helps to maintain memory loss of patients with neuropsychiatric disorders or improve memory functions.

Alternative medicine provides broad-spectrum therapeutic effects of herbal based medicines which would be useful in management of cognitive deficits. Universality of herbal remedies of Indian traditional medicine makes an avenue. Medicated ghee, one of the potent poly herbal dosage forms has been prescribed to treat different CNS disorders. These lipid base formulations might have potential to cross blood brain barrier and show beneficial effects on brain tissue.

Vachadi Ghrita (VG) is one of the medicated ghee formulations claimed in Ayurved to improve cognition (intellect and memory) [4]. Eight herbal drugs of VG have been reported for their Antipsychotic, Anti-stress, Antidepressant, and Nootropic activities. [5, 6, 7, 8, 9, 10] It is assumed that synergism of these herbal drugs in preparation of VG and extraction of lipid soluble extractives of these drugs in *Goghrita* (Cow Ghee) may show cumulative positive effect on cognition and helps to prevent neuropsychiatric disorders. Vehicle used in preparation of VG is *Goghrita* which makes the preparation highly lipid soluble, then easily crosses blood brain barrier. Thus helps to carry active components to specific target site (CNS). *Ayurveda* has considered ghee to be the healthiest source of edible fat possesses beneficial properties and facilitate the positive effect of herbal drugs added to it in preparation of medicated ghee. [11] It is well documented that *Goghrita* promotes longevity and protects normal functioning of body entities as well intellect and memory[12].

Methods of Data Collection:

The following are the process and eligibility criteria for the inclusion of data pertaining to this review: Information extracted from various *Ayurvedic* treatises, text books of *Ayurvedic* and modern pharmaceutics, available dissertations/thesis and various research articles were also investigated. A search was undertaken in Google scholar, MEDSCAPE, BMC, Science Direct, MEDLINE database, SCOPEMED, and other relevant databases, using keywords like *vacha*, *acorus calamus*, *ayurveda* etc.

Critical Review of *Vachadi Ghrita*:

Ayurvedic pharmacology explains actions of each ingredient of VG according to their properties. These drugs possess *Ushna* (hot), *Teekshna* (penetrating) properties and *Vata-Kaphashamak* activities. [13, 14, 15, 16, 17, 18, 19, 20]

As per *ayurvedic* theory it is said that the cumulative effect of these ingredients is seen in final product i.e. *Vachadi Ghrita*. Hence probably VG is useful in the treatment of memory impairment occurred due to *Kapha-Vata* dominance and can be used to improve intellect and memory.

Ghee is included in *Chatushsneha* which is "*Sarvasnehottama"* (excellent amongst three other sources). Ghee has specific property i.e. "*Samskarasya-anuvartanat"* [21] means enhances its properties along with the properties of other drugs mixed with ghee without losing its own natural properties. Cow ghee has its own importance amongst the ghee of other animal ghee drugs. [22]

Review of the ingredients of *Vachadi ghrita:*

Table 1: ingredients of *Vachadi ghrita*

S.NO	Ingredient	Latin Name	Useful Part
1.	*Vacha*	*Acorus calamus*	Rhizome
2.	*Guduchi*	*Tinospora cordifolia*	Stem
3.	*Haritaki*	*Terminalia chebula*	Fruit
4.	*Shankhapushpi*	*Convolvulus pluricaulis*	Whole plant
5.	*Vidang*	*Embelia ribes*	Fruit
6.	*Shunthi*	*Zingiber officinale*	Dried rhizome
7.	*Shati*	*Hedychium spicatum*	Rhizome
8.	*Apamarg*	*Achyranthes aspera*	Whole plant
9.	*Goghrita*	*Butyrum Deparatum*	-

Table 2: Properties of ingredients of *Vachadi ghrita*

S.NO	Ingredient	Rasa	Vipak	Veerya	Doshaghnata
1.	*Vacha*	*Katu Tikta*	*Katu*	*Ushna*	*KV Shamak*
2.	*Guduchi*	*Tikta Katu Kashay*	*Madhur*	*Ushna*	*Tridosh Shamak*
3.	*Haritaki*	*Panchrasa (except Lavan)*	*Madhur*	*Ushna*	*Tridosh Shamak*
4.	*Shankhapushpi*	*Tikta Katu Kashay*	*Madhur*	*Ushna*	*KV Shamak*
5.	*Vidang*	*Katu Tikta*	*Katu*	*Ushna*	*KV Shamak*
6.	*Shunthi*	*Katu*	*Madhur*	*Ushna*	*KV Shamak*
7.	*Shati*	*Tikta Katu Kashay*	*Katu*	*Ushna*	*Tridosh Shamak*
8.	*Apamarg*	*Tikta Katu*	*Katu*	*Ushna*	*KV Shamak*
9.	*Goghrita*	*Madhur*	*Madhur*	*Sheet*	*Tridosh Shamak*

Table showed each drug properties and actions, therefore it can be inferred that *Vachadi ghrita* has *Tikta*-K*atu rasa, Ushna veerya* and *Katu Vipaka.* It mainly has *kaphaghna* and *vatanulomak* actions*.* Thus it can be said that *t*his formulation may show effect in *vata* and *kapha* dominant diseases. Similarly literatures search from various other sources made concept clear that that all ingredients of VG have different activities towards CNS as follows.

Table 3: Activity profile of VG ingredients

Ingredients	Activity
Apamarg	Antioxidant, antidepressant, immunomodulation, anti-inflammatory
Guduchi	Antioxidant, antipsychotic, immunomodulatory
Haritaki	Antitress, antioxidant, memory enhancer
Shankhapushpi	Nootropic, anticonvulsant, antioxidant

Shati	Nootropic, immunomodulatory
Shunthi	Antidepressant, antipyretic, anti-inflammatory, analgesic, hypoglycaemic, memory enhancer, Nootropic activity
Vacha	Antidepressant, antistress, memory enhancer, antioxidant, antibacterial
Vidang	Antidepressant, hepatoprotective

Eight ingredients of VG maximally have action on CNS as nootroipc, memory enhancer, antidepressant and antioxidant. Thus it is interpreted that as a cumulative effect VG prepared with all these ingredients may have all these activities.

This review article is aimed to gather all the scientific research findings supporting the use of *Vachadi Ghrita* and its ingredients in prevention, treatment and cure of CNS disorders and other various ailments in human beings. Ingredients of *Vachadi Ghrita* viz. *Goghrita* (Cow ghee), *Vacha* (*Acorus calamus*), *Guduchi* (*Tinospora cordifolia*), *Shankhapushpi* (*Convolvulus pluricaulis*), *Haritaki* (*Terminalia chebula*), *Shati* (*Hedychium spicatum*), *Vidang* (*Embelia ribes*), *Shunthi* (*Zingiber officinale*) *and Apamarg (Achyranthes aspera)* possess various pharmacological activities like Nootropic, Antipshychotic, Antistress, Antioxidant, Antidepressant, Anticonvulsant, Anticancer, Cardioprotective and Hepatoprotective etc. The aim is to support the pharmacological potential of *Vachadi Ghrita* and it ingredients with scientific results.

Nootropic Activity:

Nootropic activity of *Vachadi Ghrita* (VG) was studied using Diazepam induced amnesia in mice using Elevated plus Maze (EPM) test and Morris Water Maze (MWM) test in rat model. Piracetam was used as standard drug. *Vachadi Ghrita* successfully reversed the amnesia induced by Diazepam (1mg/kg, i.p.). VG was administered in three dose levels of VG as X/2 (2.5gm/kg), X (5gm/kg) and 2X (10gm/kg) in mice for 8 days and X/2 (1.75gm/kg), X (3.5gm/kg) and 2X (7.0gm/kg) in rats for 21 days. EPM test showed significant effect of 5gm/kg dose of *Vachadi Ghrita*. Also, Piracetam and *Vachadi Ghrita* at 3.5gm/kg have significant memory enhancement action in MWM test in rats suggesting possible use of VG as adjuvant in mental disorder treatments. [23]

Vacha (*Acorus calamus*) has significantly

increased memory in rats and mice. It has dose dependent activity. It may primarily act by potentiating the cholinergic transmission by inhibition of AChE enzyme activity and thereby increased Ach level in brain and improving cognition memory performance. [24]

The study has been reported that the Nootropic activity of three species of *shankhapushpi* (*Evolvulous alsinoides*, *Convolvulous pluricaulis* and *Clitorea ternatea*) on spatial memory using the water maze task. *Evolvulous alsinoides* exhibited to be the best amongst the three reported species. [25]

The two doses (100 and 200 mg/kg/p.o.) of ethanol extract of *Convolvulus pluricaulis* and its ethyl acetate and aqueous fractions on significantly improved learning and memory in rats. [26]

The study indicates that *Hedychium spicatum* posses Nootropic activity due to presence of saponin. [27]

The study has been reported that *Zingiber officinale* extract (100 mg/kg) significantly improved learning and memory in young mice and also reversed the amnesia induced by diazepam (1 mg/kg, i.p.), and scopolamine (0.4 mg/kg, i.p.) due to significantly increased whole brain acetyl cholinesterase inhibition. [28]

Anticonvulsant Activity:

The comparative study confirmed that the anticonvulsant activity of classically processed *vacha* is more than raw *vacha*. [29] *Convolvulus pluricaulis* has been reported anticonvulsant and reduction in plasma phenytoin levels. [30]

Antidepressant Activity:

The study indicates that the oral administration of methanol extract of rhizome of *Acorus calamus* possesses an antidepressant-like activity probably by modulating the central neurochemical as well as HPA (Hypothalamic-pituitary-adrenal) axis in response to stress induced by FST (Forced swimming test). [31] It is concluded that *Embelia ribes* and its major bioactive compound, embelin, have therapeutic potential for managing depression. [32] The study shows that the methanolic extract of *Achyranthes aspera* has potential to reduce the immobility time revealing its significant antidepressant like effects. [33]

Antiepileptic Activity:

Results indicates that aqueous extract of *Acorus calamus* has protective effect against MES (Maximal electrical shock), but not against PTZ (pentylenetetrazole) induced seizures. [34]

Antipsychotic Activity:

The results in SLA showed that the hydro alcoholic extract of the stems of *Tinospora cordifolia* at a dose level of 250 mg/kg showed no significant antipsychotic activity in amphetamine induced hyperactivity in mice when compared to the control. [35]

Anti Stress Activity:

The anti-stress activity of fruits of *Terminalia chebula* extract of may be due to the presence of flavonoids, glycosides, tannins and polyphenols. [36]

Immunomodulatory activity

The study has been reported that the methanol extract of *Hedychium spicatum* possess a potential of significant immunomodulatory activity. [37]

Antioxidant Activity:

Ethanol extract of *Acorus calamus* significantly protects against liver injuries as well as oxidative stress. The reduced levels of antioxidant enzymes in acetaminophen treated rats were significantly increased by treatment with ethanol extract of *Acorus calamus*. [38] The study has been reported that the antioxidant activity of sedimental extract of *Tinospora cordifolia*. [39] The study indicates the antioxidant activity of *Convolvulus pluricaulis* in rat brain mitochondria against oxidative damage induced by gamma radiation and photosensitization. [40] The study shows that the significant antioxidant activity of ethanol extract of *Terminalia chebula* fruit could have scavenged the superoxide and hydroxyl radicals generated after myocardial ischemia and thus protects the myocardium from injury. [41] The study indicate that the antioxidant activity of the crude extract of *Terminalia chebula* was higher than that of ascorbic acid and shows that the percent inhibition of 10 µg/ml of *Terminalia chebula* extract was 71.56%, which is comparable with the standard antioxidant activity of ascorbic acid (57.0%). [42] The methanol and aqueous extracts of *Hedychium spicatum* rhizome shows strong antioxidant activity. [43] The study shows that the aqueous and methanolic extracts of *Achyaranthes aspera* leaves contain a variety of phytochemical compounds, which can effectively prevent free radical mediated cell damage by free radicals scavenging activity and thus can be used as a potent source of natural antioxidant compounds. [44]

Anticancer Activity:

Cow ghee and soya bean oil were tested in the mammary carcinogenesis and expression of cyclooxygenase-2 and peroxisome proliferators activated receptor- γ in rats. In this study, it is concluded that cow ghee protects against mammary carcinogenesis. [45]

Cardioprotective Activity:

In another study it is indicated that if ghee is consumed in level of 10% of the diet it does not increase lipid peroxidation processes. It doesn't create risk of cardiovascular and other free radical-induced diseases. [46]

Hepatoprotective activity

The results shows that extract of *Embelia ribes* possesses Hepatoprotective activity against paracetamol induced acute hepatocellular damage in mice. [47]

CONCLUSION:

This study concludes that *Vachadi Ghrita* possess a tremendous pharmacological and therapeutic potential. The reason behind the use of these ingredients of *Vachadi Ghrita* is justified from the research findings of various experimental studies on both human beings and animals. *Vachadi Ghrita* and its ingredients are proved to possess Nootropic, Anticonvulsant, Antidepressant, Antiepileptic, Antipsychotic, Antistress, Antioxidant, Immunomodulatory, Anticancer, Cardioprotective, Hepatoprotective, and many other therapeutic uses which are still to be explored.

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