



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(3): 3809-3812
Received: 22-03-2019
Accepted: 23-04-2019

Vijendra Pratap Singh
Assistant Professor,
Government Ayurved Collage
Jhansi, Uttar Pradesh, India

A review on pharmacodynamics of *Ashtamangal ghrita* and its uses in mental and physical growth in children

Vijendra Pratap Singh

Abstract

Ashtamangal Ghrita is a polyherbal formulation as it contain eight drugs – Brahmi (*Bacopa monneri*) Vacha (*Acorus calamus*), Pippali (*Piper longum*), Sareva (*Hemidesmus indicus*), Kushtha (*Saussurea lappa*), Siddarthaka (*Brassica campestris*), Saindhava (Rock salt), and Ghrita (Traditionally prepared butter), oil). This formulation has been used as a Medhya, Smritivardhaka and Rakshoghna (Enhance memory & cognitive function as well as it protect from the infection). The components of this formulation work as nootropic, improve nerve impulse transmission, increasing density of cholinergic neurons in hippocampus, acetylcholinesterase inhibitor and memory enhancing, neuroprotective and antioxidant, and by bioavailability enhancer.

Keywords: *Ashtamangal Ghrita*, Medhya, Smritivardhaka, Nootropic, Acetylcholinesterase, mental and physical growth

Introduction

Traditional medicines continue to play important roles in health services around the globe. *Ayurveda*, the traditional medical system of India, describes thousands of herbal preparations. Brain has its maximum growth spurt in the last 3 month of pregnancy and in first two year of life¹. By the age of 2 year there is marked increase in brain growth, synaptic arborization and the size of the adult brain is almost achieved by the age of 2 years. Undernutrition does not start after birth but it is a continuation of intrauterine malnutrition and when prolonged it lead to growth retardation.

Approximately, 150 million children worldwide are malnourished (UNICEF, 2001). This is an alarming number of our population that is at risk of developing learning and behavior problems. The greatest effect of malnutrition on brain development is experienced during the time of rapid brain growth. Insults occurring at this time will have significant negative effects on brain development, cognition, and behavior. Nutrition plays a major role in the development of the nervous system. The severity, timing and duration of malnutrition are important determinants of its possible effect on the neurological development of the child. Proper nutrition with adequate amount of necessary micronutrients, protein and calories given at appropriate time may insure normal brain development.

In classical Ayurvedic texts *Lehan Karma* is done for the child whose mother is diseased, not having good quality of milk, inadequate lactation and child not getting sufficient amount of milk (undernutrition) or inadequate growth and development without having any disease². Health of the child depends on *Lehan*. For *Lehan Karma*, many compounds have been prescribed. *Ashtamangal Ghrita*³ is one of them, which is a polyherbal formulation which is used as *Rakshoghna* (protection from the infection), enhance *Medha* and *Smriti*.

Therefore, this study was planned to review on *Ashtamangala Ghrita* and effect on physical growth and mental development, with the expectation that study will help to make an evidence based and more rational Ayurvedic preventive therapy against sequel of undernutrition and also a cognitive promoter in healthy and undernourished children.

Aims and objective

Present work aimed to review the efficacy and probable mode of action of *Ashtamangal Ghrita* on physical and mental growth in Children.

Materials and Method

This study was done by compiling the classical Ayurvedic literature, Pharmacology (Dravyaguna) and Rasashastra books, research journal.

Correspondence

Vijendra Pratap Singh
Assistant Professor,
Government Ayurved Collage
Jhansi, Uttar Pradesh, India

Ingredients of Ashtamangal Ghrita: *Ashtamangal Ghrita* contains eight drugs –Bramhi (*Bacopa monneri*), Vacha (*Acorus calamus*), Pippali (*Piper longum*), Sariva (*Hemidesmus indicus*), Kushtha (*Saussurea lappa*), Siddarthaka (*Brassica campestris*), *Saindhava* (Rock salt) and *Ghrta* [3].

Preparation of Ashtamangal Ghrita

Stainless steel vessel was selected for the preparation of *Ashtamangala Ghrita*. To prepare the AMG, LPG gas device was used to maintain temperature uniformly during whole process. Before introducing main procedure, *Ghrta* was heated on moderate temperature for eliminating moisture and foul smell. During main process also moderate heat was given for easy extraction of active constituents, to retain volatile matter and for stabilization of heat labile ingredients. Therefore, we had prepared *Ashtamangala Ghrita* on moderate temperature. *Sneha* was heated slightly in a vessel and withdrawn from the fire and *Kalka* was slowly added with continuous stirring to avoid burning of the *Kalka*. After homogenous mixing, vessel was kept over the heating devices and *Sneha Paka* processed. Water was added little by little in above mentioned container which is a mixture of *Ghrta* and *Kalka*. Kept it over the heating device for preparation of *Ashtamangala Ghrita* at moderate temperature till the completion of *Paka*. This sequence facilitates uniform distribution of active principles of *Kalka* in the *Sneha* which ultimately enhance the efficacy of formulation. After completion of *Paka*, *Sneha* was filtered in warm condition in clean and moisture free steel container through four times folded clean cotton cloth. After *Sneha Paka Siddhi Lakshana* self-cooled and filtered, *Sneha* weighed and then filled into clean container and tightly sealed and capped the mouth of container to avoid any types of spoils factors.

Pharmacodynamics, *Doshagnata* and properties of ingredient in *Ashtamangala Ghrita*:

1. Bramhi (*Bacopa monneri*) [4]

Rasa: Tikta, Kashaya, Madhura

Guna: Laghu, Sara

Virya: Sheeta

Vipaka: Madhura

Properties: Vatahara, Kaphahara, Rasayana, Ayushya, Medhya, Matiprada, Swarya, Prajasthapana, Visahara.

2. Vacha (*Acorus calamus*) [4]

Rasa: Katu, Tikta

Guna: Laghu, Tikshna

Virya: Usna

Vipaka: Katu

Properties: Vata Kaphaharsama, Pittavardhak, Mala Mutravisorodhanl, Kanthya, Krmihara, Vamak, Dipani

3. Pippali (*Piper longum*), [4]

Rasa: katu

Virya: Anushna

Vipaka: Madhura

Guna: Laghu, Snigdha, Tikshna

Properties: Deepana, Hridya, Kaphahara, Rucya, Tridosahara, Vatahara, Rasayana, Roca

4. Sariva (*Hemidesmus indicus*) [4]

Rasa: Madhura

Guna: Guru, Snigdha

Virya: shita

Vipaka: Madhura

Karma: Raktashodhaka, Vishaghna, Tridoshanghna, Dipana, Jvarahara,

5. Kushtha (*Saussurea lappa*) [4]

Rasa: Katu, Tikta

Guna: Laghu

Virya: Ushna

Vipaka: Katu

Properties: Kaphavatasamak, Sukrala, Raktasodhaka, Varnya

6. Siddarthaka (*Brassica campestris*) [4],

Rasa: Katu, Tikta

Guna: Snigdha, ushna

Virya: Ushna

Vipaka: Katu

Properties: Depana, Kaphahara, Pittakara, Vatahara, Vidaha, Hridya.

7. Saindhava (Rock salt)

Rasa: lavan, madhura

Virya: shita

Vipaka: madhura

Guna: snigdha, Tikshna, Sukshma

Properties: tridosha shamak, parshva shula, jirnakasa, shwasa

8. Ghee

Rasa: madhura

Virya: shita

Vipaka: madhura

Guna: snigdha

Doshagnata: tridoshsamak

Various researches works on individual ingredients of *Ashtamangala Ghrita*

1. Bramhi (*Bacopa monneri*)

Mechanism of action based on preclinical studies

The BM extracts and isolated bacosides have been extensively investigated for their neuropharmacological effects. The triterpenoid saponins and their bacosides are said to be responsible for BM, ability to enhance nerve impulse transmission. It was suggested that bacosides induce membrane dephosphorylation, with a concomitant increase in protein and RNA turnover in specific brain areas⁵. The other proposal that was put forward was that BM enhances protein kinase activity in the hippocampus which may also contribute to its nootropic action and thus it would aids in repair of damaged neurons by enhancing kinase activity, neuronal synthesis and restoration of synaptic activity and ultimately nerve impulse transmission⁶.

Oral administration of *Bacopa monnieri* extract at doses of 20, 40 and 80 mg/kg significantly decreased escape latency in morris water maze test and the extract at dose of 40 mg/kg significantly increased the density of cholinergic neurons in hippocampus⁷.

A study is reported on the effects of Brahmi (*Bacopa monniera*) on human memory. Seventy-six adults aged between 40 and 65 years took part in a double-blind randomized, placebo control study in which various memory functions were tested and levels of anxiety measured. There were three testing sessions: one prior to the trial, one after three months on the trial, and one six weeks after the completion of the trial. The results show a significant effect of the Brahmi on a test for the retention of new information.

2. Vacha (*Acorus calamus*)

Acetylcholinesterase inhibitory and memory enhancing effect

Methanolic extract has significant inhibition of AchE at 200mcg/ml^[8]. In vitro study of *Acorus calamus* essential oil and its constituents have acetylcholinesterase inhibitory activity^[9-11].

Neuroprotective and antioxidant activity

In one study, exposure of rat to acrylamide caused hind limb paralysis in 58% of the animals on day 10 and decreased behavioral parameters, on treatment by *Acorus calamus* rhizomes extract neurobehavioral changes were prevented.¹² Neuroprotective potential against middle cerebral artery occlusion (MCAO) induced ischemia in rats.¹³ Alcoholic extract exerted protective effect on free radical scavengers and lipid peroxidation^[14].

3. Pippali (*Piper longum*)

As Bioavailability Enhancer

Piperine is a active principle of *Piper longum* L., which enhance the bioavailability of drugs^[15, 16]. In experimental study piperine has been opoproven to enhance the bioavailability of a number of drugs including rifampicin, phenytoin, propranolol and theophylline^[18, 19].

A bioassay guided isolation of the ethanol extract from the fruits of *Piper longum* yielded a known piperidine alkaloid, piperine, as a monoamine oxidase (MAO) inhibitor. Piperine showed an inhibitory effect against MAO-A and MAO-B and antidepressant like activity^[20].

Piperine has many pharmacological actions such as antifungal, antiinflammatory, antioxidant and anticancer effects^[16]. Experimental studies have also shown their immunomodulatory and anticancer activity^[21, 22].

Saindhava (Rock salt): Charaka has mentioned the following actions imparted by lavana in the body. It is diffusive, liquifacient, digestive, inductive of defluxion, depletive and disruptive, acute, avoids accumulations and obstructions, stiffness and curative of Vata. It is also laxative, overpowers the rest of the tastes and increases the secretion of mouth. It liquefies the mucous secretion, clarifies the passage, softens all the limbs of the body, gives relish to food, is always used in food, is neither very heavy (to digest) nor very unctuous and is hot. Almost all Acharyas of Ayurveda have pronounced the same actions and properties when lavana is used in limits.

Ghrita: *Ghrita* alleviates *pitta* and *vata*, is beneficial for *rasa dhatu*, *sukra dhatu*, and *ojas*. It has *sita guna* (cooling), *mrdukaram* (softening), *svara prasadanam* (improves voice) and *varna prasadanam* (improves complexion)^[23, 24]. In summary, ghee in general and cow ghee in particular, is one of the easily digestible and assimilable food which provides essential nutrients and critical anti-oxidants to the human body for its protection and growth.

Discussion

In classical Ayurvedic texts Lehan Karma is done for the child who is not getting sufficient amount of milk (Undernutrition) or inadequate growth and development without having any disease. For Lehan, there are many yoga prescribed, Ashtamangala Ghrita is one of them. This formulation has been used as a Medhya, Smritivardhaka and Rakshoghna (Enhance memory & cognitive function as well as it protect from the infection). In *Bhava Prakasha* it is

mentioned that *Ghrita* (Ghee) is a *rasayana* tasty, good for the eye, stimulant for digestion, supports glow and beauty, enhances memory and stamina, promotes longevity and protects body from various diseases^[25].

Most *Ayurvedic* preparations are made with ghee. Digestion, absorption and delivery to a target organ system is crucial in obtaining maximum benefit from any formulation. This is facilitated by ghee. Since active ingredients are mixed with ghee, they are easily digested and absorbed. Lipophilic action of ghee facilitates transportation to a target organ and final delivery, inside the cell, because cell membrane also contains lipid. This lipophilic nature of ghee facilitates entry of the formulation into the cell and its delivery to the mitochondria, microsome and nuclear membrane.

Conclusion: Ashtamangal ghrita is a classical ayurvedic preparation, the present review indicates that it has Medhya, Smritivardhaka and Rakshoghna properties. Enhance memory, cognitive function and growth as well as it protect from the infection. Further work required through molecular and clinical research.

References

1. Dobbing J. Undernutrition and the developing brain. In 'developmental Neurobiology' (Himwich, W.A., ed.) Springfield I.L., Thomas, 1970.
2. Kasyapa Samhita with 'Vidyotini' Hindi commentary and Hindi translation by Sri Satyapala Bhisagacharya, edition: reprint, Chaukhamba Sanskrit Sansthan, Varanasi (India).sutra Lehadhyay, 2010, P3-4.
3. Yogaratnakara, 'Vaidyaprabha' Hindi commentary by Dr. Indradev Tripathi and Dr. Daya-Shankar Tripathi, Krishnadas Academy, Varanasi, balroga chikitsa. 1998, 448.
4. Dravyaguna Vijnana. by Prof. P.V. Sharma, Vol. III, Chaukhamba Bharati Academy, Varanasi-221001 (India), 2002.
5. Singh HK, Rastogi RP, Srimal RC, Dhawan BN (1988). Effect of bacosides A and B on avoidance responses in rats. *Phytother Res.* 1988; 2:70-5.
6. Singh HK, Dhawan BN. Neuropsychopharmacological effects of the ayurvedic nootropic *Bacopa monniera* Linn. *Ind. J Pharmacol.* 1997; 29:S359-S65.
7. Uabundit N, Wattanathorn J, Mucimapura S, Ingkaninan K. Cognitive enhancement and neuroprotective effects of *Bacopa monnieri* in Alzheimer's disease model. *J Ethnopharmacol.* 2010; 127:26-31.
8. Ch MH, Houghton PJ, Whang WK, Cho JM, Screening of Korean hearbal medicine, used to improve cognition function for acetylcholinesterase activity. *Phytomedicine.* 2004; 11(6):544-548.
9. Pulok K, Mukherjee V, Kumar M, Mal PJ. Houghton: In vitro acetylcholinesterase inhibitory activity of essential oil and its main constituents of *Acorus calamus*. *Planta Medica*, 2007a; 73:283-285.
10. Mukherjee PK, Kumar V, Houghton PJ. Screening of Indian medicinal plants for acetylcholinesterase inhibitory activity. *Phytother. Res.* 2007b; 21:1142-1145.
11. Pulok K. Mukherjee, V. Kumar, M. Mal and P. J. Houghton; Acetyl cholinesterase inhibitors from plants. *Phytomedicine*, 2007c; 14(4):289-300.
12. Shukla PK, Khanna VK, Ali MM, Maurya RR, Handa SS, Srimal RC. Protective effect of *Acorus calamus* against acrylamide induced neurotoxicity. *Phytother. Res.* 2002; 16:256-260.

13. Shukla PK, V.K. Khanna, M.M. Ali, R.R. Maurya, Khan M.Y. and R.C. Srlma; Neuroprotective effect of *A. calamus* against MCA occlusion induced ischaemia in rats. Human exp. Toxicol. 2006; (4):194-97.
14. Manikandan S, Srikumar R, Jaya Parthasarathy N, Sheela Devi R; Protective effect of *A. calamus* on free radical scavengers, lipid peroxidation in discrete regions of brain against noise exposed rat. Boil. Pharm Bull. 2005; 28(12):2327-30.
15. Atal CK, Zutshi, U, Rao PG. Scientific evidence of the role of Ayurvedic herbals on bioavailability of drugs. J Ethnopharm. 1981; 4:229-233.
16. Atal CK, *et al.* Biochemical basis of enhanced drug availability by piperine: Evidence that piperine is a potent inhibitor of drug metabolism. J Pharmacol. Exptal. Therap. 1985; 232:258-262
17. Bano CK. *et al.* The effect of piperine on the bioavailability and pharmacokinetics of propranolol and theophylline in healthy volunteers. European J Clin. Pharm.1991; 41:615-618.
18. Bano G, *et al.* The effect of piperine on the pharmacokinetics of phenytoin in healthy volunteers *planta Medica*. 1987; 53; 568-570.
19. Zutshi U, *et al.* Influence of piperine on rifampicine blood levels in patients with pulmonary tuberculosis. J Assoc. Physicians India. 1984; 33:223 -224.
20. Seon A Lee, Seong Su Hong, Xiang Hua Han, *et al.* Piperine from the fruits of *Piper longum* with inhibitory effect on m Monoamine Oxidase and antidepressant like activity. Chem. Pharm. Bull. 2005; 53(7):832-835.
21. Sunila S, Kuttan G. Immunomodulatory and antitumor activity of *Piper longum* Linn. and piperine. J Ethnopharm. 2004; 90:339-346.
22. Selvendiran K, Singh JP, *et al.* Cytoprotective effect of piperine against benzo (a) pyrene induced lung cancer with reference to lipid peroxidation and antioxidant system in swiss albino mice. *Fitoterapia*. 2003; 74:109-115 .
23. Charaka Samhita. 'Vidyotini' Hindi commentary by Pandit Kashinatha Shastri and Dr. Gorakha Natha Chaturvedi, Part-II, Chaukhambha Bharati Academy, Varanasi-221001 (India), 1998.
24. Susruta Samhita, Hindi commentary by Ambikadutta Shastri, Part-II, Chaukhambha Sanskrit Sansthan, Varanasi, 1998.
25. Bhavaprakasa 'Vidyotini' Hindi commentary by Sri Brahma Sankara Misra, Part-II, Chaukhambha Sanskrit Sansthan, Varanasi (India), 2000.