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Review Article

Lehana in Pediatric Healthcare: An Ayurvedic Perspective with Recent Research Updates

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ABSTRACT:

Introduction:

Lehana is the unique and sole contribution of Ayurveda in the field of child health care. care.It has been mentioned that the health and wellness of a child depend on *Lehana*. A review of indications of *lehana* refers to it as a supplementary feed for proper growth and development of a child, and it also provides resistance to various diseases.

Modern medical science has achieved much success in the improvement of childhood undernutrition, and vaccination has led to protection from most of the dreaded childhood infections and ultimately improved the area of child health care. Recurrent illness and poor growth and development are the two most important health issues related to children. But despite much advancement in the medical field, these two areas pose the greatest challenge to child health care to date. Use of or practice of *Lehana* in children may help in combating both of these challenges. Kashyapa, the renowned scholar of Kaumarabhritya (child health care), has beautifully documented the efficacy and use of *lehana* in pediatric practice, but due to lack of evidence, the knowledge remained unused. Kashyapa states that the child after birth should be given *lehana* regularly for his/her optimum growth and development as well as protection from disease.

Materials and methods: Classical texts of Ayurveda along with various articles and research papers published in journals are reviewed for the present review.

Result and discussion: Present paper reveals that practice of lehana in children is very important and is the need of the present era for disease free and optimum and growth and development in children.

Keywords: - *Lehana*, Kaumarabhritya, Ayurveda, Kashyapa

INTRODUCTION

The early childhood years are a period of great vulnerability. Responsive care, balanced nutrition, and safe environment are essential for children to grow, and develop to their full potential. More than half of under-five child deaths are due to diseases that are preventable and treatable through simple and affordable interventions.In recent years, India has made impressive achievements in child survival. The development of vaccines has revolutionized preventive child healthcare and significantly reduced childhood infections. Furthermore, improved access to health care and national health programmes along with nutritional programmes by the Government of India has added to the improved health of children.

However, several health challenges persist, particularly conditions such as recurrent respiratory tract infections, gastrointestinal infections, and dermatological disorders, for which comprehensive preventive strategies remain limited. Frequent illness lead to poor growth and development in children. A child with recurrent illness is not able to grow to his full potential. Frequent uses of antibiotics also lead to development of resistance and again compromise their growth. Conventional medicines have various limitations along with adverse effects. Emerging infectious agents such as Zika virus, Rotavirus, and Influenza strains continue to pose challenges to child health. This raises an important question regarding the extent of vaccine coverage required, as new infectious challenges continue to emerge. While vaccines remain indispensable in disease prevention, they are inherently disease-specific and do not address the broader aspect of enhancing overall immunity. Therefore, there is a growing need to explore complementary approaches that strengthen non-specific immunity and promote holistic child development

Ayurveda, the traditional system of medicine of India, offers a comprehensive framework for pediatric care, encompassing preventive, promotive, and curative aspects. Among its various concepts, *Lehana* holds a unique position as a preventive strategy aimed at improving immunity, growth, and cognitive development from early infancy.

AIMS AND OBJECTIVES

To systematically review and document the role of Lehana formulations in promoting growth, enhancing immunity, and supporting overall development in children based on classical Ayurvedic texts and contemporary research

MATERIALS AND METHODS:

Data for this review were collected from classical Ayurvedic texts such as *Kashyapa Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*, along with modern research articles retrieved from electronic databases including PubMed, Google Scholar, and Scopus. Relevant keywords such as '*Lehana'*, '*Swarnaprashana'*, 'Ayurveda pediatric care', and 'immunomodulation' were used to identify suitable literature.

LEHANA IN AYURVEDA

Lehana refers to palatable semisolid formulations administered to infants, often in conjunction with breast milk, with the aim of enhancing palatability, concentration, potency and nutritional value. Ayurveda describes that a child should be given *lehana* from early infancy as a daily regimen to support physical growth, cognitive development, and disease resistance.

Lehana is more than a supplement as it leads to optimum growth and development (both physical and mental) along with enhancement of intellect (*Medha*), strength (*Bala*), complexion (*Varna*), and longevity (*Ayushya*). According to one of the Ayurvedic scholars, Kashyapa, a child's health and disease rely on *Lehana*. This statement emphasizes the importance of *lehana* in child care. The *Kashyapa Samhita*, the primary classic on child health care, has the only detailed description of *Lehana*. Several formulas that are recommended for regular usage in newborns are discussed in other classics. **(Table 1.1).**

Further various single drugs like Brahmi (*Bacopa monnieri*), Mandookaparni (*Centella asiatica*), Vacha (*Acorus calamus*), Chitraka (*Plumbago zeylanica*), Triphala (combination of *Terminalia chebula, Terminalia bellerica* and *Emblica officinalis*), Shatavari (*Asparagus racemosus*), Nagbala (*Grewia hirsuta*), Nishotha (*Operculina turpethum*) are also documented to administer with honey and ghrita. In Arogya raksha kalpadruma, month wise formulations are described and indicated for a child up to 1 year of age for ensuring proper growth and development.

A. Swarna Prashana

Swarna Prashana when administered for long time continuously believed to impart the benefits like the long life span , *Mangalakara , Punya kara, Vrishya ,Balya* , increase the complexion ,get rid of the *Graha Rogas*. Mainly it boost up Intelligence & mental faculties of the child and make the child *Parama Medhavi* (Extra brilliant) when taken for one month

continuously and *shrutha dhara* (Able to retain the subject once told) when taken for 6 months. It also increases the digestive power , strength &tolerance of the child[5] . It makes the child free from the diseases by increasing the immune status. Non-specific immunity in the body is enhanced an average resistance is offered to all infection & reduces the severity of the diseases or disease itself . This proves the multi-dimensional approach of *Swarna Prashana*.

Immune Response-

- Research shows that in mice treated with Swarnabhasma, both specific and nonspecific safe reactions were positively altered. In order to fight infection, Swarnabhasma showed a trigger effect on peritoneal macrophages. It was expected that the introduction of the metal to the cell in a fine emulsified state may stimulate macrophages. [6].
- A study documents the increment in the serum IgG level in the gold compound gathering indicates immunological reactions of the rats against antigenic material.[7]
- In an experimental study Bajaj et al (2001) assessed the potency of swarna bhasma on non-specific immunity in rat. Male rat were managed with the gradual dose of swarna bhasma for 10 days. It was seen that swarna bhasma essentially increased count of peritoneal macrophages and stimulated phagocytic index of macrophages. This shows the immunostimulant action of traditional ayurvedic formulation swarna bhasma on macrophages function.[8]

Antioxidant Activity-

- The antioxidant and restorative effects of Swarnabhasma in rat have been indicated. Two antioxidant enzymes superoxide dismutase (SOD) and catalase were estimated after oxidative insult with acetic acid in Swarnabhasma[9].
- Another examination archive that high aspect ratio Au nanorods can act as successful antioxidant and antibacterial agent.[10]

Effect on brain function-

- Gold diminishes the impact of depression as well as enhances the ability to focus[11]. Gold can have balancing and harmonizing impact on the body especially with regards to unstable mental and emotional state. It is suppose that the nanometer sized particles in colloidal gold affect the electrical charges that are produced in neurons. It enhances the normal synaptic communication that takes place between the nerve cell[12].

B. Vacha (Acorus calamus)

Bactericidal Activity

- A study revealed that tetraploid variety of A. calamus is growing in this region with substantial amount of β-asarone. The oil showed bactericidal property against tested bacteria and fungi. The β-asarone exhibited poorer bactericidal activity against test microorganisms[13].
- Study suggests that *Vacha* has antimicrobial property against phytopathogenic fungi[14].
- The leaf and rhizome part of *Acorus Calamus* is found to possess the antibacterial activity. The methanolic extract of *Acorus Calamus* showed the inhibitory action against the bacterial strains of *Salmonella typhi, Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus*[15].

Effect on GIT

- The anti spasmodic and antidiarrhoeal activity of *Acorus calamus* was studied. In the study, jejunum was isolated from the rabbit and further effect of crude extract was evaluated. It was found that plant extract causes the spontaneous inhibition of high K(+)induced contractions which resulted in spasmolytic activity which is mediated through the calcium channel blockade[16].

Immunomodulatory activity

- The effect of test drugs on anti-body formation against sheep red blood cells (SRBC) was studied as described by Puri *et al*[17].
- Anticellular and immunosuppressive potential of ethanolic extract of *Acorus calamus* was evaluated. The ethanolic extract of *Acorus calamus* rhizome showed anti proliferative and immunosuppressive properties. This extract causes the tumor necrosis which inhibits the proliferation of mitogen, antigen stimulated peripheral blood mononuclear cells in humans, nitric oxide and interleukins-2[18].

Antioxidant

- *Acorus calamus* confer the hepatoprotective and anti-oxidant activities by biochemical and pathological observations against acetaminophen induced liver injury in rats.[19]

Neuromodulatory Effect

- The effect of *Acrous calamus* leaves extract was studied on dopaminergic system in mice for neuromodulatory effect. The effects of methanol extract and acetone extract of the plant leaves against the apomorphine (APM) induced stereotypy and haloperidol induced catalepsy was found. The ACME and ACAE (*Acorus calamus* methanol extract and *Acorus calamus* acetone extract) administration

potentiated the haloperidol induced catalepsy in mice. [20]

C. Shankhapushapi (Convolvulus pluricaulis)-

Neuroprotactive Activity-

- Its mehanolic extract induce antioxidant mechanism of the cell hence it shows therapeutic value in the treatment and prevention of neurodegenerative disorders. Convolvulus treatment reduced neurotoxic effect of scopolamine reflects its potential as potent neuroprotactive agent.[21]

Antioxidant Activity

- The ethanolic extract of CP possesses significant antioxidant property when tested in-vitro.[22] C. pluricaulis extract has been shown to display high antioxidant activity in chemical assay along with anticonvulsant action.[23]

Nootropic Effect

- Convolvulus significantly improved learning and memory in rats.[24]Another study also shows it to be a good memory enhancer.[25] Some other study also reports nootropic effect of convolvulus.[26]
- *Shankhpushpi's patra* (leaves) were used to treat asthma and chronic bronchitis, while its roots were used to treat infantile fever. It improves strength, digestive power, cures intestinal worms, dysuria, cough, uterine disorder.

D. Mandookaprni(Centella asiatica)

Mandukaparni (Centella asiatica Linn.) is a perennial herb which is one of *Medhya Rasayana* as described in *Charaka Samhita*. [27]

Anti-oxidant activity:

- It is effective in reducing brain regional lipid peroxidation (LPO) and protein carbonyl (PCO) levels and in increasing anti-oxidant status[28].
- There are some evidences which shows that water extracts of *Centella asiatica* contains flavonoids. Ariffin et al. tested *C. asiatica* prepared as herbal teas with the DPPH and ferric-reducing antioxidant potential (FRAP) assays. They found that *C. asiatica* herbal teas possess significantly high antioxidant properties, with non-fermented teas having a higher antioxidant activity than fermented ones.[29]
- A study on reproductivity in male rats by Sainath et al. found antioxidant activity of *C. asiatica*against lead-induced oxidative stress.[30]

Cognition

- The CeA (*Centella asiatica*) has not accelerated the learning process, but rather significantly facilitated the retention of learnt task as a good retention of memory for longer period which provides the further sup-port for the earlier reports on cognitive enhancing ability of CeA.[31]
- A pentacyclic triterpene in *C. asiatica*, was found to significantly reduce glutamate-induced cognitive deficits. The administration of oral AA (100 mg/kg) was found to restore levels of

lipid peroxidation and GSH, and the activity of superoxide dismutase in the hippocampus and cortex to control levels.[32]

- It has been shown to improve the altered levels of neurotransmitters such as 5HT, acetylcholine, epinephrine, nor-epinephrine, GABA (gamma-aminobutyric acid) and glutamate. It has been shown to improve the mental ability and fatigability of subjects under stress.[33]

Neuroprotectives and brain growth promoter:

- Constituents of *Centella asiatica* are saponin (medacoside, asiaticoside, medacassoside, asiatic acid, a new triterpenic acid.[34] which are neuroprotectives and brain growth promoter.[35,36]
- The study shows that the fresh leaf of *Centella* has neuronal dendritic growth stimulating properties, hence it can be used for enhancing neuronal dendrites neurodegenerative and memory disorder.[37]

E. Brahmi (*Bacopa monnieri*)

It is classified as a Medhyarasayan (Ch.Su 4/).

Nootropic Effect

- *Brahmi* (Bacopa monnieri) extracts have been extensively investigated for its effect. Triterpenoid saponins and their bacoside are responsible for Bacopa monnieri ability. It enhance nerve impulse transmission. It is very important because increases protein and RNA in specific brain areas[38].
- Some studies was put forward that *Brahmi* enhances protein kinase activity in the Hippocampus which contribute to its nootropic action .It also repair damaged neurons and play important role in neuronal synthesis and restoration synaptic activity.[39]
- The plant has been utilized as a noortropic, digestive and to improve learning, memory and respiratory function.[40.41]

Cognition

- Its formulations are used in the management of poor cognition, lack of concentration as a diuretics and as an energizer for the nervous system and heart.[42]

Gastrointestinal effect:-

- In vitro studies have been done and it shows direct spasmolytic activity on intestinal smooth muscle. Calcium influx is also observed across cell channels. The property shows that BM may have benefit in condition of intestinal spasm such as Irritable bowel syndrome.[43,44]

Anti-Microbial

- A current in vitro study also reveals its specific anti-microbial activity against Helicobacter pylori it is associated with chronic gastric ulcer. At a point when the concentrate was hatched with human colonic mucosal cell and H.pylori it brought about the accumulation of prostaglandin E And prostacyclin. Prostaglandin known to be defensive for gastic muscosa[45].

Miscellaneous Activity

- In vitro study has shown a preventive impact of BM against DNA damage in astrocytes[46] and human fibroblast.[47] In vitro research has recommended that an anticancer effect of *Brahmi* extract is possibly due to inhibition of DNA replication in cancer cell lines.[48]

Anti-Inflammatory Activity

- *Brahmi* was also reported to have anti-inflammatory activity through inhibition of prostaglandin synthesis and lysosomal membrane stabilization.[49,50]

Vasodilatory Effect

- In vitro research utilizing rabbit aorta and pulmonary artery has shown that Brahmi applies a vasodilatory effect impact on calcium chloride induced contraction in both tissues. It is believed to exert this effect by means of obstruction with calcium flux in tissue cell.

Table 1.1 : Lehana formulation mentioned by various Acharyas

Kashyapa[1] Samhita	**Susruta Samhita[2]**	**Ashtanga Hridaya[3]**	**Yogratnakara[4]**
Swarnaprashana	Swarnabhasma with Kustha (*Saussurea lappa*), Vacha (*Acorus calamus*),Madhu (honey) and Ghrita.	Swarnabhasma+Vacha with Honey and Ghrita	Ashtamangala Ghrita
Panchagavya Ghrita	Swarnabhasma with paste of Brahmi (*Bacopa monnieri*), Shankhpushpi (*Convolvus pluricaulis*) with honey and Ghrita.	Saraswata Ghrita	
Brahmi Ghrita	Swarnabhasma, Arkapushpi (*Pueraria tuberosa*), Vacha(*Acorus calamus*) Madhu and Ghrita.		
Abhaya Ghrita	Swarnabhasma,Kaidarya (*Azadirechta indica*), Swetadurva (*Cynodon dactylon*), Ghrita		
Samvardhana Ghrita			

Table 1.2 : Drugs Used in Lehana and Their Pharmacological Actions

S. N.	Drug (Botanical Name)	Pharmacological Actions
1.	**Brahmi** (*Bacopa monnieri*)	Nootropic activity; Vasodilatory effect; Anti-inflammatory activity; Antimicrobial activity.
2.	**Vacha** (*Acorus calamus*)	Neuromodulatory effect; Immunomodulatory activity; Antioxidant activity; Gastrointestinal regulatory effect.
3.	**Shankhapushpi** (*Convolvulus pluricaulis*)	Neuroprotective activity; Antioxidant activity; Nootropic effect.
4.	**Mandukaparni** *(Centella asiatica)*	Neuroprotective and brain growth-promoting activity; Cognitive enhancement; Antioxidant activity.
5.	**Swarna Prashana**	Antioxidant activity; Neurocognitive enhancement; Immunostimulant action.

DISCUSSION:

Lehana formulations described in Ayurveda represent a holistic approach to pediatric healthcare, combining nutritional support with immunomodulatory and neurodevelopmental benefits. Classical texts emphasize their role in enhancing strength, intellect, and resistance to disease, highlighting both preventive and promotive aspects of child care.

Recent scientific studies provide supportive evidence for several components used in Lehana. Swarna Bhasma has demonstrated immunomodulatory and antioxidant properties in experimental models, suggesting its role in enhancing non-specific immunity. Similarly, Brahmi (*Bacopa monnieri*), Mandukaparni (*Centella asiatica*), and Shankhapushpi (*Convolvulus pluricaulis*) have shown nootropic and neuroprotective effects, which may contribute to improved cognitive function. Vacha (*Acorus calamus*) further exhibits antimicrobial and gastrointestinal regulatory properties.

However, most available evidence is derived from preclinical studies, with limited clinical data in pediatric populations. Standardization of formulations, dosage, and long-term safety remain important concerns. Therefore, while Lehana shows promise as a complementary approach in pediatric healthcare, further well-designed clinical studies are required to validate its efficacy and safety.

CONCLUSION:

Childhood is a critical period that determines long-term health outcomes. Recurrent illnesses and frequent antibiotic

use may adversely affect growth and contribute to antimicrobial resistance. Although vaccination is essential, it does not cover all infectious diseases.

Ayurveda emphasizes a holistic approach to child healthcare, integrating preventive, promotive, and curative measures. Lehana formulations may help enhance non-specific immunity, support growth, and improve cognitive development. Their integration with modern healthcare could offer a more comprehensive strategy for pediatric well-being. However, further scientific validation is necessary to establish their safety, efficacy, and standardization for clinical use.

REFERENCES :

1. Sharma PH, Bhishagacharya S. Kasyapa Samhita. Varanasi: Chaukhambha Sanskrit Sansthan; 2006. .
2. Shastri KA. *Susruta Samhita (Ayurveda Tattva Sandipika Hindi Commentary)*. Part I. Varanasi: Chaukhambha Sanskrit Sansthan; 2005.
3. Tripathi B. *Astanga Hrdayam (Nirmala Hindi Commentary)*. New Delhi: Chaukhamba Sanskrit Pratishthan; 2009.
4. Sastri VL. Yogaratnakara (Vidyotini Hindi Commentary). Varanasi: Chaukhambha Prakashan
5. Vridha Jivaka, Leha Adhyaya. In: Bhishagacharya S, editor. Kasyapa Samhita. 10th ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2005. Sutra Sthana, p. 4–5.
6. Bajaj S, Ahmad I, Fatima M, Raisuddin S, Vohora SB. Immunomodulatory activity of a Unani gold preparation used in Indian system of medicine. Immunopharmacol Immunotoxicol. 1999 Feb;21(1):151-61.
7. Gaikwad A. Jamnagar. India: Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University; 2009-2011. A pharmaco-clinical study of effect of Madhu-Ghrita and Swarna-Vacha-Madhu-Ghrita on neonates. P.G. Dissertation work.
8. Bajaj S, Ahmad I, Raisuddin S, Vohora SB. Augmentation of non-specific immunity in mice by gold preparations. Indian J Med Res. 2001;113:192–196.
9. Hashimoto K, Whitehurst CE, Matsubara T, Hirohata K, Lipsky PE. Immunomodulatory effects of therapeutic gold compounds. J Clin Invest. 1992;89(6):1839–1848.
10. Sharma S, Manhar AK, Jyotibora P, Dolui SK, Mandal M. Evaluation of antioxidant and antibacterial activity of gold nanorods. Adv Mater Lett. 2015;6(3):235–241.
11. Abraham, Guy E., Souhaila A.McReyonlds, and Joel S. Dill."Effect of colloidal metallic gold on cognitive function: A pilot study." Frontier Perpectives 7.2 (1998): 39-41.
12. Mitra A, Chakraborty S, Auddy B, Tripathi T, Sen S, Saha AV, et al. Evaluation of Suvarnabhasma. J Ethnopharmacol. 2002;80:147–153.
13. Joshi RK. Acorus calamus Linn.: phytoconstituents and bactericidal property. World J Microbiol Biotechnol. 2016;32(10):164.
14. Zaiba IA, Beg AZ, Mahmood Z. Antimicrobial potency of selected medicinal plants. Indian Vet Med J. 1999;23:299–306.
15. K. Pokharel, B.R. Dhungana, K.B. Tiwari & R.B. Shahi., Antibacterial Activities of Some Indigenous Medicinal Plants of Nepal, http://kiranbabutiwari.blogspot.com/2008/07/antibacterial-of-some-html.
16. Gilani, A.U., A.J. Shah, M. Ahmad and F. Shaheen, 2006. Antispasmodic effect of Acorus calamus is mediated through calcium channel blockade, Phytotherapy Res., 20(12): 1080-4.

17. Puri A, Saxena R, Saxena RP, Saxena KC, Srivastava V, Tandon JS. Immunostimulant activity of Nyctanthes arbor-tristis. J Ethnopharmacol. 1994;42(1):31–7.
18. Mehrotra S, Mishra KP, Maurya R, Srimal RC, Yadav VS, Pandey R, Singh VK. Anticellular immunosuppressive properties of ethanolic extract of Acorus calamus rhizome. Int Immunopharmacol. 2003;3(1):53–61.
19. Palani S, Raja S, Kumar RP, Venkadesan D, Devi K, Sivaraj A, Kumar BS. Therapeutic efficacy of antihepatotoxic and antioxidant activity of Acorus calamus on acetaminophen-induced toxicity in rats. Int J Integr Biol. 2009;7(1):39–44.
20. Prabhu KV, George T, Kumar RV, Nancy J. Neuromodulatory effect of Acorus calamus leaf extract on the dopaminergic system in mice. Int J Pharm Tech Res. 2009;1(4):1255–1259.
21. Dhuna K, Dhuna V, Bhatia G, Singh J, Kamboj SS. Neuroprotective effect of Convolvulus pluricaulis. Br Biotechnol J. 2012;2(4):192–210.
22. Nahata A, Patil UK, Dixit VK. Anxiolytic activity of Evolvulus alsinoides and Convolvulus pluricaulis. Pharm Biol. 2009;47(5):444–451.
23. Verma S, Sinha R, Kumar P, Amin F, Jain J, Tanwar S. Study of Convolvulus pluricaulis for antioxidant and anticonvulsant activity. Cent Nerv Syst Agents Med Chem. 2012;12:55-9
24. Nahata A, Patil UK, Dixit VK. Anxiolytic activity of Evolvulus alsinoides and Convulvulus pluricaulis in rodents. Pharm Biol 2009; 47(5):444–51
25. Sharma K, Bhatnagar M, Kulkarni SK. Effect of Convolvulus pluricaulis Choisy and Asparagus racemosus Willd on learning and memory in young and old mice: a comparative evaluation. Indian J Exp Biol. 2010;48:479–485.
26. Kothiyal P, Rawat MS. Comparative nootropic effect of Evolvulus alsinoides and Convolvulus pluricaulis Choisy. Int J Pharma Bio Sci. 2011;2(1):616–621.
27. Agnivesha. Charaka Samhita. Revised by Charaka and Dridhabala. Varanasi: Chaukhambha Orientalia; 1998. Chikitsa Sthana, Chapter 1, Verse 14.
28. Anand T, Naika M, Kumar PG, Khanum F. Antioxidant and DNA damage preventive properties of Centella asiatica (L.) Urb. Phcog J. 2010;2:53–58.
29. Ariffin F, Chew SH, Kaur B, Karim AA, Huda N. Antioxidant capacity and phenolic composition of fermented Centella asiatica herbal teas. J Sci Food Agric. 2011;91(15):2731–2739.
30. Sainath SB, Meena R, Supriya C, Reddy KP, Reddy PS. Protective role of Centella asiatica on lead-induced oxidative stress and suppressed reproductive health in male rats. Environ Toxicol Pharmacol. 2011;32(2):146–154.
31. Rao KGM, Rao MS, Rao GS. Enhancement of hippocampal CA3 neuronal dendritic arborization by *Centella asiatica* (Linn.) fresh leaf extract treatment in adult rats. *J Chin Med Assoc*. 2008;71(1):6–13.
32. Ramesh BN, Indi SS, Rao KSJ. Studies to understand the effect of *Centella asiatica* on Aβ(42) aggregation in vitro. *Curr Trends Biotechnol Pharm*. 2010;4(2):716–724.
33. Subathra M, Shila S, Devi MA, Panneerselvam C. Emerging role of *Centella asiatica* in improving age-related neurological antioxidant status. *Exp Gerontol*. 2005;40(8–9):707–715.
34. Sharma PC, Yelne MB, Dennis TJ. *Database on medicinal plants used in Ayurveda and Siddha*. Vol. 1. New Delhi: CCRAS, Department of AYUSH, Ministry of Health and Family Welfare, Government of India; 2005. p. 265–266.
35. Ramanathan M, Sivakumar S, Vijayakumar PRA, Saravanababu C, Pandian PR. Neuroprotective evaluation of standardized extracts of *Centella asiatica* in monosodium glutamate-

treated rats. *Indian J Exp Biol*. 2007;45:425–431.
36. Anbuganapathi GA. Synergetic effect of Vallarai and Brahmi on learning ability of albino mice and school children. In: Proceedings of the International Seminar on Recent Trends in Pharmaceutical Sciences; 1995; Ootacamund. p. 18–20.
37. Rao KGM, Rao MS, Rao GS. Evaluation of amygdaloid neuronal dendritic arborization enhancing effect of Centella asiatica (Linn.) fresh leaf extract in adult rats. Chin J Integr Med. 2012
38. Singh HK, Rastogi RP, Srimal RC, Dhawan BN. Effect of bacosides A and B on avoidance responses in rats. Phytother Res. 1988;2:70–75.
39. Singh HK, Dhawan BN. Neuropsychopharmacological effects of the Ayurvedic nootropic Bacopa monnieri (Linn.) (Brahmi). Indian J Pharmacol. 1997;29:S359–S365.
40. Nadkarni KM. Indian Materia Medica. Vol. 1. Columbia (MO): South Asia Books; 1988. p. 624–625.
41. Kirtikar KR, Basu BD. Indian medicinal plants. Part 2. Allahabad: Indian Press; 1918. p. 930–931.
42. Mukherjee DG, Dey CD. Clinical trial on Brahmi. Int J Exp Med Sci. 1966;10:5–11.
43. Dar A, Channa S. Relaxant effect of ethanol extract of Bacopa monnieri on trachea, pulmonary artery and aorta from rabbit and guinea pig. Phytother Res. 1997;11:323–325.
44. Dar A, Channa S. Calcium antagonistic activity of Bacopa monnieri on vascular and intestinal smooth muscles of rabbit and guinea pig. J Ethnopharmacol. 1999;66:167–174.
45. Goel RK, Sairam K, Babu MD, Tavares IA, Raman A. In vitro evaluation of *Bacopa monnieri* on anti-Helicobacter pylori activity and accumulation of prostaglandins. Phytomedicine. 2003;10:523–527.
46. Russo A, Borrelli F, Campisi A, Acquaviva R, Raciti G, Vanella A. Nitric oxide-related toxicity in cultured astrocytes: effect of *Bacopa monnieri.* Life Sci. 2003;73:1517–1526.
47. Russo A, Izzo AA, Borrelli F, Renis M, Vanella A. Free radical scavenging capacity and protective effect of *Bacopa monnier*i L. on DNA damage. Phytother Res. 2003;17:870–875.
48. Elangovan V, Govindasamy S, Ramamoorthy N, Balasubramanian K. In vitro studies on the anticancer activity of *Bacopa monnieri. Fitoterapia*. 1995;66:211–215.
49. Jain P, Khanna NK, Trehan T, Pendse VK, Godhwani JL. Antiinflammatory effects of an Ayurvedic preparation, Brahmi Rasayan, in rodents. *Indian J Exp Biol*. 1994;32:633–636.
50. Channa S, Dar A, Anjum S, Yaqoob M, Rahman A. Antiinflammatory activity of *Bacopa monnieri* in rodents. J Ethnopharmacol. 2006;104:286–289.

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