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Role of *Pancharavinda Rasayana* in enhancement of Intellectual Skills in Children - A Comprehensive Review

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ABSTRACT

Optimal intelligence is a vital essentiality to deal with day-to-day challenges, especially in children who have to build up their life in an apt manner. In the competitive world certain children may experience poor intelligence and cognitive skills resulting in learning disability, scholastic backwardness etc. affecting their school completion, higher education, inter personal relationships, prospects of employment etc. According to meta-analysis study, In India 1-3% of the children are suffering with low Intellectual skills and cognitive skills requiring an early attention in this field. The concept of improving the intellectual skills, academic performance, vocabulary etc. are relatively very new to current modern system of medicine. However, Ayurveda documents the knowledge of various drugs possessing Intellectual enhancing activity under the broad spectrum of *Medhya Rasayana*. The present study has been taken to analyze the *Medhya* actions of *Pancharavinda Rasayana* w.s.r. to *Buddhi* (Discriminative skills), *Medha* (Intellectual skills) and *Smriti* (Memory) based upon *Rasapanchaka* and mode of action its ingredients. The whole formulation is ideal in enhancement of *Medha*, *Buddhi* and *Smriti* with due consideration of *Rasa Panchaka* and *Prabhavi Karma* of its ingredients.

Key words: *Pancharavinda Rasayana*, *Cognitive skills*, *Medhya Rasayana*

INTRODUCTION

Optimal intelligence is a vital essentiality to deal with day-to-day challenges, especially in children who have to build up their life in an apt manner. However, due to over educational burden, academic stress, inter peer completions and familial stress children are facing lots

of psychological issues, leading to learning disabilities, scholastic backwardness, inter personal relationships, prospects of employment etc. This is affecting their overall health.

In Ayurveda the concept of health is explained with special emphasis on *Prasanna Atma Indriya* (delighted soul with proper functioning of sense organs) and *Swastha Manas* (healthy mental state),^[1] which is very much essential in acquisition of *Jnana* (Cognition).

The concept of improving the intellectual & cognitive skills are relatively very new to current modern system of medicine. However, Ayurvedic literature documents the knowledge of various natural herbs possessing intellect enhancing activity under the broad spectrum of *Medhya Rasayana's*.

Literary concept of *Medhya* (Intelligence) is not clearly explained in *Ayurveda*. *Medha* & *Buddhi* are the two

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major factors explained in classical literature w.s.r Intellectual skills.

The word "Medha" - is explained as "Grahanena iti Granthadi Dharanena"^[2] - to understand, grasp, remember and recall the *Granthas*(books). It has been mainly used in two ways i.e., the power of enhancing the *Dharana Shakti* (retention power) and *Grahana Shakti* (grasping power). Besides this, *Dhee*, *Dhriti*, *Smriti*, *Vijnana* etc. words have been used in similar sense at many places and can be considered as functional aspects of *Buddhi* (Cognitive skills and intellectual functions).^[3]

Pancharavinda Rasayana^[4] is one such polyherbal preparation with *Aravinda* (*Nelumbo nucifera* Gaertn.) and *Hemashakala* (Gold Foils) as chief ingredients along with *Ksheera* (Milk) and *Ghrita* (Ghee)- having special abilities in improving the *Pratibha* (Intelligence skills).

Majority of the ingredients are *Madhura Rasa*, *Sheeta Veerya* & *Pitta Prasadaka* in nature along with *Medhya* as *Prabhava Karma*. The unique *Rasapanchaka* of *Aravinda* (*Nelumbo nucifera* Gaertn.) helps in enhancing the functional abilities of *Sadhaka Pitta* and *Alochaka Pitta* and whereas the other ingredient, *Hema Shakala* (Gold foils - Aurum) is considered as *Sresta Rasayana*, *Medhya* & *Tridosha Nashaka*. Hence, *Pancharavinda Rasayana* could be an ultimate remedy in conditions like *Nashta Pratibha* - Deranged cognitive and intellectual skills, and also helpful in improving the academic performance specially in children.

AIMS AND OBJECTIVES

The study was taken with a view to critically analyze the *Rasapanchaka* and mode of action of ingredients of *Pancharavinda Rasayana* w.s.r. to its *Medhya Karma*.

MATERIALS AND METHODS

The thorough review of classical textbooks, contemporary textbooks and research articles is done to evaluate the effectiveness of *Pancharavinda Rasayana* as *Medhya Rasayana* based upon *Guna*, *Karma* & *Doshagnata*.

The present study has been taken to analyze the *Medhya Rasayana* effect of *Pancharavinda Rasayana*^[4]

based upon *Rasapanchaka* and mode of action its ingredients.

Pancharavinda Rasayana^[4]

पैष्यैर्मृणालबिसकेसरपत्रबीजैःसिद्धं सहेमशकलं पयसा च सर्पिः।

पञ्चारविन्दमिति तत्प्रथितं

पृथिव्यांप्रभृष्टपौरुषबलप्रतिभैर्निषेच्यम् ॥४८॥

Paste of Five parts of *Panchanga* of *Aravinda* (*Nelumbo nucifera* Gaertn.) i.e., *Mrnala* (stalk), *Bisa* (Tuber), *Patra* (leaves), *Kesara* (stamens), *Beeja* (Seed) and *Hema Shakala* (thin flakes of Gold), *Payasa* (Milk) and *Sarpi* (ghee) cooked together is known as *Pancharavinda Rasayana* which is said to be beneficial to those who have lost their *Paurushya* (Potency), *Bala* (Strength), *Pratibha* (Intelligence skills).

Ingredients

1. *Aravinda* (*Kamala*)^[5]

The derivation of the drug is- '*Kama Jalati Bhushayati Iti*', i.e., which enhances the beauty of pond, similarly, in clinical terms, the drug is meant to enhance one's body and mind.

कमलं शीतलं वर्णं मधुरं कफपित्तिज्त् ।

तृष्णादाहास्रविस्फोटविषवीसर्पनाशनम् ॥ Kaideva.Ni.1445-1446

Taxonomy

Kingdom : Plantae

Clade : Tracheophytes

Clade : Angiosperms

Order : Proteales

Family : Nymphaeaceae

Genus : *Nelumbo*

Species : *N. nucifera*

Sanskrit names : *Kamala*, *Padma*, *Nalina*, *Sahasrapatra*. *Satapatra*

Botanical Name : *Nelumbo nucifera* Gaertn.

Family : Nymphaeaceae

Classical name : *Kamala*

Gana Vargekarana

- Charaka : Varnya, Mutraverajaniya,
- Sushruta : Utpaladi
- Ashtanga Sangraha : Mutraverajaniya
- Dhanvantari Nighantu : Karaveeradi Varga
- Bhavapraksha : Pushpa Varga
- Kaideva Nighantu : Oshadi Varga

Rasa Panchaka^[6]**Rasa** : Kashaya, Madhura, Tikta**Guna** : Laghu, Snigdha, Pichhila**Virya** : Sheeta**Vipaka** : Madhura**Doshagnata** : Kapha Pittashamaka**Karma** : Vrshya, Grahi, Varnya, Medhya**Bheda:**^[7] Based on the color of the Kamala has been classified in three varieties

1.Shweta Kamala 2.Rakta Kamala 3.Neela Kamala

Morphological description^[8]

Perennial aquatic herbs with rhizomatic root stock. Leaves orbicular, petate, upto 35 cm. petioles and peduncles sparsely prickly. Flowers solitary, pinkish or white; petals numerous. mainly seriate, 4-12cm long. Flowers- red, white, or rarely yellow; 4-10 in diameter. Anthers appendaged. Carpels many, spongy torus.

A large handsome aquatic herb with milky. Root- stock creeping, much branched. Peduncles and leaf-stalks 3-6 ft. long, full of spiral vessels, smooth or with small scattered prickles. Leaves 2-3 ft. in diam., orbicular, entire, membranous glaucous, cupped. Flowers solitary, 4-10-inch diameter

Flowering and fruiting time

April to November (flowers) and December to January (fruits).

Distribution

Plant grows throughout India in tanks, ponds, Jhils and marshes, as a major aquatic plant, popular for its

beautiful flowers. It is often cultivated in aquatic habitat. It occurs throughout India, as far, as north as Kashmir; also in Persia, north Africa, Malay Islands, China, Japan and Tropical Australia. Warmer parts in India.

Chemical composition

The rhizomes and seeds contain resin, glucose, metarbin, tannin, fat, nupharfin and nupharine alkaloidal substance. The seeds of *N. nucifera* are rich in asparagine, fat, protein, starch and tannin. Normally, lotus seeds are rich in protein, amino acids, unsaturated fatty acids and minerals. The ethanol extract of the seed has been evaluated for its antioxidant activity using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical assay. Potent free radical scavenging effects were seen, with a median inhibition concentration (IC50) of 6.49mg/ml.

The methanol and acetone extract of rhizome showed highest DPPH scavenging activity, at 66.7 and 133.3 mg/l, respectively; the methanol extract exhibited a higher anti-oxidant activity coefficient than ascorbic acid. The rhizome knot also exhibited radical scavenging activity, measured spectrophotometrically and by electron spin resonance.^[9]

The leave extract exhibited concentration-dependent antioxidant activities against hemoglobin-induced linoleic acid peroxidation and Fenton reaction-mediated plasmid DNA oxidation

The methanol extract flowers showed strong antioxidant activity in the ONOO-system (peroxynitrate) and marginal activity in the DPPH (2,2-Diphenyl-1-picrylhydrazyl) and total ROS systems. In a similar fashion, seven known flavonoids were isolated from lotus stamens, most of which also showed potent antioxidant activity.^[10] The glycosides nelumboside A, nelumboside B, isorhamnetin glycoside and isorhamnetin rutinoside isolated from *N. nucifera* stamens showed potent antioxidant activity in DPPH and ONOO-assays.^[11]

2. Hemashakala

Suvarna/Swarna is the term used to describe gold metal in *Sanskrit, Hindi* and other regional languages.

The therapeutic value of *Suvarna* (Aurum) metal was known to ancient *Acharyas*. It is widely described in *Upanishad, Purana*.^[12] *Swarna* has been used although these ages in various forms such as *Swarna Shakala, Swarna Patra, Swarna Raja, Swarna Parpati, and Swarna Bhasma, Swarna churna* and other forms in varying dose and stands time tested for oral administration.^[13]

Rasa Panchaka^[14]

Rasa: Madhura, Tikta, Kashaya

Guna: Guru, Pichhila, Snigdha

Virya: Sheeta

Vipaka: Madhura

Doshagnata: Tridosahara

Karma: Brimhana, Rasayana, Buddhi-Smritiprada, Hridya

The importance of *Swarna* as a *Medhya* is been mentioned in classics under the heading of *Swarna Prashana Vidhi* with special focus on enhancement of *Medhya* and *Bala*.^[15]

Therapeutic efficacy of Gold (Swarnabhasma) as described in Ayurvedic classics^[16]

SN	Different Texts	Dose	Indications
1.	<i>Rasa Ratna Samuchayya</i>	2 Ratti	<i>Kshaya, Agnimandya, Swasa, Kasa, Aruchi, Sangrahnihar, Ojodhatuvivardhana, Balakar, Pandu Rogahara.</i>
2.	<i>Rasa Prakash Sudhakar</i>	½ Ratti	<i>Saundarya Kantivardhana, Prevents from ageing on using for 20years</i>
3.	<i>Ayurveda Prakasha</i>	1Yava-8 Ratti	<i>Vrishya, Balya, Rasayana, Brimhana, Netrya, Medha, Smritiprada, Hrdya, Ayushya.</i>
4.	<i>Rasa Tarangini</i>	1/8-¼ Ratti	<i>Vrishya, Hrdya, Netrya, Smritiprada, Medhya Rasayana, Kantikara.</i>

3. Ghrita

Ghrita (clarified butter) is the prominent element of Indian food since hundreds of years. *Ghrita* is considered as *Sneha Uttama*^[17] which possess multi-

systemic benefits.^[18] It is a dietary supplement as well as a drug in its purest form and in combinations. *Ghrita* acts as *Medhya Dravya* and it also has special attributes that, it assimilates the property of the drug added to it providing a synergetic action in combination.^[19]

Rasapanchaka

Rasa: Madhura

Guna: Snigdha, Mridu, Slakshna, Guru, Yogavahi

Virya: Sheeta

Vipaka: Madhura

Doshagnata: Tridosha Shamaka

Karma: Agnidipana, Ayushya, Balya, Cakshushya, Smriti, Medha, Agni, Buddhi Vardhana, Hridya, Rasayana.

4. Ksheera (Milk)

Ksheera (milk) is *Ajanma Satmya* (wholesome adaptation since birth), *Ksheera* possess properties such has *Rasayana, Balya, Medhya, Jeevaniya*^[20]

Rasapanchaka^[21]

Rasa: Madhura

Guna: Mridu, Slakshna, Pichila, Bahala

Veerya: Sheeta Veerya

Vipaka: Madhura

Karma: Jeevaniya, Rasayana, Ojovardhana.

DISCUSSION

The present era of competitive world children requires an optimal intelligence and cognitive skills to cop up day to day academic performance. Poor cognition, intellectual derangement, academic under achievement etc. are matter of concern in student life, which has an untoward effect on their carrier too. In this regard, the concept of *Medhya Rasayana* stands unique in the field of enhancement of Intellectual skills among children.

Medhya - is very unique concept in *Ayurveda*, which goes hand in hand along with *Buddhi, Dhi, Driti* and *Smriti*. *Tridosha's* specially *Sadhaka Pitta (Buddhi*

Vaisheshika Pitta) and *Alochaka Pitta* play a vital role in improving the cognitive abilities of an individual.

Pancharavinda Rasayana is one such polyherbal preparation, which could be an ideal remedy in the field of Intellectual enhancement as well as management of certain cognitive impairment conditions like learning disabilities, Intellectual disabilities, Low IQ etc. Five Parts of *Aravinda* (*Nelumbo nucifera* Gaertn.) *Mrnala* (stalk), *Bisa* (Tuber), *Patra* (leaves), *Kesara* (stamens), *Beeja* (Seed) and *Hemashakala* (Gold Foils) as chief ingredients along with *Ksheera* (Milk) and *Ghrita* (Ghee) - is specifically indicated in improving *Nashta Pratibha* (deranged intellectual skills).

Majority of the ingredients are *Madhura Rasa*, *Sheeta Veerya* & *Pitta Prasadaka* in nature and *Medhya* as *Prabhavi Karma*. The unique *Rasapanchaka* of *Aravinda* as well as *Medhya Rasayana* effect of *Suvarna* helps in enhancing the functional abilities of *Sadhaka Pitta* and *Alochaka Pitta*, associated with *Dhi*, *Driti* & *Smriti*.

Sadhaka Pitta is specifically related with *Buddhi*, *Medha*, *Abhimana* and fulfillment of *Abhiprarthitha Manoratha*^[22,23] (Provide intellect, discriminative power and zeal to a person which motivates a person to achieve his aspiration, goals and dreams). On the other hand, *Buddhi Vaisheshika Pitta* - a variety of *Alochaka Pitta* is said to be essential in grasping, recalling and retaining the gathered information in mind. It is also attributed with special qualities like perceiving the minute and extraordinary matters and information's experienced in past. It takes part and controls memory process and enables memorizing the past events.

In this regards, *Pancharavinda* would be ideal to improve the functional aspects of both *Sadhaka Pitta* and *Alochaka Pitta*.

In-fact, most of the research studies on *Nelumbo nucifera* Gaertn. Has shown promising results on its Neuro-protective effect,^[24] Nootropic effect^[25] & Anti-depressant effect.^[26] Ethanolic extract of *Nelumbo nucifera* Gaertn has shown improving the memory and learning ability by attenuating neurotransmission;

while Its nootropic activity is linked to the serotonergic transmission, where nootropics suppress noradrenalin function. The flower extract of *Nelumbo nucifera* Gaertn found to be an excellent neuroprotective and cognitive enhancer.^[27]

Hema Shakala (Gold foils - Aurum) - A form of *Suvarna* is considered as *Sresta Medhya Rasayana* & *Tridosha Nashaka*. In Ayurveda, the importance of *Swarna* as a *Medhya* is been mentioned in classics under the heading of *Swarna Prashana Vidhi* with special focus on enhancement of *Medha* and *Bala*.^[15] *Suvarna* can have a balancing and harmonizing effect on the body, particularly with regard to unstable mental and emotional states. It is believed 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 cells. This enhancement is believed to be responsible for increased brain functions and enhances the ability to focus. Several other research studies have proven its *Medhya Rasayana* effect by significant improvement in both performance and verbal test of I.Q score based upon updated Wechsler Intelligence Scales Battery of Tests (WAIS-R).^[28]

Ghrita basically said to be *Pittashamaka*, *Agnidipana* and *Medhya* in nature. It has the capacity to cross the blood brain barrier and do target drug delivery by incorporating the herbal drugs having therapeutic effects on cognitive impairment.

Ghrita being lipid in nature is rapidly absorbed in the target areas of central nervous system. Additionally, *Ghrita* contains docosahexaenoic acid, and an omega-3 long chain poly unsaturated fatty acid, which is also present in high concentration in brain cells too. Scientifically experimented studies show that docosahexaenoic acid has positive outcome in cognitive decline.^[29,30]

Hence, *Pancharavinda Rasayana* could be an ultimate remedy in enhancing the intelligence in conditions like *Nashta Pratibha* - Deranged cognitive and intellectual skills as well as in improving the academic performance in children.

CONCLUSION

Pancharavinda Rasayana a unique preparation with *Aravinda* and *Suvarna (Swarna Shakala)* as a main ingredient, which could to be an excellent neuroprotective and Intellectual enhancer. Majority of the ingredients in *Pancharavinda Rasayana* are said to be *Madhura Rasa, Sheeta Veerya & Pitta Prasadaka* in nature and *Medhya* as *Prabhavi Karma* helps in enhancing the Cognitive and Intellectual skills in association with *Dhi, Driti & Smriti*. Hence *Pancharavinda Rasayana* could be a better drug of choice in children with certain cognitive impairment conditions like learning disabilities, Intellectual disabilities and Low IQ.

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