Multidimensional Approach on Medhya Rasāyana Chathushkaya in Ayurveda-A Review

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ABSTRACT

Medhya Rasāyana, a unique concept of Āyurveda is believed to be used as a solution for major issues i.e., loss of memory, cognitive deficits, impaired mental function and also age related neurological and mental disorders. Charaka Sāphitā has mentioned Medhya Rasāyana Chathushkaya as Maṇḍūkapaṇṇī, Yaṣṭāmadhu, Gudūcī and Śaṅkhapuşpī. This study was focused to compile Pharmacodynamics, Pharmacokinetic and Pharmacological potentials of Medhya Rasāyana Chathushkaya for further identification of their noble approaches. The contents were collected from authentic Ayurvedic texts, dictionaries, monographs, websites, online and printed journals. Results of the study revealed that Tikta (75%), Kashaya(75%), Madhura(50%) in Rasa, Guru(50%), Laghu(50%) Guna, Sheeta(50%), Ushna(50%) Veerya, Madhura(100%) vipaka, Medhya(100%) Prabhava and Tridosha hara (75%) were present as prominent Āyurvedic pharmacodynamic properties of Medhya Rasāyana Chathushkaya. Further, Medhya, Rasayana, Raktha shodhaka, Vishaghna, Vayah sithapana, Kushtthagha, Mehağhaṇa, Jwaraghna, Deepana, Balya, Chardighna, Trṣna Nigraḥana were show as pharmacokinetic properties while memory enhancing effect & effect on cognitive function, anti-ulcer activity, immunomodulatory, anti-oxidant activity, anti-microbial activity, hepatoprotective, anti-inflammatory and anti-fibrotic activity, anti-cancer activity, cardio protective, anti-diabetic property, anti-toxic effect were observed as Pharmacological potentials. In view of the above it is seen that Medhya Rasāyana Chathushkaya has Tikta, Kashaya Rasa, Sama sheetoshna in veerya, Madhura vipaka, Medhya in prabhava and Thidosha hara potential for unique; wide spreading curing and preventive capability with multidimensional approaches.

KEYWORDS Medhya Rasāyana Chathushkaya, Pharmacodynamics, Pharmacokinetic, Pharmacological potentials
INTRODUCTION

Today the percentage of the elder population of the world is increasing and most of them are over 60-65 years. Out of them a high proportion suffer from insomnia, loss of strength or immunity, cognitive and memory impairment, loss of perception, helplessness, fear, anxiety and much other senile diseases. Statistically the prevalence of overall mental illnesses is 12.5% among children and young generation in consequence of overloading of stress, tension, anxiety and lack of sleep which adversely affective to the mental, social functions and learning capacity.

Āyurveda is knowledge of living. Perfect health does not mean only an absence of diseases. True health is experienced when a person is established with balanced states of the three Doshas, normal digestion and metabolism, normal condition of tissue and excretory process, spirit freed from bondage and clear and bright mind and senses.

For maintaining of the mental health pragna is the prime factor and it is composed of

Dhee (promote the intellect)
Dhrthi (Retention of information)
Smriti (The ability of recall)

These three mental abilities get imbalanced when people get old and due to other issues in children and young generation. For solving this health detriment 3000 years ago scholars (Rishi and Āchāryas) gathered knowledge on Rasāyana; specifically Medhya Rasāyana. While going through the concept of Medhya Rasayan; there is a significant classification in Charaka samhitta called Medhya Rasāyana Chathushkaya which is a group of four potent plants. In modern view; it is referred under Nootropics.

AIMS AND OBJECTIVES

To identify the Pharmacodynamics properties of the Medhya Rasāyana Chathushkaya
To find out the Pharmacokinetic properties of the Medhya Rasāyana Chathushkaya
To review the Pharmacological potentials of the Medhya Rasāyana Chathushkaya Rasāyana

Āyurveda has given birth to new way to discover oneself with compromising eight branches called as Ashtānāgāyurveda. Rasāyana Tantra is one aspect of Ashtānāgāyurveda.

Literally, the word Rasāyana is derived from “Rasa+Ayanam” which finally gives the meaning of all the approaches and measures which ensure improved circulation of Rasa.

Based on points in modern view it is corre-
Medhya Rasāyana

The term Medhya Rasāyana, is derived from the Sanskrit words “Medha”, meaning intellect or cognition. While explaining Medhya Rasāyana Āchārya Charaka has emphasized on four special medicinal plants (Figure 1) called Medhya Rasāyana Chathushkaya\(^1\). It comprises of:

- The juice of Maṇḍūkaparnī (Centella asiatica Linn.)
- The powder of Yaṣṭīmadhu (Glycyrrhiza glabra Linn.) with milk
- The juice of Gudūcī (Tinospora cordifolia Miers) along with its root and flowers
- The paste of Śaṅkhapuṣpī (Convolvulus pluricaulis Chois)

Āchārya Charaka has further explained the effectiveness of Medhya Rasāyana

Pharmacodynamic properties of Medhya Rasāyana Chathushkaya.

<table>
<thead>
<tr>
<th>Name of the plant</th>
<th>Rasa</th>
<th>Guna</th>
<th>Veerya</th>
<th>Vipaka</th>
<th>Prabhava</th>
<th>Dosa hara action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maṇḍūkaparnī</td>
<td>Tiktha Madhura Kashaya</td>
<td>Laghu Sara</td>
<td>Sheeta Madhura</td>
<td>Medhya</td>
<td>Tridosha hara</td>
<td></td>
</tr>
<tr>
<td>Yaṣṭīmadhu</td>
<td>Madhura</td>
<td>Guru Snigda</td>
<td>Sheeta Madhura</td>
<td>Medhya</td>
<td>Pitta vata hara</td>
<td></td>
</tr>
<tr>
<td>Gudūcī</td>
<td>Tiktha Kashaya</td>
<td>Guru Ushna</td>
<td>Madhura Medhya</td>
<td>Tridosha hara</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Śaṅkhapuṣpī</td>
<td>Tiktha Kashaya Katu</td>
<td>Laghu Ushna</td>
<td>Madhura Medhya</td>
<td>Tridosha hara</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pharmacodynamic properties in Ayurveda are described based on Rasa Panchaka. Its descriptions are available in samhītha and nigants with separate discussions on each plant. Rasa panchaka and dosha karma of plants including in Medhya Rasāyana Chathushkaya are given there separately (Table 1).

![Ingredient of Medhya Rasāyana Chathushkaya](http://www.theayurveda.org/ayurveda/herbs/5-health-benefits-of-brain-tonic-herb-shankhpushpi/)
Pharmacokinetic properties and Pharmacological potentials of Medhya Rasāyana Chathushkaya.

A pharmacokinetic property is a description of mechanism by which a physical and chemical changes in effected inside or outside the body. *Karma* of plants has been broadly described in Ayurveda; within modern studies they have been well proven (Table 2).

**Evidence based approach**

Generation of free radicals and toxicity through monosodiumglutamate (MSG) can affect the nervous system. *Mandukaprni*

Table 2 Pharmacokinetics properties and Pharmacological potentials of Medhya Rasāyana Chathushkaya

<table>
<thead>
<tr>
<th>Name of the plant</th>
<th>Pharmacokinetics Properties</th>
<th>Pharmacological potentials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Śaṅkhapuṣpi</td>
<td>Medhya, Rasayana, Vayah sthapana, Kushthagha, Mehagha, Raktha shodhaka, Kasagha, Vishagha,</td>
<td>Neuroprotective, Memory enhancing effect, Anticonvulsant Activity, Anti-depressant activity, Anxiolytic activity, Anti-stress</td>
</tr>
</tbody>
</table>
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has an ability to protect neurons including the region of Hippocampus and protect general behaviour and locomotor activities\(^2\). Neuro-protective action of Mandukaparni has significant effect on cognitive enhancement among school children and Albino mice\(^3\). Another study on Centella asiatica; it’s effectiveness in management of epileptic seizures was proved\(^4\). Mandukaparni is a well-known remedy for skin lesions and it has determined its effectiveness on psoriasis\(^5\). Hence in the study with chloroform and methanol extracts, Mandukaparni was reported as anti-inflammatory and analgesic in Swiss Albino rats\(^6\). In addition to that the ulcer healing effect of Mandukaparni was demonstrated in the study on ethanol-induced gastric ulcers in rats. Strengthening of gastric mucosal barrier and reducing free radicals resulted in this preventive action\(^7\). Wound healing effect was another potential showed by in Mandukaparni\(^8\). Further, water extract of Centella asiatica gives an effect of immunostimulation\(^9\). Anti-proliferative effect is another marked effect which showed the efficacy of Asiatic acid of Centella asiatica against growth of lung cancer cells\(^10\). The study proved the beneficial effect on Mandukaparni against arsenic-induced oxidative stress\(^11\) and also it has radio-protective action\(^12\). Furthermore, Asiatic acid in Mandukaparni possess inhibitory effect in mechanism of heart failure\(^13\) and hepatitis B virus\(^14\). Mandukaparni has already been used as a traditional remedy for treating Diabetes mellitus\(^15\).

Yastimadhu is Glycyrrhiza glabra, a perennial herb with a thick rootstock, slightly branched roots of about 1.2 cm diameters, red or orange brownish in colour. The study was conducted to investigate the improvement in learning and memory enhancement of Glycyrrhiza glabra (GA) by using mice species. A result of another clinical study has proven beneficial effect of Glycyrrhiza glabra on skin indicating ability of UV protection, anti-inflammatory and anti-oxidant properties\(^17\). Further, anti-proliferative action is a significant in Yastimadhu and marked in reduction of breast cancer cells growth\(^18\). Glycyrrhiza glabra also has an immune modulating action\(^19\). In broth
microdilution method study, extracts of GA indicated anti-microbial action\(^ {20}\) therefore, in a study on *Yastimadhu* against *Plasmodim yoelii*, anti-malarial action was investigated\(^ {21}\). Researchers also found evidence of nephroprotective effect against Cisplatin\(^ {22}\) and hepatoprotective activity\(^ {23}\) of *Yastimadhu* by various experiments. And also cardioprotective effect of *Glycyrrhiza glabra* against myocardial infarction was markedly proved\(^ {24}\). *Yastimadhu* has significant effect on cough relief\(^ {25}\) and it has already been used traditionally in Ayurveda.

*Guduci* is *Tinospora cordifolia*, a perennial climbing plant growing on very high top of trees sending down very long thread-like aerial roots. *Tinospora cordifolia* is a significant memory enhancing agent\(^ {26}\) and another study also evaluated its learning and memory enhancing effect\(^ {27}\). *Tinospora cordifolia*, possess anti-ulcer activity\(^ {28}\) and its strong analgesic, anti-inflammatory and anti-pyretic actions were observed\(^ {29}\). Wound healing activity was another effect shown in a study which was conducted with methanolic extract of *Guduci*\(^ {30}\). *Tinospora cordifolia* has significant anti-oxidant action which was present in all Ethanol, Methanol and water extactions\(^ {31}\). In a study; anti-cancer and immune-modulatory action of *Tinospora cordifolia* extractions was revealed\(^ {32}\). Another study was implied protective action against radiation exposure\(^ {33}\) and microbial strains\(^ {34}\). Leaf and stem extract of *Tinospora cordifolia* was reported as a hepatoprotective\(^ {35}\) and extract of stem had an effect of reducing plasma glucose level\(^ {36}\). *Tinospora cordifolia* provided relief in some nasal disorders such as sneezing, nasal discharge, nasal obstruction and nasal pruritus\(^ {37}\). *Sankapushpi* is a perennial herb like morning glory and is a fulvous hairy herb. *Convolvulus pluricaulis* Chois exhibited Neuro-protective and anti-oxidant effects in a study which was conducted with treated mice\(^ {38}\). *Sankapushpi* has elevated memory enhancing effect\(^ {39}\) and has a protective role in epilepsy\(^ {40}\). *Convolvulus pluricaulis*(CP) showed antiulcerogenic effect\(^ {41}\) and has ability in curing of abscesses\(^ {42}\). Antifungal action is another effect which was shown in a study of alcohol extraction of *Convolvulus pluricaulis*\(^ {43}\). In prolonged hypotension *Sankapushpi* has significant action\(^ {44}\). And also Hepatoprotective activity is present in *Convolvulus pluricaulis*\(^ {45}\). CP was shown to be an effective remedy for treatment of diabetes\(^ {46}\). Potent effect was also found in CP for management of thyrotoxicosis\(^ {47}\).

**MATERIALS AND METHODS**

The study was designed as a Literature survey which collected data from authentic
Ayurveda texts, dictionaries, monographs, Ayurveda database on medical plants used in Ayurveda and Siddha, Google scholar, science direct, online webpages and journals. Gathered data were analysed based on three main objectives.

RESULTS AND DISCUSSION
Pharmacodynamic properties of Medhya Rasāyana Chathushkaya
Analyzing rasa panchaka and dosha karma of separate plants, majorities were compiled as a percentage (Figure 2).

![Graph showing distribution of Pharmacodynamic properties of Medhya Rasāyana Chathushkaya](image)

Fig 2 Distribution of Pharmacodynamic properties of Medhya Rasāyana Chathushkaya

Results of this summary of pharmacodynamics properties were as followed,

- **Rasa**-
  - Tikta (75%)
  - Kashaya (75%)
  - Madhura (50%)
- **Guna**-
  - Guru (50%)
  - Laghu (50%)
- **Veerya**-
  - Sheeta (50%)
  - Ushna (50%)

Vipaka- Madhura (100%)
Prabhava- Medhya (100%)
Doshas- Tridosha hara (75%)

Shītha veerya and Madhura Vipaka properties promote Kapha and enhance Dharana Karma (Retention of cognition) while Ushna Veerya and Tikha Rasa promote Pitta and improve Grahana Shakthi and Smrti (Grasping power and Memory). All plants have Medhya in prabhava which is the major factor of Medhya action in Medhya Rasāyana Chathushkaya. Tridosha hara potential was another important factor of Medhya Rasāyana Chathushkaya. Because of that it can be prescribed for all of person and can be used as a supplementary drug for day-to-day life.

Pharmacokinetic properties of Medhya Rasāyana Chathushkaya
Along with pharmacokinetic properties of separate plants, common and frequently mentined karma were compiled (Figure 3).

![Graph showing distribution of Pharmacokinetic property of Medhya Rasāyana Chathushkaya](image)

Fig 3 Distribution of Pharmacokinetic property of Medhya Rasāyana Chathushkaya
Medhya, Rasayana, Raktha shodhaka and Vishaghna karma are highly indicated in all plants and also it has been reported that Vayah sthapana, Kushtagha, Mehaagha, Jwaragha, Deepana, Balya, Charidighna and Trshna Nigrahana as marked karma of Medhya Rasāyana Chathushkaya.

**Pharmacological potentials of Medhya Rasāyana Chathushkaya**

Studying currently available clinical studies and experiments which were focused on plants, the abundance of pharmacological potentials were analyzed (Figure 4).

![Fig 4 Distribution of Pharmacological potential of Medhya Rasāyana Chathushkaya](image)

Most of the studies have proved memory enhancing effect & effect on cognitive function, anti-ulcer activity, immunomodulatory, anti-oxidant activity, anti-microbial activity and hepatoprotective in Medhya Rasāyana Chathushkaya.

Further, based on these evidences they were categorized according to actions on human body systems and organs (Figure 5). Central nervous system, Digestive system, Endocrine system, Immunity system, Brain and Liver were the most affected parts of the body.

![Fig 5 Distribution of Pharmacological potentials action on body system and organ](image)

**CONCLUSION**

Medhya Rasāyana Chathushkaya is an excellent effective herbal collection which has been mentioned in Charaka Samhītā. It is a combination of Mandukaparni swara, Yastimadhi choorna, Guduchi swarasa and Shankapushpi kalka. According to many references, it possesses Tikta, Kashaya Rasa, Sama sheetoshna in veerya, Madhura vipaka, Medhya Prabhava and Thridosha hara action.
In *Medhya, Rasayana, Raktha shodhaka* and *Vishaghna* are the major *karmas* and memory & cognitive enhancement, anti-ulcer activity, hepatoprotection, immune-modulatory, anti-oxidant activity and antimicrobial activity has revealed pharmacological activities of *Medhya Rasāyana Chathushkaya*. Central nervous system, digestive system, endocrine system, immunity system, brain and liver are the functioning areas of body under the action of *Medhya Rasāyana Chathushkaya*. These four plants are freely available especially in Asian countries and are easy to prepare. They can be prescribed for any age group without any adverse effects. It fulfills the main two aims of Ayurveda i.e., prevention and curing and provides both somatic and psychological wellbeing. Totally completing the definition of *Swastha, Medhya Rasāyana Chathushkaya* reveals the ability of maintaining equilibrium of *thridosa*, *Agni*, *Dhatu*, *Mala* and all mental functions. Therefore, it is a great day-to-day supplement. Sending this message to public, may be of greatly assistance to create a healthful society.
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