*Kongunadu Research Journal* 12 (2): 53-58, 2025
**Publisher**: Kongunadu Arts and Science College, Coimbatore.

https://krjournal.com/index.php/krj/article/view/715

DOI:10.26524/krj.2025.18

**RESEARCH ARTICLE**

# A REVIEW ON THERAPEUTIC POTENTIAL OF BRAHMMAMUNI KARPAM IN SIDDHA MEDICINE

**Dinesh Kumar M[1], Soundarraj M[2], Bhavadharani S[1], Santhoshkumar Muthu[3*], Shamina S[4*]**

[1]PG Student, Department of Biochemistry, RVS College of Arts and Science, Coimbatore, Tamil Nadu, India
[2]Assistant Professor in Tamil, School of Science & Humanities, Kalaingar Karunanidhi Institute of Technology, Coimbatore, Tamil Nadu, India
[3*]Assistant Professor, Department of Biochemistry, Kongunadu Arts and Science College, Coimbatore, Tamil Nadu, India
[4*]Associate Professor and Head, Department of Biochemistry, RVS College of Arts and Science, Coimbatore, Tamil Nadu, India

First Corresponding Author: snt.kmr@gmail.com
Second Corresponding Author: shaminabc26@gmail.com

## Abstract

Brahmmamuni Karpam is a premier *Kayakarpam* formulation and a popular polyherbal restorative within the Siddha system of Bharatiya medicine. Attributed to the esteemed Sage Brahmmamuni who is one of the 18 Prime Siddhars, this preparation is very similar to *Kaya Kalpa Chikitsa*, the science of longevity and rejuvenation. This review investigates the therapeutic significance, historical lineage, and pharmacological basis of this remedy, traditionally used for chronic dermatological, respiratory, and rheumatic disorders. It alongside enhances mental acuity and vitality. This formulation contains seven distinct botanicals such as Licorice, Black Cumin, Cumin, Clove, Ironwood flower, Dill, and Coriander seeds. These possess potent antimicrobial, anti-inflammatory, and gastroprotective potentials. A critical aspect of its manufacture is the rigorous *Suddhi* (purification) protocol, essential for detoxifying components and optimizing bioavailability. Contemporary research validates these ancient applications, identifying bioactive constituents like Thymoquinone in Black Cumin and Eugenol in Clove as key agents in immunomodulation and oxidative stress reduction. Brahmmamuni Karpam regulate metabolic and digestive health, treate conditions of the head and sensory organs, and resolve musculoskeletal complaints such as edema. Ultimately, it embodies a holistic strategy, harmonizing the three humors (*Vatham, Pitham, Kapham*) to ensure sustained physical resilience and youthful vigor.

## keywords

Kaya Karpam, Rishi Brahmmamuni, Suddhi, Tridosha, Vatham, Pitham, and Kapham.

## 1. INTRODUCTION

Brahmmamuni Karpam stands as a preeminent formulation within the Siddha system of medicine, one of the world's oldest traditional healing lineages rooted in Dravidian culture. This traditional polyherbal preparation is attributed to Rishi Brahmmamuni, a luminary among the eighteen primordial *Siddhars* (spiritual scientists) who laid the foundations of Tamil medical literature. As a foundational element of *Kaya Kalpa Chikitsa* the specialized branch of Siddha science dedicated to rejuvenation and longevity Brahmmamuni Karpam is designed to transcend the limitations of conventional disease treatment. Its primary objective is not merely the improvement of symptoms but the fundamental transformation of the body's resistance to degeneration. The term *Kayakarpam* is derived from the Tamil words *Kaya* (body) and *Karpam* (stone-like durability). In this context, the formulation acts as a biological shield, and aim to arrest the natural process of agin. [1]

It prevents premature signs of senescence such as *Narai* (graying of hair), *Thirai* (wrinkling of the skin), and general frailty. It also strengthens the innate immunity. Achieving a precise equilibrium of the *tridhosam.* The efficacy of Brahmmamuni Karpam is due to synergistic blend of seven distinct herbals. However, the raw potency of these botanicals is refined through a rigorous and elaborate purification process known as Suddhi. In Siddha pharmaceutics, *Suddhi* is critical; it is a detoxification protocol designed to eliminate

impurities, mitigate toxicity, and enhance the bioavailability of the bioactive compounds. This ensures that the final product is potent and safe for human consumption. Brahmmamuni Karpam is indicated for a wide spectrum of chronic ailments. It has been employed in the management of refractory skin diseases (dermatopathies), chronic respiratory conditions, and rheumatic disorders involving inflammation and pain [2]. Beyond its somatic applications, the formulation is prominent for its psychosomatic benefits, believed to enhance mental clarity, cognitive function, and kindle internal spiritual energy. However, the administration of such potent *Kalpa* medicines requires a disciplined approach. It demands strict observance to Pathiyam (dietary and lifestyle restrictions) to facilitate proper adaptation. The guidance of a qualified medical practitioner, specifically a Bachelor of Siddha Medicine and Surgery (BSMS), is necessary to determine the proper dosage and duration, ensuring the therapy yields its promised vitality without adverse effects. [3]

## 2. BRAHMMAMUNI SIDDHAR

Brammahmuni Siddhar stands as a seminal figure within the ancient Tamil Siddha lineage, celebrated for his profound contributions to spiritual philosophy, alchemy, and medicine. As one of the eighteen principal Siddhars, he represented the tradition's core such as Yoga, medicine, and alchemy. Brahmmamuni's philosophy emphasizes on the transmutation of the human physique into a divine instrument, advocating for physical longevity and holistic well-being as essential prerequisites for spiritual liberation. Brahmmamuni made pivotal advancements in the development of complex Herbo-mineral formulations. He advocated meticulous *Suddhi* (purification) protocols and critical processes devised to eliminate toxicity from potent metals and minerals to detoxify. His medical doctrine is strongly rooted in the restoration of humoral homeostasis, aiming to balance the *Mukkutram* (*Vatham, Pitham,* and *Kapham*) to prevent disease and arrest degeneration. These advanced medical insights were traditionally encoded in cryptic and symbolic Tamil verses, a stylistic method intended to preserve the secrecy and integrity of this knowledge for future generations. [4]

### 2.1. Siddha Medicine

The classical texts provide a comprehensive framework incorporating the botanical identification and taxonomy of medicinal flora, the confer significant immunomodulatory benefits and a broad spectrum of therapeutic effects. These ingredients are recognized for their anti-ulcer, gastroprotective, anti-inflammatory, and anti-complex pharmaceutical processing of herbo-mineral formulations, and specific detoxification protocols. Furthermore, they delineate precise guidelines for posology and therapeutic application. This literature posits that the pharmacological efficacy of the medicine is intrinsically linked to the ethical integrity and spiritual discipline of the practitioner during the preparation process. [5]

### 2.2. Rasavatham (Alchemy)

A substantial portion of Rishi Brahmmamuni's literary corpus is dedicated to the intricate science of alchemy (Rasavada). His treatises provide detailed expositions on the purification (Suddhi) and stabilization of mercury, the pharmacological application of sulfur and minerals, and the precise regulation of thermal cycles. However, this alchemical discourse transcends mere material transmutation; it is articulated as a profound allegory for inner spiritual refinement, where the chemical purification of matter serves as a symbolic representation of the soul's evolution [6]

### 2.3. Kayakalpa, Longevity and Scientific Convergence

Brahmmamuni posited that physical longevity is a fundamental prerequisite for spiritual progression and self-realization. Despite originating in a pre-modern era, Brahmmamuni's methodologies exhibit a profound convergence with contemporary biomedical principles [7] Preventive Medicine and Public Health: His holistic health framework prioritizes disease prevention over symptomatic treatment. His recommendations regarding dietary discipline, sleep hygiene, and breath regulation align closely with modern preventative medicine strategies and lifestyle management protocols. From a modern pharmacological perspective, this reflects an early, empirical awareness of toxicity management and the necessity of safety profiling in drug development. Modern science acknowledges the critical role of trace minerals in enzymatic and metabolic regulation. The herbo-mineral formulations attributed to Brahmmamuni demonstrate an advanced understanding of pharmacokinetics, where minerals are processed to enhance bioavailability and therapeutic efficacy while mitigating potential cytotoxicity [1]

## 3. COMPOSITION OF BRAHMMAMUNI KARPAM

As per the classical literature available in Tamil, Brahmmamuni Karpam is a polyherbal formulation composed of a specific blend of seven medicinal herbs. This synergistic combination is reported to microbial properties, while also playing a vital role in maintaining oral hygiene and optimizing digestive function. [4]

**Table-1 List of Herbal Ingredients used in Brahmmamuni Karpam**

| S.No | Herbs used in Karpam | Parts used |
|---|---|---|
| 1 | Glycyrrhiza glabra | Roots |
| 2 | Nigella sativa | Seeds |
| 3 | Syzygium aromaticum | Flower |
| 4 | Cuminum cyminum | Seeds |
| 5 | Mesua Ferre | Flower |
| 6 | Anethum graveolans | Seeds |
| 7 | Coriandrum sativum | Seeds |

### 3.1. Glycyrrhiza glabra L (Athimathuram)

Glycyrrhiza glabra L is known as as Licorice and traditionally revered as Athimathuram in Tamil medicine, and represents one of the most pharmacologically significant species within the Fabaceae family. For several years, this perennial herbaceous legume has served as a cornerstone of ethnopharmacology, spanning the ancient medical systems of Egypt, Greece, Rome, and China. Its medicinal value is concentrated in its extensive rhizome and root system, which serves as a biological factory for a diverse array of bioactive secondary metabolites. The most prominent among these is Glycyrrhizin that provides the root with its characteristic sweetness. The pharmacological profile of G. Glabra is remarkably broad, characterized by potent anti-inflammatory, antioxidant, antimicrobial, and immunomodulatory activities. Clinical and laboratory investigations have validated its efficacy in treating various systemic disorders. In respiratory medicine, it acts as a powerful demulcent and expectorant, providing relief for throat infections, persistent coughs, and even adjunct support for tuberculosis management. In the gastrointestinal tract, licorice extracts are utilized for their anti-ulcer properties, effectively coating the stomach lining and regulating acid secretion. Furthermore, its hepatoprotective nature makes it a vital agent in managing liver diseases, including hepatitis, by mitigating oxidative stress and inhibiting viral replication. Recent oncological research has also begun to explore its potential in inducing apoptosis in specific malignant cell lines, while its cardiovascular benefits include the regulation of lipid metabolism and plaque stabilization [8]. Thus, modern research continues to refine delivery systems and dosage protocols to harness the profound healing potential of this ancient botanical while ensuring systemic safety. [9]

### 3.2. Nigella sativa (Karuncheeragam)

Nigella Sativa L., commonly known as Black Cumin or Karuncheeragam in Tamil tradition, is an annual flowering herb of the Ranunculaceae family. Renowned globally as the "miracle herb," its seeds have been utilized for millennia in Unani, Siddha, and Ayurvedic systems. The plant's profound medicinal value is primarily attributed to its complex chemical profile, which includes fixed oils, proteins, alkaloids, and saponins. However, its most significant bioactive constituent is thymoquinone (TQ), a volatile oil component that has been the subject of extensive contemporary research.

The therapeutic spectrum of Nigella sativa is remarkably diverse. Scientific investigations have validated its potent antioxidant, anti-inflammatory, and immunomodulatory properties, which serve as the foundation for its multi-organ protective effects. In the cardiovascular system, it assists in the management of hypertension and hyperlipidemia. Its metabolic benefits are equally significant; it enhances insulin sensitivity and glycemic control, making it a critical functional food for type 2 diabetes management. Furthermore, N. Sativa exhibits strong nephroprotective and hepatoprotective activities, shielding vital organs from drug-induced toxicities and oxidative damage. Emerging oncological studies also highlight its potential to inhibit tumor growth and induce apoptosis in various cancer cell lines, while its bronchodilatory effects offer relief in chronic respiratory conditions like asthma [10]. As clinical integration evolves, N. sativa remains a primary candidate for drug discovery, bridging the gap between ancient herbal wisdom and modern evidence-based medicine. [11]

### 3.3. Cuminum cyminum (Seeragam)

Cuminum cyminum is known as Seeragam in Tamil tradition and Cumin in English. It is a significant aromatic herb belonging to the Apiaceae (Umbelliferae) family. It has gained substantial scientific interest for its role as a functional food. The plant's medicinal efficacy is largely attributed to its volatile oils and secondary metabolites, most notably cuminaldehyde, which serves as the primary bioactive marker for its therapeutic potential. The pharmacological spectrum of C. cyminum is broad, characterized by potent antioxidant, anti-inflammatory, and antimicrobial properties. In metabolic health, cumin has demonstrated remarkable clinical efficacy in weight management and obesity control. Clinical trials have exhibited that cumin extract can significantly reduce Body

Mass Index (BMI), waist circumference, and fat mass in overweight individuals. Its anti-diabetic potential is evidenced by its ability to improve insulin sensitivity and regulate blood glucose levels in Type 2 diabetes patients. The herb also exhibits profound organ-protective effects, particularly nephroprotective and hepatoprotective activities, which help mitigate oxidative damage in the kidneys and improve liver function markers in patients with non-alcoholic fatty liver disease (NAFLD). Additionally, its carminative properties make it a staple for treating various gastrointestinal disorders [12]. Geographically, Cuminum cyminum is native to the East Mediterranean region and Upper Egypt, though it is now cultivated extensively across the globe. [13]

### 3.4. Syzygium aromaticum (Ilavangapoo)

Syzygium aromaticum, known as Ilavangapoo in Tamil tradition and Clove globally, is a premier aromatic spice belonging to the Myrtaceae family. Historically native to the Maluku Islands of Indonesia, it has evolved into a globally significant botanical resource. The medicinal value of clove is exceptionally high, primarily residing in its dried flower buds, which yield a potent essential oil. The pharmacological cornerstone of the plant is Eugenol, a phenolic compound that constitutes up to 70–90% of its essential oil, alongside eugenol acetate and gallic acid. [14]. The therapeutic spectrum of S. aromaticum is distinguished by its superior antioxidant and antimicrobial capabilities, which often surpass those of many common fruits and vegetables. In clinical and traditional settings, it is revered for its Anti-inflammatory and Antiseptic Actions: It effectively inhibits cyclooxygenase-2 (COX-2) and possesses broad-spectrum activity against bacterial and fungal pathogens. Emerging studies suggest its role in regulating blood glucose levels and providing hepatoprotective benefits against oxidative stress [15]. Its resilience and high phenolic content ensure its continued dominance as a critical raw material for the pharmaceutical, cosmetic, and food preservation industries. [16]

### 3.5. Mesua Ferre (Sirunagapoo)

Mesua ferrea L., traditionally recognized as Sirunagapoo in Tamil medicine and Nagakesara in Ayurveda, is a majestic evergreen tree belonging to the Calophyllaceae family. Often referred to as Sri Lankan Ironwood or Indian Rose Chestnut, it is celebrated for its heavy timber and aromatic blossoms. In the context of the Brahmmamuni Karpam formulation, the dried flowers and stamens are the primary focus of pharmacological interest, serving as a rich reservoir of bioactive secondary metabolites, including phenylcoumarins, xanthones (such as euxanthone and mesuaxanthone), triterpenoids, and flavonoids [17]. Antimicrobial Activity: Recent studies highlight its efficacy against various pathogenic strains, supporting its use in treating skin infections and promoting wound healing [18]. While often found growing wild in protected forest reserves, it is frequently cultivated as an ornamental tree in parks and temple gardens due to its elegant form, distinctive drooping pink-to-red young foliage, and highly fragrant white flowers [19]

### 3.6. Anethum graveolans (Sadhakuppai)

Anethum Graveolens L., recognized as Sadhakuppai in Tamil tradition and Dill globally, is an annual aromatic herb belonging to the Apiaceae family. Historically integrated into Ayurvedic and Siddha medicine, it serves as a multifaceted botanical resource valued for both its culinary utility and its essential oil production. The medicinal efficacy of the plant is primarily concentrated in its dried fruits (commonly referred to as seeds), which house a complex essential oil matrix dominated by Carvone, alongside limonene, dillapiole, and various phellandrenes [20]. The pharmacological spectrum of A. graveolens seeds is largely defined by its gastrointestinal and metabolic benefits. Dill seeds are a premier remedy for flatulence, dyspepsia, and intestinal spasms. The essential oil stimulates gastric mucosal secretion and improves overall digestion. Antidiabetic and Hypolipidemic Effects: Contemporary studies indicate that dill extracts can significantly lower blood glucose levels and improve lipid profiles, making it a valuable adjunct for managing metabolic syndrome and Type 2 diabetes. The presence of flavonoids and phenolic acids provides a robust defense against oxidative stress and exhibits broad-spectrum activity against various food-borne pathogens. It is utilized to promote urine flow and enhance milk secretion in lactating mothers, supported by its ability to modulate hormonal pathways [21]. The Indian subcontinent remains one of the largest producers, where the specific climatic conditions of the semi-arid regions contribute to the high carvone content required for pharmaceutical-grade essential oils. [22]

### 3.7. Coriandrum sativum (Malli)

Coriandrum sativum, commonly known as coriander or cilantro, is a versatile annual herb belonging to the Apiaceae family. It is highly valued in both traditional systems like Ayurveda and modern pharmacology for its diverse bioactive profile, which includes essential oils (primarily linalool), flavonoids, and phenolic acids. Its applications are broad-spectrum; it is widely utilized as a digestive stimulant and carminative to treat dyspepsia, flatulence, and diarrhea. Modern research has further validated its antidiabetic potential, as it stimulates insulin secretion and enhances glucose uptake. Additionally, the plant

exhibits significant antioxidant, anti-inflammatory, and antimicrobial properties, making it effective against foodborne pathogens and chronic inflammatory conditions like arthritis. Emerging studies also highlight its neuroprotective effects, suggesting a role in managing anxiety and preventing neurodegenerative diseases such as Alzheimer's by reducing oxidative stress in brain tissues [23]. It is a truly global crop, extensively distributed across temperate and subtropical biomes. Major producing regions include India (the world's largest producer), Morocco, Canada, Pakistan, and various countries in Central Europe and North Africa. The plant is highly adaptable but thrives best in well-drained loamy soils and cool-to-moderate climates; however, it is known for "bolting" when exposed to high temperatures. While primarily a cultivated species, it has naturalized in several parts of North America and Europe, frequently appearing in anthropogenic habitats such as roadsides and fields. This wide distribution underscores its economic and cultural importance as both a staple culinary spice and a cornerstone of herbal medicine [24]

## 4. CONCLUSION

Brahmmmuni Karpam must be explored in both the polyherbal formulation and individually. This is regarded as the boon of the Indian Knowledge system pertaining to Tamil Culture and Tamil Tradition. It is right to explore all the polyherbal formulation and karpam with modern research tools. This review suggests that systematic research can be carried out in Brahmmmuni Karpam.


## ACKNOWLEDGEMENT

The authors wish to express their gratitude to the IKS Division, Ministry of Education, Government of India, for the financial assistance provided to pursue this internship. We also acknowledge the support and guidance of Vidya Bharati Uchcha Shiksha Sansthan (VBUSS), Noida, U.P. Special thanks are due to the Secretary and Principal of Kongunadu Arts and Science College for their administrative cooperation and for allowing the research to be conducted at the institution. Thanks are due to the Department of Biochemistry for providing facilities and laboratory for the research works.


## REFERENCES


1. Sathish, R., & Sanmuga Priya, E. (2020). Therapeutic potential of Karpam medicines in Siddha: A review on Brahmmamuni Karpam. Journal of Pharmacognosy and Phytochemistry, 9(4), 112-118.
2. Pratheep, G., & Kumar, S. (2022). Evaluation of the gastroprotective and anti-inflammatory activities of Brahmmamuni Karpam: A polyherbal Siddha formulation. Ancient Science of Life, 41(2), 88–95.
3. Santhosh Kumar, R., & Muthuvel, W. (2020). A comprehensive review on the pharmaceutical and clinical perspectives of Brahmmamuni Karpam. International Journal of Siddha Medicine, 3(2), 45–52.
4. Brahmamuni. (2014). Brahmamuni vaithiya soothiram , 390 (K. Maruthamuthu, Ed.). Sarasvati Mahal Library & Research Centre, Thanjavur, Tamil Nadus
5. Parthasarathy, K., & Thas, J. J. (2019). The significance of Suddhi (purification) in the preparation of herbo-mineral drugs in Siddha system. Journal of Pharmacognosy and Phytochemistry, 8(3), 1120–1126.
6. Kalyanasundaram, S., & Ganesan, M. (2018). Brahmmamuni Vaithiya Soothiram: A critical analysis of classical Siddha alchemical texts. Journal of Ancient Tamil Science, 12(1), 14–22.
7. Dhandapani, R., & Sabna, B. (2021). Siddha Kayakalpa: A traditional way to lead a disease-free life. International Journal of Siddha Medicine, 4(2), 45–52.
8. Hosseinzadeh, H., & Nassiri-Asl, M. (2015). Pharmacological effects of Glycyrrhiza glabra L. and its bioactive constituents: An update. Phytotherapy Research, 29(12), 18681886. https://doi.org/10.1002/ptr.5487
9. Batiha, G. E. S., Beshbishy, A. M., El-Mleeh, A., Abdel-Daim, M. M., & Devkota, H. P. (2020). Traditional uses, bioactive chemical constituents, and pharmacological and toxicological activities of Glycyrrhiza glabra L. (Fabaceae). Biomolecules, 10(3), 352. https://doi.org/10.3390/biom10030352
10. Ahmad, A., Husain, A., Mujeeb, M., Khan, S. A., Najmi, A. K., Siddique, N. A., Damanhouri, Z. A., & Anwar, F. (2013). A review on therapeutic potential of Nigella sativa: A miracle herb. Asian Pacific Journal of Tropical Biomedicine, 3(5), 337–352. https://doi.org/10.1016/S2221-1691(13)60075-1
11. Srinivasan, K. (2018). Cumin (Cuminum cyminum) and black cumin (Nigella sativa) seeds: Traditional uses, chemical constituents, and nutraceutical effects. Food Quality and Safety, 2(1), 1–16. https://doi.org/10.1093/fqsafe/fyx031
12. Mnif, S., & Aifa, S. (2015). Cuminum cyminum L.: Chemical composition, antioxidant and antibacterial activities. Reviews in Medical Microbiology, 26(4), 160–165.

13. Mnif, S., & Aifa, S. (2015). Cumin (Cuminum cyminum L.) from traditional uses to potential biomedical applications. Chemistry & Biodiversity, 12(5), 733–742. https://doi.org/10.1002/cbdv.201400305
14. Batiha, G. E., Al-Mazaideh, E. C., Al-Najjar, B. O., & Beshbishy, A. M. (2020). Syzygium aromaticum L. (Clove): A vital herbal drug used in health management. Phytotherapy Research, 34(8), 1708–1722. https://doi.org/10.1002/ptr.6634
15. Abdul Aziz, A. H., Rizkiyah, D. N., Qomariyah, L., Irianto, I., Che Yunus, M. A., & Putra, N. R. (2023). Unlocking the full potential of clove (Syzygium aromaticum) spice: An overview of extraction techniques, bioactivity, and future opportunities in the food and beverage industry. Processes, 11(8), 2453. https://doi.org/10.3390/pr11082453
16. Abdul Aziz, A. H., Rizkiyah, D. N., Qomariyah, L., Irianto, I., Che Yunus, M. A., & Putra, N. R. (2023). Unlocking the full potential of clove (Syzygium aromaticum) spice: An overview of extraction techniques, bioactivity, and future opportunities in the food and beverage industry. Processes, 11(8), 2453. https://doi.org/10.3390/pr11082453
17. Maji, A. K., & Banerji, P. (2016). Mesua ferrea L.: A review of the traditional uses, phytochemistry and pharmacology. International Journal of Pharmaceutical Sciences and Research, 7(12), 4730–4740.
18. Rani, S., & Sharma, A. (2021). Mesua ferrea: A review of its traditional uses and pharmacological activities. Journal of Drug Delivery and Therapeutics, 11(2-S), 146–149.
19. Rajalakshmi, P., Vadivel, V., Ravichandran, N., & Brindha, P. (2019). Investigation on pharmacognostic parameters of Sirunagapoo (Mesua ferrea L): A traditional Indian herbal drug. Pharmacognosy Journal, 11(2), 225–230.
20. Chander, V., Gulati, K., & Ray, A. (2020). Anethum graveolens L. (Dill): A comprehensive review on its ethnomedical uses, phytochemistry, and pharmacological activities. Journal of Ethnopharmacology, 261, 113051.
21. Jana, S., & Shekhawat, G. S. (2010). Anethum graveolens: An Indian traditional medicinal herb and spice. Pharmacognosy Reviews, 4(8),179–184. https://doi.org/10.4103/0973-7847.70914
22. Jana, S., & Shekhawat, G. S. (2010). Anethum graveolens: An Indian traditional medicinal herb and spice. Pharmacognosy Reviews, 4(8),79–184. https://doi.org/10.4103/0973-7847.70914
23. Laribi, B., Kouki, K., M'Hamdi, M., & Bettaieb, T. (2015). Coriandrum sativum L.: A review on ethnomedicinal uses, phytochemistry and biological activities. Industrial Crops and Products, 76, 753–771.
24. Parthasarathy, V. A., & Zachariah, T. J. (2008). Coriander. In V. A. Parthasarathy, B.Chempakam, & T. J. Zachariah (Eds.), Chemistry of spices (pp. 190–210). CAB International.