

ROLE OF VISHAGHNA DRAVYAS IN THE MANAGEMENT OF POISONING: AN
AYURVEDIC LITERARY REVIEWDr. Pranali Dipak Dongare^{1*}, Dr. Houserao Patil²¹MD Scholar, PG Department of Agadatantra, LRP Ayurvedic College, Hospital, Post Graduate Institute and Research Center, Urun Islampur, Tal. -Walwa, Sangli, Maharashtra.²HOD and Professor, Department of Agadatantra, LRP Ayurvedic College, Hospital, Post Graduate Institute and Research Center, Urun Islampur, Tal. -Walwa, Sangli, Maharashtra.***Corresponding Author: Dr. Pranali Dipak Dongare**

MD Scholar, PG Department of Agadatantra, LRP Ayurvedic College, Hospital, Post Graduate Institute and Research Center, Urun Islampur, Tal. -Walwa, Sangli, Maharashtra.

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ABSTRACT**Background:** Poisoning remains a significant global public health issue, contributing considerably to illness and mortality across all age groups. In Ayurveda, toxicology is comprehensively addressed under Agadatantra, one of the eight classical branches of Ashtanga Ayurveda, which describes the etiology, diagnosis, prevention, and treatment of various forms of poisoning. A key therapeutic concept within Agadatantra is the use of Vishaghna Dravyas, medicinal substances traditionally recognized for their ability to counteract toxic effects and re-establish physiological equilibrium.^[1-4]**Objective:** To critically review the therapeutic importance of Vishaghna Dravyas described in classical Ayurvedic literature and to correlate their traditional indications with available modern pharmacological evidence in the management of poisoning. **Methods:** A narrative literature review was undertaken using information retrieved from authoritative Ayurvedic classics along with peer-reviewed scientific publications. Data related to the Ayurvedic attributes, therapeutic applications, and experimentally reported pharmacological activities of Vishaghna Dravyas were systematically collected, evaluated, and synthesized.^[1-8]**Results:** Classical Ayurvedic texts identify several medicinal plants with established Vishaghna properties, including Albizia lebeck, Curcuma longa, Tinospora cordifolia, Azadirachta indica, and Phyllanthus emblica. Contemporary pharmacological investigations have demonstrated that these plants possess antioxidant, anti-inflammatory, hepatoprotective, antimicrobial, and immunomodulatory activities, providing scientific support for many of their traditional therapeutic uses in toxicological conditions.^[5-10] **Conclusion:** Vishaghna Dravyas continue to represent an essential component of Ayurvedic toxicology. Correlating classical Ayurvedic concepts with current scientific findings may facilitate the development of complementary therapeutic strategies for poisoning management. Nevertheless, additional experimental investigations and well-designed clinical studies are necessary to further establish their efficacy, safety, and therapeutic potential.^[1-10]**KEYWORDS:** Agadatantra, Vishaghna Dravya, Poisoning, Ayurveda, Toxicology, Herbal antidote.**INTRODUCTION**

Poisoning continues to be a major public health concern throughout the world and is responsible for a substantial number of emergency hospital admissions, long-term health complications, and deaths each year. Toxic exposure may result from accidental, occupational, environmental, or intentional contact with poisonous substances such as pharmaceuticals, pesticides, industrial chemicals, heavy metals, household products, poisonous

plants, and animal venoms. Despite remarkable progress in emergency medicine and intensive care, poisoning remains a significant challenge, particularly in low- and middle-income countries where access to prompt medical care and poison control facilities may be limited.^[9,10]

Ayurveda has recognized the importance of toxicology since ancient times through the specialized branch known as Agadatantra (DamshttraChikitsa), one of the eight divisions of Ashtanga Ayurveda. This discipline provides a systematic description of the origin, classification, clinical features, prognosis, preventive measures, and therapeutic management of different types of poisons. Classical Ayurvedic texts emphasize that early diagnosis and timely intervention are essential for preventing severe complications associated with toxic exposure.^[1-4]

According to Ayurvedic literature, poisons are broadly categorized into SthavaraVisha, JangamaVisha, and KritrimaVisha. SthavaraVisha comprises poisons derived from plants and minerals, whereas JangamaVisha includes toxins originating from living organisms such as snakes, scorpions, spiders, insects, and other venomous animals. KritrimaVisha refers to artificially prepared or compounded poisonous substances produced through the combination of different toxic materials. This classification forms the basis for selecting suitable therapeutic measures according to the source and nature of the poison.^[2]

Classical Ayurvedic scholars describe poison as possessing distinct physicochemical characteristics, including Tikshna (penetrating), Ushna (hot), Laghu (light), Sukshma (subtle), Vyavayi (rapidly disseminating), Vikasi (causing loosening of tissues), and Ashukari (fast acting). Owing to these inherent properties, poison spreads rapidly throughout the body, disturbs the balance of Dosha, damages Dhatu, obstructs Srotas, and ultimately interferes with normal physiological functions. If appropriate treatment is delayed, these pathological changes may lead to serious systemic complications and even death.^[2,3]

To neutralize these harmful effects, Ayurveda recommends the administration of VishaghnaDravyas, which are medicinal substances possessing antidotal and detoxifying properties. These drugs are employed either individually or in combination as constituents of classical Agada formulations. Depending on the clinical condition, the type of poison involved, and the patient's strength, they may be administered in various dosage forms, including powders (Churna), decoctions (Kwatha), medicated ghee (Ghrita), pastes (Lepa), nasal medications (Nasya), eye preparations (Anjana), and fumigation (Dhoopana). Such therapeutic diversity reflects the comprehensive approach of Ayurveda toward the management of poisoning.^[1-4]

Among the numerous VishaghnaDravyas described in Ayurvedic literature, Shirisha (*Albizialebbeck*) occupies a distinguished position and is widely regarded as one of the most effective antidotal plants. Classical texts repeatedly recommend Shirisha for managing different forms of poisoning because of its detoxifying properties. In addition to Shirisha, several other medicinal plants—

including Haridra (*Curcuma longa*), Guduchi (*Tinosporacordifolia*), Nimba (*Azadirachta indica*), Yashtimadhu (*Glycyrrhizaglabra*), Amalaki (*Phyllanthusemblica*), Tulasi (*Ocimumtenuiflorum*), and Vacha (*Acoruscalamus*)—have been described as possessing significant Vishaghna activity. Traditionally, these drugs have been utilized to counteract toxins, reduce inflammation, promote tissue repair, and enhance recovery following poisoning.^[4-8]

Recent advances in phytochemistry and pharmacology have generated growing scientific interest in these medicinal plants. Numerous experimental investigations have demonstrated that many VishaghnaDravyas exhibit potent antioxidant, anti-inflammatory, antimicrobial, hepatoprotective, immunomodulatory, and cytoprotective properties. These biological activities provide plausible scientific explanations for several therapeutic claims documented in classical Ayurvedic texts and suggest that these plants may play a valuable complementary role in the management of toxicological disorders.^[5-10]

Although considerable pharmacological evidence has accumulated over recent decades, information integrating classical Ayurvedic concepts with modern scientific findings remains scattered across different sources. A comprehensive understanding of the traditional descriptions, therapeutic indications, and experimentally validated pharmacological actions of VishaghnaDravyas is therefore required. Such an integrated review may help bridge the gap between classical knowledge and contemporary biomedical research while identifying areas that require further scientific investigation.

Accordingly, the present review aims to critically analyze the role of VishaghnaDravyas described in classical Ayurvedic literature and to examine the available experimental and pharmacological evidence supporting their application in the prevention and management of poisoning. By correlating traditional concepts with current scientific knowledge, this review seeks to highlight the therapeutic significance of these medicinal plants and identify future directions for research in Ayurvedic toxicology.^[1-10]

MATERIALS AND METHODS

Study Design

The present investigation was designed as a narrative literature review to examine the therapeutic significance of VishaghnaDravyas in the management of poisoning as described in classical Ayurvedic literature and to compare these traditional concepts with contemporary scientific evidence. A systematic approach was adopted for the identification, selection, appraisal, and synthesis of relevant information from classical Ayurvedic texts and modern biomedical literature.^[11,12]

Literature Sources

The classical Ayurvedic data were collected from authoritative texts related to Agadatantra and Dravyaguna, including AshtangaSangraha, DhanvantariNighantu, KaiyadevaNighantu, Raja Nighantu, and The Ayurvedic Pharmacopoeia of India.^[11-15]

Modern scientific evidence concerning the pharmacological properties and toxicological relevance of VishaghnaDravyas was gathered from peer-reviewed publications available through electronic databases such as PubMed, Scopus, Google Scholar, and ScienceDirect.^[16-19]

Search Strategy

A comprehensive electronic and manual literature search was performed using appropriate combinations of the following search terms.

- VishaghnaDravya
- Agadatantra
- Ayurvedic toxicology
- Poisoning
- Herbal antidotes
- Medicinal plants
- Antioxidant activity
- Hepatoprotective activity
- Immunomodulatory activity
- Antivenom

Eligibility Criteria

Inclusion Criteria

The review included the following categories of literature:

- Classical Ayurvedic descriptions related to Visha, Agada, and VishaghnaDravyas from standard Ayurvedic treatises.^[11-15]
- Experimental investigations evaluating antioxidant, anti-inflammatory, hepatoprotective, antimicrobial, immunomodulatory, cytoprotective, or antitoxic activities of medicinal plants traditionally described as VishaghnaDravyas.^[16-20]
- Review articles, systematic reviews, and other scholarly publications relevant to Ayurvedic toxicology and medicinal plant research.

Exclusion Criteria

The following sources were excluded from the review.

- Duplicate publications.
- Articles with insufficient methodological details.
- Publications not directly related to poisoning or Vishaghna activity.
- Conference abstracts and reports for which the complete text was unavailable.

Data Extraction

Relevant information from the selected publications was extracted in a standardized manner. The collected data included the Ayurvedic name, botanical name, botanical family, part used, traditional therapeutic indications, reported pharmacological properties, and available experimental or clinical evidence. The extracted

information was subsequently arranged into comparative tables to facilitate systematic evaluation of the medicinal plants included in the review.^[16-20]

Data Analysis

The retrieved literature was analyzed qualitatively by comparing the classical Ayurvedic descriptions of VishaghnaDravyas with findings from modern pharmacological studies. Particular emphasis was placed on biological activities associated with detoxification, including antioxidant, anti-inflammatory, hepatoprotective, immunomodulatory, antimicrobial, and cytoprotective effects. The available evidence was critically interpreted to understand the possible scientific basis of the traditional therapeutic applications of these medicinal plants in poisoning.^[16-20]

Ethical Consideration

As this study was based exclusively on information obtained from published classical Ayurvedic texts and previously published scientific literature, it did not involve human participants or experimental animals. Consequently, approval from an Institutional Ethics Committee was not required.

RESULTS

The review of classical Ayurvedic literature together with contemporary scientific publications revealed that numerous medicinal plants described as VishaghnaDravyas possess properties that may be beneficial in the prevention and management of poisoning. Ayurvedic texts recommend these drugs either as individual remedies or as constituents of classical Agada formulations for treating different categories of Sthavara, Jangama, and KritrimaVisha. Modern pharmacological investigations have further demonstrated that many of these medicinal plants exhibit antioxidant, anti-inflammatory, hepatoprotective, antimicrobial, immunomodulatory, and cytoprotective activities, thereby supporting several of their traditional therapeutic indications.^[21-24]

Among all the medicinal plants reviewed, Shirisha (*Albizialebeck*) is consistently regarded in Ayurvedic literature as one of the most important antidotal drugs. Different parts of the plant, including the bark, leaves, flowers, seeds, and roots, have traditionally been employed in the treatment of various forms of poisoning. Experimental studies have demonstrated antioxidant, anti-inflammatory, and hepatoprotective properties, indicating that Shirisha may reduce toxin-induced cellular injury and help preserve normal tissue function.^[21,25]

Guduchi (*Tinosporacordifolia*) is another extensively documented VishaghnaDravya with additional Rasayana properties. Scientific studies have shown that Guduchi possesses significant antioxidant, immunomodulatory, hepatoprotective, and anti-inflammatory activities. These pharmacological actions may contribute to protection

against oxidative damage, modulation of immune responses, and enhancement of recovery following toxic exposure.^[22,26]

Haridra (*Curcuma longa*) has been widely investigated because of the biological activities of its principal constituent, curcumin. Experimental evidence indicates that curcumin exhibits potent antioxidant, anti-inflammatory, and cytoprotective effects. These activities may help reduce inflammatory responses and oxidative tissue damage associated with different toxic agents.^[23,27]

Nimba (*Azadirachta indica*) has traditionally been recommended in Ayurveda for poisoning as well as for infectious and inflammatory disorders. Modern studies have demonstrated that Neem possesses antimicrobial, antioxidant, anti-inflammatory, and immunomodulatory properties, suggesting its potential supportive role during the management of toxin-induced disorders.^[24,28]

Amalaki (*Phyllanthus emblica*) is recognized in Ayurveda as a valuable Rasayana drug with protective effects on body tissues. Owing to its rich content of vitamin C, tannins, and other polyphenolic compounds, experimental studies have reported remarkable antioxidant and hepatoprotective activities, which may contribute to minimizing oxidative stress and protecting organs affected by toxic substances.^[29]

Yashtimadhu (*Glycyrrhiza glabra*) is another important medicinal plant described in Ayurvedic literature for its soothing and restorative actions. Experimental research has demonstrated anti-inflammatory, antioxidant, and hepatoprotective properties, indicating its potential usefulness as an adjunctive therapeutic agent during recovery from poisoning.^[30]

Important Vishaghna Dravyas and their Ayurvedic properties.

- Shirisha- *Albizia lebbek*
Principal Vishaghna drug
Antioxidant, anti-inflammatory, hepatoprotective.^[21,25]
- Guduchi- *Tinospora cordifolia*
Detoxifying and Rasayana, Immunomodulatory, antioxidant, hepatoprotective.^[22,26]
- Haridra- *Curcuma longa*
Traditionally indicated to alleviate toxic effects
Antioxidant, anti-inflammatory, cytoprotective.^[23,27]
- Nimba- *Azadirachta indica*
Indicated in poisoning and inflammatory disorders,
Antimicrobial, antioxidant, immunomodulatory.^[24,28]
- Amalaki- *Phyllanthus emblica*
Rasayana with tissue-protective action, Antioxidant, hepatoprotective.^[29]
- Yashtimadhu - *Glycyrrhiza glabra*
Restorative and protective medicinal drug, Anti-inflammatory, antioxidant, hepatoprotective.^[30]
Proposed mechanisms underlying the antitoxic effects of Vishaghna Dravyas

Mechanism & Therapeutic significance.

- Antioxidant activity, Neutralizes free radicals and decreases oxidative stress produced by toxic substances.^[26,27,29]
- Anti-inflammatory activity, Reduces inflammatory responses and limits tissue injury following toxic exposure.^[25,27]
- Hepatoprotective activity, Preserves hepatic function and minimizes toxin-induced liver damage.^[25-30]
- Immunomodulatory activity, Regulates immune responses and enhances host defence mechanisms.^[26,28]
- Antimicrobial activity, Assists in controlling microbial infections that may accompany poisoning.^[28]
- Cytoprotective activity, Protects cells and tissues from toxin-mediated structural and functional damage.^[27,29]

The collective evidence obtained from both classical Ayurvedic literature and modern pharmacological studies indicates that Vishaghna Dravyas possess multiple biological activities that may contribute to their traditional use in poisoning. Nevertheless, most available evidence is derived from experimental studies, and further well-designed clinical investigations are required to establish their efficacy, safety, and therapeutic applicability in human poisoning.^[25-30]

DISCUSSION

The findings of the present review reaffirm the pivotal role of Vishaghna Dravyas in Agadatantra, the Ayurvedic branch devoted to toxicology. Classical Ayurvedic texts describe poisoning as a rapidly progressing pathological condition capable of disturbing the normal balance of Dosha, Dhātu, and Srotas, ultimately affecting the body's vital functions. Consequently, Ayurvedic management extends beyond the mere neutralization of toxins and focuses on restoring physiological equilibrium, strengthening body tissues, and promoting recovery through a comprehensive therapeutic approach.^[31-33]

Among the medicinal plants discussed in the classical literature, Shirisha (*Albizia lebbek*) has consistently been accorded the highest importance as a Vishaghna Dravya. Various plant parts, including the bark, leaves, flowers, seeds, and roots, are recommended in traditional formulations for different types of poisoning. Modern pharmacological investigations have reported antioxidant, anti-inflammatory, and hepatoprotective activities, which may help reduce oxidative injury and preserve cellular integrity following toxic exposure. These observations provide scientific support for the traditional Ayurvedic use of Shirisha as an antidotal plant.^[31,34]

Guduchi (*Tinospora cordifolia*) is another extensively studied medicinal plant with established Rasayana and detoxifying properties. Experimental studies indicate that Guduchi possesses potent antioxidant,

immunomodulatory, hepatoprotective, and anti-inflammatory effects. These biological activities may enhance resistance against toxin-induced oxidative stress, regulate immune function, and facilitate tissue repair, thereby supporting its classical indications in the management of poisoning.^[35,36]

The therapeutic relevance of Haridra (*Curcuma longa*) has also been supported by extensive pharmacological research. Curcumin, the principal active constituent of Haridra, has demonstrated significant antioxidant and anti-inflammatory effects through modulation of oxidative stress pathways and inflammatory mediators. These mechanisms may contribute to minimizing cellular injury and protecting tissues from damage produced by toxic substances.^[37,38]

Similarly, Nimba (*Azadirachta indica*) and Amalaki (*Phyllanthusemblica*) exhibit a broad spectrum of pharmacological actions that are relevant to toxicological disorders. Neem has been shown to possess antimicrobial, antioxidant, anti-inflammatory, and immunomodulatory activities, whereas Amalaki demonstrates strong antioxidant and hepatoprotective effects owing to its abundance of vitamin C and polyphenolic compounds. These properties may assist in reducing tissue injury, improving antioxidant defence, and promoting recovery following toxic exposure.^[39,40]

Although the pharmacological evidence supporting VishaghnaDravyas is encouraging, most currently available data originate from laboratory-based investigations and experimental animal studies. Clinical evidence in human poisoning remains comparatively limited. Differences in botanical authentication, extraction methods, pharmaceutical processing, dosage regimens, and study design further restrict direct comparison among published studies and highlight the need for standardized research methodologies.^[35-40]

An important principle emphasized in Ayurvedic toxicology is that successful management of poisoning depends on a holistic therapeutic strategy rather than the administration of a single medicinal plant. Classical treatment protocols incorporate elimination of the poison, administration of appropriate Agada formulations, dietary regulation, supportive therapeutic procedures, and restoration of the normal balance of Dosha, Dhatu, and Srotas. Therefore, the therapeutic effectiveness of VishaghnaDravyas should be interpreted within this comprehensive clinical framework instead of considering them as isolated antidotal agents.^[31-33]

Overall, the available classical descriptions and contemporary pharmacological evidence indicate that VishaghnaDravyas possess considerable potential as complementary therapeutic agents in poisoning management. Future multidisciplinary investigations integrating Ayurvedic concepts with advances in pharmacology, toxicology, phytochemistry, and clinical

medicine are expected to provide stronger scientific validation, facilitate standardization of formulations, and promote evidence-based integration of these medicinal plants into contemporary healthcare practices.^[35-40]

CONCLUSION

The present review demonstrates that VishaghnaDravyas occupy a central position in Agadatantra, the Ayurvedic discipline dedicated to the prevention and treatment of poisoning. Classical Ayurvedic literature describes these medicinal substances as important therapeutic agents that help minimize the harmful effects of toxins by promoting detoxification, maintaining physiological balance, and protecting vital organs from toxic injury.^[41-43]

Among the medicinal plants reviewed, Shirisha (*Albizia lebeck*), Guduchi (*Tinospora cordifolia*), Haridra (*Curcuma longa*), Nimba (*Azadirachta indica*), Amalaki (*Phyllanthusemblica*), and Yashtimadhu (*Glycyrrhiza glabra*) have been consistently recognized in Ayurvedic literature for their Vishaghna properties. Contemporary pharmacological investigations have further demonstrated antioxidant, anti-inflammatory, hepatoprotective, antimicrobial, immunomodulatory, and cytoprotective activities, providing scientific support for their traditional therapeutic applications in toxicological disorders.^[44-48]

Although the existing experimental evidence is encouraging, most published studies have been conducted under laboratory or preclinical conditions. Robust clinical investigations involving standardized formulations, appropriate dosage regimens, safety assessment, and long-term follow-up are still required before these medicinal plants can be widely recommended as evidence-based complementary therapies for poisoning.^[44-48]

The integration of classical Ayurvedic knowledge with contemporary pharmacological and toxicological research offers promising opportunities for the development of scientifically validated approaches to poisoning management. Future interdisciplinary research may strengthen the evidence base for VishaghnaDravyas and facilitate their appropriate incorporation into integrative healthcare practices.^[41-48]

Limitations

The present review is based on information obtained from published Ayurvedic classics and contemporary scientific literature. Differences among studies with respect to plant authentication, extraction techniques, pharmaceutical processing, dosage forms, research methodology, and outcome measures limited direct comparison of findings. Furthermore, the limited availability of high-quality clinical trials remains a significant constraint in evaluating the clinical effectiveness of VishaghnaDravyas for poisoning.^[44-48]

Future Scope

Further research should focus on the following areas.

- Standardization and quality control of Vishaghna Dravyas and classical Agada formulations.^[41–43]
- Experimental studies exploring the molecular and cellular mechanisms responsible for their antitoxic actions.^[44–48]
- Multicentric randomized controlled clinical trials to establish efficacy and safety in different categories of poisoning.^[44–48]
- Comprehensive toxicological evaluation and pharmacovigilance of Ayurvedic antidotal formulations.^[41–48]
- Development of evidence-based integrative protocols combining Ayurvedic toxicology with modern emergency management for poisoning.^[41–48]

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REFERENCES

1. Sharma RK, Dash B, editors. Charaka Samhita. Varanasi: Chowkhamba Sanskrit Series Office.
2. Sharma PV, editor. Sushruta Samhita. Varanasi: Chaukhambha Vishvabharati.
3. Murthy KRS, editor. Ashtanga Hridaya of Vagbhata. Varanasi: Chaukhambha Krishnadas Academy.
4. Chuneekar KC, Pandey GS, editors. Bhavaprakasha Nighantu. Varanasi: Chaukhambha Bharati Academy.
5. Gupta SC, Patchva S, Aggarwal BB. Therapeutic roles of curcumin: lessons learned from clinical trials. *AAPS J.* 2013; 15(1): 195–218.
6. Upadhyay AK, Kumar K, Kumar A, Mishra HS. *Tinospora cordifolia* (Willd.) Hook. f. and Thomson: a review of its pharmacological properties and therapeutic applications. *J Ethnopharmacol.* 2010; 128(1): 1–12.
7. Subapriya R, Nagini S. Medicinal properties of *Azadirachta indica*: a review. *Curr Med Chem Anticancer Agents*; 2005; 5(2): 149–156.
8. Baliga MS, Dsouza JJ. Amla (*Phyllanthus emblica*): traditional uses, phytochemistry and pharmacology. *Food Res Int*, 2011; 44(7): 1768–1775.
9. World Health Organization. Guidelines for Poison Control. Geneva: World Health Organization; 1997.
10. Eddleston M, Buckley NA, Eyer P, Dawson AH. Management of acute poisoning. *Lancet*. 2008; 371(9612): 597–607.
11. Murthy KRS, editor. Ashtanga Sangraha. Varanasi: Chaukhambha Orientalia.
12. Sharma PV, editor. Dhanvantari Nighantu. Varanasi: Chaukhambha Orientalia.
13. Sharma PV, editor. Kaiyadeva Nighantu. Varanasi: Chaukhambha Orientalia.
14. Sharma PV, editor. Raja Nighantu. Varanasi: Chaukhambha Orientalia.
15. Government of India. The Ayurvedic Pharmacopoeia of India. Part I. New Delhi: Ministry of AYUSH.
16. Trease GE, Evans WC. Trease and Evans Pharmacognosy. 16th ed. London: Elsevier; 2009.
17. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 56th ed. Pune: Nirali Prakashan.
18. Brunton LL, Hilal-Dandan R, Knollmann BC, editors. Goodman & Gilman's The Pharmacological Basis of Therapeutics. 13th ed. New York: McGraw-Hill Education; 2018.
19. Rang HP, Ritter JM, Flower RJ, Henderson G. Rang & Dale's Pharmacology. 9th ed. London: Elsevier; 2020.
20. Salehi B, Sharifi-Rad J, Quispe C, et al. Insights into the pharmacological activities of medicinal plants: an updated review. *Biomolecules*. 2019; 9(10): 681.
21. Sharma PV, editor. Priya Nighantu. Varanasi: Chaukhambha Surbharati Prakashan.
22. Singh RH. The Holistic Principles of Ayurvedic Medicine. Varanasi: Chaukhambha Sanskrit Series Office.
23. Gupta SC, Patchva S, Aggarwal BB. Therapeutic roles of curcumin: lessons learned from clinical trials. *AAPS J.* 2013; 15(1): 195–218.
24. Subapriya R, Nagini S. Medicinal properties of *Azadirachta indica*: a review. *Curr Med Chem*. 2005; 5(2): 149–156.
25. Kirtikar KR, Basu BD. Indian Medicinal Plants. 2nd ed. Dehradun: International Book Distributors.
26. Upadhyay AK, Kumar K, Kumar A, Mishra HS. *Tinospora cordifolia* (Willd.) Hook. f. and Thomson: biology and medicinal properties. *J Ethnopharmacol*. 2010; 128(1): 1–12.
27. Hewlings SJ, Kalman DS. Curcumin: a review of its effects on human health. *Foods*. 2017; 6(10): 92.
28. Biswas K, Chattopadhyay I, Banerjee RK, Bandyopadhyay U. Biological activities and medicinal properties of neem (*Azadirachta indica*). *Curr Sci*. 2002; 82(11): 1336–1345.
29. Baliga MS, Dsouza JJ. *Phyllanthus emblica* (Amla): phytochemistry and pharmacology. *Food Res Int*. 2011; 44(7): 1768–1775.
30. Asl MN, Hosseinzadeh H. Review of the pharmacological effects of *Glycyrrhiza glabra*. *Phytother Res*. 2008; 22(6): 709–724.
31. Sharma PV, editor. Sushruta Samhita. Varanasi: Chaukhambha Vishvabharati.
32. Sharma RK, Dash B, editors. Charaka Samhita. Varanasi: Chowkhamba Sanskrit Series Office.
33. Murthy KRS, editor. Ashtanga Hridaya of Vagbhata. Varanasi: Chaukhambha Krishnadas Academy.
34. Kirtikar KR, Basu BD. Indian Medicinal Plants. 2nd ed. Dehradun: International Book Distributors.
35. Upadhyay AK, Kumar K, Kumar A, Mishra HS. *Tinospora cordifolia* (Willd.) Hook. f. and Thomson:

- biology and medicinal properties. *J Ethnopharmacol.* 2010; 128(1): 1–12.
36. Saha S, Ghosh S. *Tinospora cordifolia*: one plant, many roles. *Anc Sci Life.* 2012; 31(4): 151–159.
 37. Hewlings SJ, Kalman DS. Curcumin: a review of its effects on human health. *Foods.* 2017; 6(10): 92.
 38. Gupta SC, Patchva S, Aggarwal BB. Therapeutic roles of curcumin: lessons learned from clinical trials. *AAPS J.* 2013; 15(1): 195–218.
 39. Biswas K, Chattopadhyay I, Banerjee RK, Bandyopadhyay U. Biological activities and medicinal properties of neem (*Azadirachta indica*). *Curr Sci.* 2002; 82(11): 1336–1345.
 40. Baliga MS, Dsouza JJ. *Phyllanthus emblica* (Amla): traditional uses, phytochemistry and pharmacology. *Food Res Int.* 2011; 44(7): 1768–1775.
 41. Sharma RK, Dash B, editors. *Charaka Samhita*. Varanasi: Chowkhamba Sanskrit Series Office.
 42. Sharma PV, editor. *Sushruta Samhita*. Varanasi: Chaukhambha Vishvabharati.
 43. Murthy KRS, editor. *Ashtanga Hridaya of Vagbhata*. Varanasi: Chaukhambha Krishnadas Academy.
 44. Hewlings SJ, Kalman DS. Curcumin: a review of its effects on human health. *Foods.* 2017; 6(10): 92.
 45. Upadhyay AK, Kumar K, Kumar A, Mishra HS. *Tinospora cordifolia* (Willd.) Hook. f. and Thomson: biology and medicinal properties. *J Ethnopharmacol.* 2010; 128(1): 1–12.
 46. Biswas K, Chattopadhyay I, Banerjee RK, Bandyopadhyay U. Biological activities and medicinal properties of neem (*Azadirachta indica*). *Curr Sci.* 2002; 82(11): 1336–1345.
 47. Baliga MS, Dsouza JJ. *Phyllanthus emblica* (Amla): traditional uses, phytochemistry and pharmacology. *Food Res Int.* 2011; 44(7): 1768–1775.
 48. Asl MN, Hosseinzadeh H. Review of the pharmacological effects of *Glycyrrhiza glabra*. *Phytother Res.* 2008; 22(6): 709–724.