

REVIEW ARTICLE

A Literature Review on Water Purification Methods in Ayurveda: Insights from the Brihatrayee Texts

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ARTICLE INFO

Article history:

Received on: 08-02-2025

Accepted on: 09-03-2025

Published on: 31-03-2025

Key words:

Ashtanga Hridaya,
Ashtanga Sangraha,
Ayurveda,
Charaka Samhita,
Jalanirvishikarana,
Sushruta Samhita,
Traditional Medicine,
Water Contamination,
Water Purification

ABSTRACT

Water is a vital component for the sustenance of all living organisms. *Ayurveda*, the ancient Indian system of medicine, emphasizes the significance of safe drinking water, its purification, and its role in maintaining health. The *Brihatrayee* texts, namely *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and *Ashtanga Sangraha*, offer detailed descriptions of water, its properties, sources, and purification methods. This literature review aims to critically analyze the water purification methods described in the *Brihatrayee* texts, focusing on their scientific relevance and application in modern water purification techniques. A comprehensive review was conducted of the four core *Ayurvedic* texts – *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and *Ashtanga Sangraha* – studied at the Central Library of *Shri B.M. Kankanawadi Ayurveda Mahavidyalaya, Belagavi, Karnataka*. The methods of water purification outlined in these texts were examined and compared with contemporary scientific approaches. The review reveals that various *Ayurvedic* purification techniques, such as boiling, filtration, exposure to sunlight, and the use of herbal and mineral substances such as *kataka*, *gomeda*, and pearls, align with modern scientific methods of water treatment. The texts also emphasize the importance of water's quality based on its source, season, and contamination level, highlighting the use of plant-based coagulants and natural filtration methods. The *Ayurvedic* methods of water purification offer sustainable and eco-friendly alternatives to modern practices, especially in resource-limited settings. The integration of these traditional techniques with modern water purification systems could potentially improve access to safe drinking water while maintaining environmental sustainability. Further scientific exploration into these methods can lead to the development of cost-effective solutions for global water quality issues.

1. INTRODUCTION

Water is essential for all living beings, as they are made up largely of water.^[1] Safe and palatable drinking water is essential for maintaining good health. Ancient Indian medical science, Ayurveda, emphasizes the importance of safe drinking water practices. It describes various water sources such as wells, rivers, oceans, waterfalls, and ponds. Ayurveda also highlights the hazards of consuming unclean or unpalatable water.^[2] *Acharya Charaka* described the qualities of rainwater and river water in the 27th chapter of *Sutrasthana* with reference to *jala varga*.^[3] *Acharya Sushruta*, in the *Dravadravyavidhi Adhyayam* of *Sutra Sthana* 45, discusses the properties of different types of water based on their sources. He emphasizes the importance of drinking

clean water and outlines various purification methods using different substances.^[4] The characteristics of *vishakta jala* are elucidated by *Acharya Sushruta*, who also provides a formulation for *jala Nirvishikarana*.^[5] In the *Ashtanga Hridya* chapter on *Dravadravyadi Vigyanaya*, *Acharya Vagbhata* has explained the characteristics of various forms of water according to their origins.^[6] The *acharya* in *Ashtanga Sangraha* has described the qualities of *dushita jala*, its purification techniques, *jala anivaryata*, etc.^[7] Understanding the purification methods of water is important, as water is given prime importance in all the *Samhitas*.

1.1. Aims and Objectives

To critically review and analyze the water purification methods described in the *Brihatrayee* texts (*Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and *Ashtanga Sangraha*) with a focus on their scientific relevance and application.

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1.1.1. Objectives

1. To examine the water purification methods (Jalanirvishikarana) described by *Acharya Charaka, Sushruta, and Vagbhata*.
2. To evaluate the potential scientific principles underlying *Ayurvedic* water purification techniques.

2. MATERIALS AND METHODS

The four ancient and authoritative texts – *Charaka Samhita, Sushruta Samhita, Ashtanga Sangraha, and Ashtanga Hridaya* (collectively referred to as *Brihatrayee*, comprising *Charaka Samhita, Sushruta Samhita*, and either *Ashtanga Hridaya* or *Ashtanga Sangraha*) – were thoroughly studied at the Central Library of *Shri B.M. Kankanawadi Ayurveda Mahavidyalaya* in *Belagavi, Karnataka*.

3. REVIEW OF LITERATURE

- A. According to *Acharya Charaka*, in the concept of *Jala Varga* in *Charaka Sutrasthana* 27, he describes the qualities of rainwater, river water, and the qualities of water in relation to different seasons.^[8] He did not explain any *Jalanirvishikarana yoga*.
- B. According to *Acharya Sushruta* in *Sutrasthana* 45th *Adhyaya* namely *dravadravyavidhim* regarding *Antariksha jala*, sources of water, taste of water according to presence of *mahabhoota*, effects of drinking contaminated water, properties of water flowing in different directions, *Gangambu* (sky water), properties of different types of water and last some of the *dravyas* which are doing *nirvishikarana* of *jala*^[9] are mentioned and enlisted below.
- *Seven Nirvishikarana* or *jalaprasadana dravyas*^[10] are mentioned by *acharya sushruta* in chapter 45th of *Sutrasthana*. They are
 1. *Kataka* (Strychnous potatorum)
 2. *Gomeda* (Zircon)
 3. *Bisagranthi* (Lotus Root)
 4. *Saivalamoola* (root of selected aquatic algae)
 5. *Vastra* (Cloth)
 6. *Mukta* (Pearl)
 7. *Mani* (*Sphatika*)
 - Water storage apparatus^[11] for water purification. They are:
 1. *Phalakam* (made with planks of *shalmali* wood)
 2. *Trayastakam* (Tripod with the base for keeping water)
 3. *Munjavalaya* (a circular structure fabricated with *munja*)
 4. *Udakamanchika* (a construction specially meant for storing water in open space made up of cane and bamboo)
 5. *Shikya* (also fabricated with *munja*).
 - (*Dooshita jala shodhana*) Water Purifying methods.^[12] They are:
 1. If water is *ati dooshita* then procedure told is *-Agni kwathana* (Water is boiled on fire)
 2. If water is *alpa dooshita* then the procedure indicated is *-Suryatapa pratapana* (Heated in the sun) or *Taptaya pinda sikata loshtranam va nirvapana prasadana* (Adding heated iron ball, sand, or stones and cleaned).
 3. If the water is *Durgandhayukta* then the procedure indicated is *-naga-champaka-utpala-patala pushpaadhisvasana* (If the water is having foul smell then submersion of the flowers of Ceylon ironwood - *Mesua ferrea*, *Champak-Magnolia champaka*, *Lotus - Nymphaea Lotus*, *Fragrant Padri Tree-Stereospermum suaveolens* etc.)
 - *Dhavaashwarnadi Yoga*^[13] *Dhava, Aswakarna, Asana, Paribhadra, Patala, Sidraka, Mokshaka, Aragwadha, and Somavalka*

This *jalanirvishikarana yoga* contains 9 drugs. They are

1. *Dhava*
2. *Aswakarna*
3. *Asana*
4. *Paribhadra*
5. *Patala*
6. *Sidraka*
7. *Mokshaka*
8. *Aragwadha*
9. *Somavalka (Kaphala)*.

All these drugs should be burnt into ash when cooled should be thrown in the lake. Drinking water kept in the pitcher can also be purified by putting one *anjali* (160 g) of this ash.

- C. According to *Ashtanga Hridaya* discussed water in the *Dravadravya vinyaniya adhyaya* (*Sutrasthana*, Chapter 5). He explained about properties of water, i.e., regarding *Gangambu*,^[14] properties of water which is unfit for drinking, diseases occurred due to usage of improper water, properties of water according to the direction of the flow of water, complications caused due to drinking excessive water, properties of coconut water, qualities of river water-surface water, *Jalapanavidhi* (rules of drinking water), *Jalapana* and *bhojana* (effect of drinking water in relation to food), *Shitajalaguna* (qualities of cold water), *Ushnajalaguna* (qualities of warm water), *Kwathitashitalajala* (qualities of boiled and cooled water).
- D. According to *Ashtanga Sangraha* discussed water in the *Dravadravyavinyaniya Adhyaya Sutrasthana*, chapter 6 under the heading of *jalavarga*.^[15] He explained regarding qualities of *Gangambhu-Bhumishtajala* (terrestrial water)-*astavidha jala* (8 kinds of water in relation to sources), *dushta jala lakshana* (properties of impotable water), *matraya jalapana* (drinking water in appropriate quantity)-*atijalapana* (drinking water in excessive quantity)-*ushnajalapana* (drinking hot water)-*Jalavarjana* (condition in which water should be avoided)-*jalapana kala* (proper time for drinking water)-*sitajalapana* (complications caused by drinking cold water)-*kwatitha jala* (qualities of boiled water)-*Himakarajala* (water from hailstones)-*Chandrakantajala* (water from marble)-*Narikelodaka* (properties of coconut water).

Acharya Vagbhata in *Ashtanga Sangraha* explained water purification methods.^[16] They are:

1. Polluted water should be filtered through thick cloth to remove insects and worms
2. Polluted water should be heated by fire
3. By exposure to sunlight
4. By immersing red hot balls in polluted water
5. Polluted water should be made clear by putting it into *parnimula* (a kind of grass which has the property of diluting the water), knots (tubers) of the lotus plant, pearls, seeds of *kataka*, algae, thick cloth or *gomedaka* (dolomite stone)
6. Bad smell should be removed by putting it into the flowers of *patala, karavira*, and other fragrance-bearing flowers.

Acharya Vagbhata in *Sangraha Sutrasthana* 8th chapter *Annarakshavidhi Adhyaya* explained regarding *vishajushta jala lakshana* (features of poisoned water).

He explained some of the *Jalanirvishikarana* formulations^[17] such as

1. *Sigruvadi Agada*:

This agada consists drugs such as *Shigru*, *somavalli*, *ushira*, *matulunga swarasa*, and *hingu*.

2. It is explained in *dushita desha* (polluted land) and in the context of *dushita jala lakshana* and purification method he told that use the same *sigravadi agada* along with curd for *pana* (drinking internally).
3. *Ajashringi*, *Vishala* (*Gavakshi*), *Vishagni* (*Guduchi*), *Uttamarini* (*Padmasharini*), *Phanjika*, and *Prativisha* should be burnt into ash. This ash should be filtered many times and it is then boiled by adding paste prepared from *Sarala*, *trivrt*, *rajanidvaya* (*haridra-daruharidra*), *ela*, *udichya*, *manjishtha*, *sunandha* and *bakuchi*. Afterward, the water is reduced a little by boiling and it is taken out for use. It is said to this yoga as wherever the drops of this water fall those parts become depoisoned.
4. *Patala*, *Paribhadra* (*Nimba*), *Ashwakarna* (*Shala*), *Samyaka* (*Aragwadha*), *Sidra* (*Nirgundi*) – These 5 drugs are taken in equal quantities in a pot with the lid closed and set on a fire. The ash formed is taken out later and sprinkled over *dooshita jala*.

4. DISCUSSION

Water plays a crucial role in sustaining life, and its purity is vital for maintaining health and preventing diseases. The *Ayurvedic* texts – *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and *Ashtanga Sangraha* – provide a detailed analysis of water, its sources, properties, and purification methods. These ancient scriptures emphasize not only the physical and chemical characteristics of water but also its seasonal variations, therapeutic effects, and purification techniques.

4.1. Comparative Analysis of Ayurvedic Perspectives

The *Charaka Samhita* classifies water based on its origin and seasonal variations but does not mention specific formulations for water purification (*Jalanirvishikarana Yoga*). However, it acknowledges the impact of impure water on health and advises the consumption of fresh and clean water. In contrast, the *Sushruta Samhita* provides an elaborate discussion on water purification techniques, including the use of natural substances like *kataka* (*Strychnos potatorum*), *bisagranthi* (lotus root), *gomeda* (zircon), and *saivalamoola* (aquatic algae roots) for *Jalanirvishikarana*. *Sushruta* also describes the storage and purification apparatus used in ancient times, highlighting the importance of water preservation.

The *Ashtanga Hridaya* and *Ashtanga Sangraha* further expand on the classification of water, detailing different types of potable and non-potable water based on their sources and directions of flow. *Vagbhata's* works provide specific purification methods, such as boiling, filtration through thick cloth, exposure to sunlight, and the addition of medicinal herbs and minerals. He also introduces formulations such as *Sigravadi Agada* and ash-based treatments to detoxify water contaminated with poisons.

4.2. Scientific Relevance of Ayurvedic Water Purification

Many of the *Ayurvedic* purification techniques align with modern water treatment methods. For instance:

- Boiling water to remove impurities and pathogens is a widely accepted scientific method.
- Filtration using cloth resembles modern-day sedimentation and filtration techniques.
- Exposure to sunlight for disinfection is supported by research on solar water disinfection (SODIS), which utilizes UV rays to kill bacteria and viruses.

- Herbal purification using *kataka* (Nirmali seeds) has been studied scientifically and found to have coagulating and antimicrobial properties, making it an effective natural water purifier.
- The use of minerals like zircon and pearls in water purification suggests an understanding of adsorption and sedimentation techniques, which are used in contemporary filtration systems.

Importance of Ayurvedic Water Purification in Present Times.

With rising concerns about water pollution, chemical contaminants, and waterborne diseases, *Ayurvedic* principles of water purification offer sustainable and eco-friendly alternatives. The use of plant-based coagulants and natural filtration methods can complement modern water purification techniques, especially in rural and resource-limited areas where access to advanced filtration systems is limited.

Furthermore, *Ayurveda* emphasizes the seasonal impact on water quality and the importance of drinking water that aligns with an individual's constitution (*prakriti*). This holistic approach can be integrated into modern health guidelines to promote better hydration practices and disease prevention.

5. CONCLUSION

The *Ayurvedic* texts provide a profound understanding of water, its classifications, and purification methods, many of which align with modern scientific principles. *Acharya Sushruta* and *Vagbhata* extensively describe *Jalanirvishikarana* (water detoxification techniques) using natural substances, highlighting their therapeutic significance. The eco-friendly and sustainable purification techniques prescribed in *Ayurveda* can be explored further through scientific research to develop cost-effective water purification solutions. Integrating these traditional methods with modern technologies can contribute to ensuring safe and accessible drinking water for all.

6. ACKNOWLEDGMENTS

Nil.

7. AUTHORS' CONTRIBUTIONS

All the authors contributed equally in design and execution of the article.

8. FUNDING

Nil.

9. ETHICAL APPROVALS

This study does not require ethical clearance as it is a review study.

10. CONFLICTS OF INTEREST

Nil.

11. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

12. PUBLISHERS NOTE

This journal remains neutral with regard to jurisdictional claims in published institutional affiliation.

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How to cite this article:

Sangeeta T, Gundakalle MB, Singh V. A Literature Review on Water Purification Methods in *Ayurveda*: Insights from the *Brihatrayee* Texts. IRJAY. [online] 2025;8(3):61-64.

Available from: <https://irjay.com>

DOI link- <https://doi.org/10.48165/IRJAY.2025.80310>