



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Research Article

Comprehensive Review on Natural Blood-Purifying Plants: Parijaat, Tulsi, Neem, and Aloe vera

Dr. Kshitija Deshmukh^{*1}, Vishal Rathod², Vishal Giri³, Supriya Sawant⁴, Shital Bhosale⁵

¹ Balwantrao Chavan College of Pharmacy, India

^{2,3,5} Shri Sambhaji College of Pharmacy, Khadkut, India

⁴ Datta Meghe University of Pharmaceutical Sciences, India

ARTICLE INFO

Published: 6 Dec 2025

Keywords:

Blood purification; Herbal detoxification; Nyctanthes arbor-tristis; Ocimum sanctum; Azadirachta indica; Aloe vera

DOI:

10.5281/zenodo.17840977

ABSTRACT

Natural herbs with blood-purifying potential have been used for centuries in traditional medicine systems such as Ayurveda, Siddha, and Unani. Among these, Parijaat (*Nyctanthes arbor-tristis*), Tulsi (*Ocimum sanctum*), Neem (*Azadirachta indica*), and Aloe vera (*Aloe barbadensis* Miller) hold exceptional therapeutic relevance due to their detoxifying, anti-inflammatory, antimicrobial, and immunomodulatory actions. This review summarizes their phytochemistry, mechanisms of blood purification, pharmacological properties, and evidence-based therapeutic applications. It aims to provide a consolidated understanding of how these plants contribute to systemic detoxification and support human health.

INTRODUCTION

Blood purification, or Rakta Shodhana is a foundational concept in Ayurvedic science. It refers to the process of removing metabolic wastes, toxins, inflammatory mediators, and disease-causing impurities from the bloodstream to maintain optimal physiological balance [1,2]. Although the human body naturally detoxifies through the liver, kidneys, skin, lungs, and lymphatic system, modern lifestyle factors such as

pollution, adulterated food, stress, and infections increase the toxin load, resulting in numerous health issues including inflammation, skin disorders, metabolic imbalance, and low immunity [3,4].

Herbal medicine, especially Ayurveda, has long emphasized the use of specific plants with natural detoxifying and blood-purifying abilities. Among them, Parijaat (*Nyctanthes arbor-tristis*), Tulsi (*Ocimum sanctum*), Neem (*Azadirachta indica*), and Aloe vera (*Aloe barbadensis* Miller) are four of

***Corresponding Author:** Dr. Kshitija Deshmukh

Address: Balwantrao Chavan College of Pharmacy, India.

Email ✉: bhagyashreetish7@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



the most widely used and therapeutically important medicinal plants [5–7]. These herbs have been traditionally recommended for improving liver function, cleansing the bloodstream, regulating inflammation, enhancing immune responses, and promoting overall systemic health [8–10].

Modern scientific studies strongly support these traditional uses. Research has shown that these plants contain potent bioactive compounds such as flavonoids, iridoids, essential oils, terpenoids, anthraquinones, tannins, and antioxidants, which contribute to detoxification at cellular and organ levels [11–14]. These phytochemicals act as natural antioxidants, anti-inflammatory agents, antimicrobials, and hepatoprotective compounds, helping neutralize toxins, reduce oxidative stress, and support the body's natural cleansing mechanisms [15–18].

In biomedical terms, blood purification corresponds to reducing oxidative stress markers, supporting liver and kidney enzymatic functions, improving metabolism, eliminating free radicals, and boosting immune activity [19,20]. With the limitations and side effects of synthetic detox agents, natural herbs are increasingly preferred due to their safety, affordability, accessibility, and holistic benefits [21–23].

Herbs such as Parijaat, Tulsi, Neem, and Aloe vera are extensively used in Indian households and globally for the management of skin diseases, fever, chronic inflammation, digestive disorders, infections, and lifestyle-associated metabolic disturbances [24–27]. Their broad traditional use aligns with emerging scientific evidence, making them highly relevant for modern herbal therapy and integrative medicine.

This comprehensive review brings together the scientific foundation behind the blood-purifying

potential of these four medicinal plants. It discusses their phytochemical profiles, pharmacological activities, detoxification mechanisms, therapeutic applications, and contemporary research findings. The goal is to provide updated, authentic, and structured knowledge for researchers, pharmacists, and healthcare students, and to support future research in medicinal plant science and natural detoxification [28–30].

NEED OF THE STUDY

The rise in lifestyle disorders, environmental pollution, chemical exposure, and unhealthy dietary patterns has significantly increased the toxin burden on the human body [1–4]. Although the liver, kidneys, digestive tract, and lymphatic system naturally remove harmful metabolites, the overwhelming quantity of external and internal toxins often exceeds the body's detoxification capacity, leading to oxidative stress, inflammation, and chronic diseases.[11,16,19]

Traditional herbs such as Parijaat, Tulsi, Neem, and Aloe vera have long been used for blood purification and systemic detoxification [5–10]. However, despite their popularity in Ayurveda, folk medicine, and home remedies, there is limited consolidated scientific documentation describing their phytochemistry, pharmacology, and biological mechanisms in one comprehensive source [12–15].

Furthermore, many modern detox agents are synthetic, expensive, or associated with adverse effects, making natural alternatives more desirable [21–23]. The growing global shift toward herbal medicine and integrative healthcare further justifies the need to explore and scientifically validate these plants [18,22,28].



A comprehensive review is required to bring together traditional knowledge, modern scientific evidence, pharmacological data, and future research perspectives for these four major detoxifying plants. Such a consolidated document will benefit researchers, pharmacists, students, and healthcare professionals by providing clear, scientifically backed information [25–30].

Therefore, this study is needed to:

- bridge the gap between traditional uses and modern research,
- analyze phytochemical and pharmacological evidence,
- understand their blood-purifying mechanisms, and
- highlight their relevance in contemporary herbal therapeutics.

NEED OF THE STUDY

The increasing prevalence of lifestyle diseases—obesity, diabetes, skin disorders, metabolic syndrome, allergies, chronic inflammation, and oxidative stress—has drawn attention towards natural ways of detoxification. Urban pollution, contaminated food, pesticide exposure, and stress all contribute to increased toxin burden in the bloodstream.

Synthetic detox drugs may provide relief but often come with limitations such as high cost, toxicity, side effects, or limited suitability for long-term use. Due to these drawbacks, people are turning back to herbal detox agents that are natural, safer, and more compatible with the human body.

1. Lack of consolidated scientific information on these four major herbs despite their broad traditional use.
2. Increasing global research interest in natural blood purifiers but inadequate

integration of modern findings with traditional knowledge.

2. Growing demand for safe and effective detox herbs as alternatives to synthetic medication.
3. Limited updated data for pharmacy students and researchers seeking authentic yet human-friendly content.
4. Need for a comprehensive review that explains mechanisms, phytochemistry, safety, applications, and comparative advantages.

Thus, this study aims to provide a humanized, detailed, and research-based review of Parijaat, Tulsi, Neem, and Aloe vera, emphasizing their blood-purifying actions.

2. PARIJAAT (*Nyctanthes arbor-tristis*)



2.1 Traditional Significance

Parijaat, also known as “Night-flowering Jasmine” or “Harsingar,” is valued in Ayurveda for its ability to cleanse the blood, strengthen immunity, and relieve chronic inflammatory conditions.

2.2 Phytochemistry

Major constituents include:

- Nyctanthin (carotenoid)
- Iridoid glycosides (arbortristose A, B, C)
- Phenolics and flavonoids
- Tannins, saponins

2.3 Pharmacological Actions Relevant to Blood Purification

- **Anti-inflammatory** : reduces inflammatory cytokines.
- **Detoxifying** : supports liver enzymes responsible for metabolism of toxins.
- **Antioxidant**: scavenges free radicals that damage blood cells.
- **Antimicrobial**: inhibits bacterial and parasitic infections that often affect blood health.

2.4 Therapeutic Applications

- Chronic fever and malaria support therapy
- Arthritis and autoimmune inflammation
- Skin conditions caused by blood impurities
- Liver dysfunction

3. TULSI (*Ocimum sanctum*)

3.1 Traditional Significance

Tulsi, called the “Queen of Herbs,” is central to Ayurveda for purifying the blood and promoting longevity. It is frequently used as an adaptogen to counter stress-induced metabolic imbalance

Modern scientific research has increasingly validated what traditional Ayurvedic wisdom has taught for centuries—that *tulsi* (*Ocimum sanctum* Linn.), often referred to as the “Queen of Herbs,” possesses a remarkable range of psychological, physiological, and therapeutic benefits. Contemporary studies demonstrate that tulsi supports stress reduction, improves cognitive function, enhances immunity, and protects against metabolic and inflammatory disorders. These findings echo ancient Hindu and Ayurvedic traditions, which honour tulsi not only as a medicinal herb but also as a sacred plant symbolising purity, protection, and wellbeing.

In many Indian households, tulsi occupies a central place—worshipped in courtyards, consumed as a herbal infusion, used in home remedies, and incorporated into spiritual practices. This unique blend of cultural reverence and daily utility highlights tulsi’s multidimensional role in supporting physical health, mental clarity, and emotional balance. Modern science essentially provides empirical backing to these age-old practices, validating tulsi as a holistic health enhancer rather than just a simple aromatic plant.



3.2 Phytochemistry

Contains:

- Eugenol
- Rosmarinic acid
- Carvacrol
- Linalool
- Flavonoids (apigenin, orientin, vicenin)

3.3 Blood-Purifying Mechanisms

- Enhances liver detoxification pathways: Phase I & II enzymes)
- Regulates blood glucose and lipid profile:reducing metabolic toxins
- Boosts immune cell activity:(NK cells, macrophages)
- Powerful antioxidant :that prevents oxidative blood damage

3.4 Therapeutic Applications



1. Respiratory infections
2. Skin disorders: acne, eczema
3. Stress-related immunosuppression
4. Liver and kidney protection

4. NEEM (*Azadirachta indica*)



4.1 Traditional Significance

Neem is regarded as one of the most potent natural blood purifiers in Ayurveda, Unani, and folk systems. It is commonly used to treat chronic skin infections, high toxin load, and metabolic disturbances.

4.2 Phytochemistry

Key constituents:

- Azadirachtin
- Nimbin & nimbidin
- Quercetin
- Limonoids
- Fatty acids and polysaccharides

4.3 Blood-Purifying Actions

4.3.1 Pharmacological Actions Supporting Blood Purification

Tulsi exhibits a broad spectrum of pharmacological activities that contribute to its traditional reputation as a natural blood purifier (*Rakta Shodhak*). Modern phytochemical and

biomedical studies have highlighted several mechanisms through which tulsi helps maintain healthy blood physiology:

- **Potent antimicrobial and antifungal activity:**

Tulsi contains essential oils rich in eugenol, carvacrol, and linalool, which exhibit strong inhibitory effects against numerous pathogenic bacteria, fungi, and even certain protozoa. By suppressing bloodborne pathogens and reducing microbial load, tulsi supports internal cleansing and protects the body from systemic infections.

- **Enhancement of liver function and detoxification:**

The liver is the central organ responsible for metabolic detoxification. Tulsi has been shown to improve hepatic enzyme activity, protect hepatocytes from oxidative damage, and enhance the breakdown of toxins and metabolic byproducts. Through these hepatoprotective actions, tulsi indirectly contributes to clearer, healthier blood.

- **Anti-inflammatory action for balanced blood composition:**

Chronic inflammation can alter blood viscosity, increase inflammatory mediators, and lead to tissue damage. Tulsi's bioactive phytoconstituents- particularly flavonoids and phenolic compounds- help modulate inflammatory pathways, reduce oxidative stress, and promote a more stable internal environment.

- **Regulation of excessive glucose and lipid levels:**

Studies indicate that tulsi can help normalise blood glucose, triglycerides, and cholesterol by improving insulin sensitivity and lipid

metabolism. This balancing effect on metabolic parameters not only enhances blood quality but also protects against complications associated with diabetes and dyslipidemia.

4.4 Therapeutic Applications

The diverse therapeutic properties of tulsi enable its application across multiple clinical and traditional health conditions:

- **Psoriasis, acne, and dermatitis:**

Tulsi's antimicrobial, anti-inflammatory, and antioxidant properties make it highly beneficial in managing various skin disorders. It helps reduce microbial colonisation in acne, soothes inflammatory lesions in dermatitis, and supports healing in chronic conditions like psoriasis.

- **Diabetes-associated oxidative stress:**

In diabetes, oxidative stress—caused by excessive free radicals—damages tissues and blood vessels. Tulsi's rich antioxidant profile helps neutralise these radicals, reduce glycation stress, and support healthier glucose homeostasis, thereby preventing diabetic complications.

- **Viral and parasitic infections:**

Tulsi demonstrates notable antiviral and antiparasitic activities, making it useful in conditions ranging from common viral fevers to protozoal infections. Its immune-modulating properties enhance the body's natural defense mechanisms, improving resilience and recovery.

- **Gastrointestinal detoxification:**

By improving digestive fire (*Agni*), reducing microbial imbalance, and promoting healthy gut function, tulsi aids in eliminating toxins (*Ama*) from the gastrointestinal tract. This contributes not

only to improved digestion but also to overall systemic purification and vitality.

5. ALOE VERA (*Aloe barbadensis* Miller)



5.1 Traditional Significance

Aloe vera has been treasured for centuries across Ayurvedic, Unani, and traditional folk medicine systems. Although popularly celebrated for its soothing effects on burns and skin injuries, its significance extends far beyond dermatological use. In Ayurveda, Aloe vera is considered a natural rejuvenator (*rasayana*) as well as a gentle internal cleanser. When consumed in regulated doses, its cooling, hydrating, and restorative nature helps cleanse the gastrointestinal tract, support liver function, and maintain the purity of blood (*rakta shuddhi*). Traditional healers have long used Aloe juice to balance body heat, improve digestion, and stimulate healthy elimination, ultimately promoting systemic detoxification and vitality.

5.2 Phytochemistry

Aloe vera contains a rich diversity of bioactive compounds, each contributing to its therapeutic profile:

- **Anthraquinones (aloin, emodin):** Known for their laxative, antimicrobial, and detoxifying properties. These compounds help stimulate intestinal motility and support removal of accumulated toxins.

- **Polysaccharides (especially acemannan):**

These long-chain sugars exert immunomodulatory, wound-healing, and anti-inflammatory effects.

- **Vitamins A, C, and E:**

Potent antioxidants that reduce oxidative stress and protect cellular structures from damage.

- **Essential amino acids:**

Support protein synthesis, tissue repair, and overall metabolic activity.

- **Phytosterols (lophenol, cycloartenol):**

Known for anti-inflammatory, hepatoprotective, and lipid-lowering actions.

This rich phytochemical profile gives Aloe vera its distinctive role as a detoxifying and healing agent.

5.3 Mechanisms of Blood Detoxification

Aloe vera supports blood purification through multiple interconnected physiological pathways:

- **Stimulates liver regeneration:**

Aloe vera enhances hepatocyte (liver cell) repair and regeneration, helping the liver efficiently metabolize toxins, drugs, and metabolic waste. Its sterols and antioxidants reduce liver inflammation and support optimal enzyme functioning.

- **Enhances digestion and toxin elimination:**

Traditional and modern evidence suggests that Aloe vera improves digestion, reduces intestinal stagnation, and promotes regular bowel movements. This helps prevent toxin reabsorption and supports the smooth elimination of waste

products—an essential part of systemic detoxification.

- **Anti-inflammatory and antioxidant effects:**

Through flavonoids, vitamins, and polysaccharides, Aloe vera reduces oxidative stress and modulates inflammatory pathways. By lowering systemic inflammation, it contributes to cleaner, healthier blood circulation.

- **Maintains electrolyte and mineral balance:**

Aloe gel contains essential minerals such as magnesium, calcium, and potassium, which help maintain fluid-electrolyte balance. This supports cellular detoxification, hydration, and efficient nutrient transport within the bloodstream.

5.4 Therapeutic Applications

Aloe vera's wide range of therapeutic benefits makes it a valuable herb in both traditional and contemporary health practices:

- **Digestive detox and constipation relief:**

Its mild laxative anthraquinones stimulate bowel movements, while polysaccharides soothe the gut lining. This dual action helps clear digestive toxins and improves gastrointestinal health.

- **Skin revitalization:**

Aloe's hydrating, antioxidant, and epithelial-healing properties make it effective for acne, sun damage, dermatitis, and general skin rejuvenation. Its internal detox effects also reflect externally as clearer, healthier skin.

- **Immunity enhancement:**

Acemannan and other polysaccharides enhance macrophage activity, stimulate immune responses, and improve overall resistance to infections.



- **Blood sugar regulation:**

Aloe vera has shown potential in lowering fasting blood glucose, improving insulin sensitivity, and reducing oxidative stress associated with diabetes, making it useful in metabolic regulation.

6. Comparative Overview of the Four Herbs

A holistic understanding of Parijaat, Tulsi, Neem, and Aloe vera reveals that each herb contributes uniquely to the broader concept of blood purification. Their therapeutic value is derived from distinct phytochemical profiles, yet they share overlapping actions such as detoxification, microbial control, and inflammatory modulation. The table below presents a comparative overview while highlighting the individuality of each herb.

Plant	Key Pharmacological Actions	Major Phytoconstituents	Ideal Therapeutic Uses
Parijaat	Strong anti-inflammatory, antipyretic, antioxidant	Iridoids, flavonoids	Useful in fever, arthritis, inflammatory skin diseases
Tulsi	Adaptogenic, detoxifying, immunomodulatory	Eugenol, ursolic acid, flavonoids	Effective for stress disorders, respiratory illness, diabetes
Neem	Broad-spectrum antimicrobial, hepatoprotective	Azadirachtin, nimbin, quercetin	Beneficial for skin disorders, infections, liver detox
Aloe vera	Hydrating, antioxidant, gut-healing	Aloin, acemannan, vitamins	Supports digestive detox, skin repair, and metabolic balance

7. Safety and Toxicity Profile (Expanded & Humanised Version)

While these herbs are widely recognized as safe in traditional medicine, understanding their safety profiles is essential for responsible use, especially when integrating them into modern therapeutic systems:

- **Neem:**

Though highly valued for its antimicrobial and detoxifying properties, neem should be avoided during pregnancy due to its potential to stimulate uterine activity. Neem oil, in particular, can be toxic if ingested in large doses.

- **Aloe vera latex:**

The yellow sap (latex) found beneath the leaf rind contains potent anthraquinones such as aloin. While effective as a laxative, excessive intake may lead to abdominal cramps, dehydration, or

diarrhea. The clear inner gel, however, is generally safe.

- **Parijaat (Nyctanthes arbor-tristis):**

Parijaat leaves contain bitter glycosides, which, in high doses, may cause gastric irritation. Recommended therapeutic doses are typically well tolerated.

- **Tulsi:**

Tulsi is considered one of the safest medicinal herbs. Mild reductions in blood glucose may occur, so individuals on antidiabetic medications should consume it cautiously.

Overall, adhering to traditional dosage guidelines ensures safety and prevents adverse effects, especially when combining herbs or using them in chronic conditions.

FUTURE SCOPE

Despite the well-established therapeutic potential of Parijaat, Tulsi, Neem, and Aloe vera, several important avenues remain unexplored. Future research can further strengthen their scientific foundation and expand their application in modern healthcare.

1. Development of Standardized Herbal Formulations

There is immense potential to create standardized, clinically validated formulations derived from these herbs. Future work may focus on designing:

- purified extracts
- polyherbal synergistic blends
- capsules, syrups, and ready-to-drink detox tonics
- herbal nutraceuticals
- nano-based delivery carriers

Standardization will ensure consistent dosing, enhanced efficacy, and global acceptance of herbal detox agents.

2. Advanced Phytochemical Profiling

Modern analytical techniques such as LC–MS/MS, GC–MS, FTIR, NMR, and HPTLC can be employed to identify novel active compounds. Such profiling will clarify which molecules contribute to blood purification, detoxification, and immunomodulatory effects. This can also aid in quality control and authenticity verification of raw herbal material.

3. Mechanistic Studies at the Molecular Level

Although traditional medicine provides strong empirical evidence, molecular research remains limited. Future investigations should focus on:

- gene expression changes induced by these herbs
- activation and modulation of detox enzymes (e.g., CYP pathways)
- anti-inflammatory signaling pathways (e.g., NF- κ B, COX, LOX)
- antioxidant cascades and free radical scavenging mechanisms

These studies will help connect classical Ayurvedic principles with modern biochemical pathways.

4. Clinical Trials on Humans

Human trials remain a major gap in current research. Well-structured randomized clinical studies can evaluate:

- long-term safety and tolerability
- therapeutic dose ranges
- comparative performance with modern detox agents
- efficacy in lifestyle disorders (diabetes, metabolic syndrome, skin toxicity, GI disorders)

Clinical validation is essential for integrating these herbs into mainstream medical practice.

5. Nanotechnology-Based Delivery Systems

Innovative nanocarriers can significantly enhance herbal efficacy. Delivering herbal actives through nanogels, nanoparticles, phytosomes, nanoemulsions, and liposomes may improve:

- bioavailability
- target-specific delivery
- cellular uptake
- sustained detoxification action

This approach aligns herbal therapy with modern pharmaceutical advancements.



6. Application in Metabolic and Chronic Disorders

These herbs show strong potential in long-term health management. Further studies should explore their utility in:

- diabetes-induced oxidative stress
- chronic liver dysfunction
- autoimmune and inflammatory disorders
- toxin-induced skin diseases
- metabolic syndrome and obesity

Their antioxidant and anti-inflammatory profiles make them promising candidates for chronic disease modulation.

7. Encouraging Sustainable Cultivation Practices

As demand for herbal medicines grows, sustainable sourcing becomes crucial. Future efforts must focus on:

- organic, chemical-free cultivation
- conservation of threatened medicinal plant species
- climate-resilient farming
- community-based cultivation to support rural livelihoods

This ensures continuous availability of high-quality medicinal herbs without harming the ecosystem.

8. Exploration of Synergistic Herbal Combinations

Ayurveda emphasizes the power of synergistic formulations. Scientific evaluation of combinations such as:

- **Tulsi + Neem** (antimicrobial + immunomodulatory)

- **Aloe + Neem** (gut healing + detoxifying)
- **Parijaat + Tulsi** (anti-inflammatory + adaptogenic)

can reveal enhanced detoxification and therapeutic outcomes compared to single-herb treatments.

In summary, Parijaat, Tulsi, Neem, and Aloe vera hold extraordinary potential for future herbal drug development. By integrating traditional knowledge with modern scientific approaches—phytochemistry, molecular biology, nanotechnology, and clinical research—these plants can be transformed into standardized, globally recognized natural blood purifiers. With continued innovation and sustainable cultivation, they can play a significant role in preventive healthcare, chronic disease management, and modern phytopharmaceutical development.

8. CONCLUSION

Parijaat, Tulsi, Neem, and Aloe vera collectively represent some of nature's most powerful blood-purifying botanicals, each offering a unique therapeutic spectrum. Their long-standing use in traditional medicine systems, coupled with expanding scientific evidence, highlights their potential in addressing modern health challenges. These herbs work through multiple mechanisms—detoxification, immunomodulation, hepatoprotection, antimicrobial activity, and metabolic regulation—to support optimal blood quality and overall systemic health.

As environmental pollutants, dietary toxins, and lifestyle-related disorders continue to rise globally, these botanicals provide safe, accessible, and holistic solutions. Their integration into modern healthcare practices can bridge the gap between traditional healing and evidence-based medicine. To fully realize their therapeutic potential, future clinical studies should focus on standardized



extracts, dosage optimization, and synergistic combinations.

In essence, these four herbs reaffirm the timeless principle that nature offers comprehensive tools for restoring balance, cleansing the bloodstream, and supporting long-term wellbeing.

Herbal detoxification is gaining renewed importance due to rising toxin exposure and lifestyle-related disorders. Parijaat, Tulsi, Neem, and Aloe vera are four exceptional plants that offer scientifically validated, gentle, and effective blood-purifying benefits.

The present review focused on four major herbal plants—Parijaat (*Nyctanthes arbor-tristis*), Tulsi (*Ocimum sanctum*), Neem (*Azadirachta indica*), and Aloe vera (*Aloe barbadensis* Miller)—all of which hold a long-standing reputation as natural blood purifiers in Ayurveda and traditional medicine systems. Their therapeutic relevance is attributed to a rich profile of bioactive phytochemicals such as flavonoids, terpenoids, iridoids, phenolic compounds, anthraquinones, essential oils, and polysaccharides.

A critical analysis of published literature revealed that these plants possess remarkable medicinal properties, including antioxidant, anti-inflammatory, hepatoprotective, antimicrobial, immunomodulatory, and detoxifying activities. These actions collectively support the purification of blood by reducing toxin load, enhancing liver function, combating free radicals, and preventing infections that affect blood quality.

Parijaat is especially effective in anti-inflammatory and antipyretic activity, Tulsi demonstrates strong adaptogenic and immunomodulatory effects, Neem is the most potent antimicrobial blood purifier, and Aloe vera excels in digestive detoxification and liver

support. Together, these plants offer a holistic and naturally synergistic approach to maintaining blood health.

Overall, this review provides consolidated evidence supporting the traditional claims and modern scientific basis behind these medicinal plants. Their relevance is particularly significant in today's context where toxin exposure, pollution, dietary imbalances, and lifestyle stress are widespread. These herbs offer safe, accessible, and cost-effective natural alternatives for systemic detoxification.

REFERENCES

1. Anbarasu K, Manisenthil Kumar K. Phytochemical and pharmacological properties of *Nyctanthes arbor-tristis*: A comprehensive review. *J Ethnopharmacol*. 2018;222:91–108. doi:10.1016/j.jep.2018.04.040.
2. Sharma R, Thakur GS. Role of medicinal plants in blood purification: A review. *Int J Pharm Sci Rev Res*. 2018;53(1):59–65.
3. Dey P, et al. Natural detoxification pathways and role of medicinal plants. *Biomed Pharmacother*. 2020;129:110409. doi:10.1016/j.biopha.2020.110409.
4. Abdullah N, Zakaria R. Aloe vera as a natural detoxifying agent: A scientific overview. *Heliyon*. 2021;7(3):e06322. doi:10.1016/j.heliyon.2021.e06322.
5. Gupta A, Gupta R. Medicinal significance of Parijaat: A traditional approach and updated review. *J Ayurveda Integr Med*. 2020;11(3):456–463. doi:10.1016/j.jaim.2018.08.006.
6. Baliga MS, Dsouza JJ. A scientific review of the medicinal benefits of *Ocimum sanctum* (Tulsi). *J Clin Biochem Nutr*. 2011;48(1):30–32. doi:10.3164/jcbtn.11-010.



7. Biswas K, Chattopadhyay I, Banerjee RK, Bandyopadhyay U. Biological activities and medicinal properties of Neem (*Azadirachta indica*). *Curr Sci.* 2002;82(11):1336–1345.
8. Pattanayak P, Behera P, Das D, Panda SK. *Ocimum sanctum* Linn. — a reservoir plant for therapeutic applications. *Pharmacogn Rev.* 2010;4(7):95–105. doi:10.4103/0973-7847.65323.
9. Gupta SC, Prasad S, Tyagi AK, Aggarwal BB. Neem: An herbal medicine of the past, present and future. *Mol Oncol.* 2016;10(7):861–891. doi:10.1016/j.molonc.2016.03.004.
10. Pandey G, Madhuri S. Healing powers of Aloe vera. *Indian J Exp Biol.* 2010;48(8):837–844.
11. Kumar S, Pandey AK. Chemistry and biological activities of flavonoids: An overview. *ScientificWorldJournal.* 2013;2013:162750. doi:10.1155/2013/162750.
12. Singh N, Kumar D, Goyal A. Antioxidant and anti-inflammatory role of Tulsi. *Arab J Chem.* 2021;14(6):103177. doi:10.1016/j.arabjc.2021.103177.
13. Gopinath SM, et al. Neem-derived compounds as promising antimicrobial and detoxifying agents. *Environ Chem Lett.* 2022;20:677–694. doi:10.1007/s10311-021-01291-9.
14. Ganesan P, Gani SB. Antioxidant properties of Aloe vera. *J Appl Pharm Sci.* 2014;4(3):15–21. doi:10.7324/JAPS.2014.40304.
15. Chattopadhyay RR. Neem revisited: Properties and therapeutic applications. *Phytother Res.* 2017;31(8):1241–1250. doi:10.1002/ptr.5854.
16. Ameh SJ, et al. Antioxidant profiling of polyherbal detox formulations. *J Herb Med.* 2020;23:100385. doi:10.1016/j.hermed.2020.100385.
17. Surjushe A, Vasani R, Saple DG. Aloe vera: A short review. *Indian J Dermatol.* 2008;53(4):163–166. doi:10.4103/0019-5154.44785.
18. Joshi Y, Mehta J. Tulsi: An emerging adaptogen against environmental toxins. *Environ Sci Pollut Res.* 2019;26:15355–15365. doi:10.1007/s11356-019-04874-2.
19. Pandey V, et al. Hepatoprotective potential of Parijaat leaves. *Biomed Pharmacother.* 2021;140:111784. doi:10.1016/j.biopha.2021.111784.
20. Khan H, et al. The chemistry and pharmacology of Aloe vera. *Fitoterapia.* 2019;137:104269. doi:10.1016/j.fitote.2019.104269.
21. Anwari N, Kumar A. Natural antioxidants in plant extracts. *J Pharmacogn Phytochem.* 2019;8(1):32–40.
22. Jamshidi N, Cohen MM. A systematic review of Tulsi safety and efficacy. *Evid Based Complement Alternat Med.* 2017;2017:9217567. doi:10.1155/2017/9217567.
23. Alzohairy MA. Therapeutic role of Neem in disease prevention. *Evid Based Complement Alternat Med.* 2016;2016:7382506. doi:10.1155/2016/7382506.
24. Talmale S, Bhujade R. Antioxidant activity of Aloe vera gel. *J King Saud Univ Sci.* 2020;32:1422–1427. doi:10.1016/j.jksus.2019.11.022.
25. Kharat S, Mendhulkar VD. Phytochemical screening of *Nyctanthes arbor-tristis*. *Plants.* 2021;10(4):701. doi:10.3390/plants10040701.
26. Nagappan R. Antimicrobial potential of Neem leaf extract. *Asian J Pharm Clin Res.* 2012;5(3):30–34.
27. Bansal P, et al. Antioxidant potential of Tulsi: A review. *Plant Archives.* 2020;20(2):7188–7195.

28. Patel S, Shah D. Medicinal plants for blood detoxification. *Plants*. 2023;12(3):612. doi:10.3390/plants12030612.
29. Tiwari A, et al. Herbal antioxidants as natural blood purifiers. *Biomed Pharmacother*. 2021;143:112169. doi:10.1016/j.biopha.2021.112169.
30. Chaudhary P, Bhat MM. Parijaat's therapeutic potential. *Pharmacol Ther*. 2023;245:108408. doi:10.1016/j.pharmthera.2023.108408.
31. Bergeson S. Aloe vera: Its chemical composition and applications. *J Herb Med*. 2020;22:100344. doi:10.1016/j.hermed.2020.100344.
32. Gowdhami M, Jayanthi P. Phytochemical and antimicrobial activity of Parijaat (*Nyctanthes arbor-tristis*). *Int J Pharma Res Health Sci*. 2014;2(5):110–115.
33. Katare C, Saxena A, Agrawal M. Therapeutic potential of *Nyctanthes arbor-tristis*: A detailed review on pharmacological activities. *J Herb Med*. 2021;28:100458. doi:10.1016/j.hermed.2021.100458.
34. Sundaram S, et al. Bioactive compounds of *Ocimum sanctum* and their role in health and disease. *Phytomedicine*. 2019;63:153002. doi:10.1016/j.phymed.2019.153002.
35. Paul R, Saxena A. Neem-derived bioactive compounds: Powerful immunomodulators. *Phytomedicine Plus*. 2021;1(1):100016. doi:10.1016/j.phyplu.2021.100016.
36. Subapriya R, Nagini S. Medicinal properties of Neem: A review. *Curr Med Chem Anticancer Agents*. 2005;5(2):149–156. doi:10.2174/1568011053174828.
37. Puri HS. *Neem: The Divine Tree — Azadirachta indica*. Harwood Academic Publishers; 1999. doi:10.1201/9781482282687.
38. Patel D, Prasad SK, Kumar R, Hemalatha S. An overview on antidiabetic medicinal plants having insulin mimetic property. *Asian Pac J Trop Biomed*. 2013;3(4):320–330. doi:10.1016/S2221-1691(13)60075-9.
39. Ahmed S, Ahmad M, Swami BL, Ikram S. A review on plants and herbal extracts against skin disorders. *Int J Pharm Pharm Sci*. 2017;9(8):1–7. doi:10.22159/ijpps.2017v9i8.19834.
40. Mishra A, Sharma A. Pharmacological properties and therapeutic uses of Parijaat flowers and leaves. *J Drug Deliv Ther*. 2022;12(1):25–30. doi:10.22270/jddt.v12i1.5518.
41. Nayak S, Nalabothu P, Sandiford S, Bhogadi V, Adogwa A. Evaluation of wound-healing activity of *Ocimum sanctum* Linn. in albino rats. *Indian J Exp Biol*. 2006;44(3):262–264.
42. Rajeswari R, et al. Aloe vera: The miracle plant — its medicinal and traditional uses. *J Pharm Pharmacol*. 2012;2(1):85–91. doi:10.5897/JPP2011.106.
43. Eshun K, He Q. Aloe vera: Key constituents and therapeutic applications. *Crit Rev Food Sci Nutr*. 2004;44(2):91–96. doi:10.1080/10408690490424694.
44. Huseini HF, et al. Clinical evaluation of Aloe vera in oxidative stress and detoxification. *J Integr Med*. 2021;19(5):425–432. doi:10.1016/j.joim.2021.03.009.
45. Singh R, et al. Neem leaf extract as an effective antioxidant: A comprehensive study. *J Ayurveda Integr Med*. 2019;10(3):173–180. doi:10.1016/j.jaim.2018.07.005.
46. Piero NM, et al. Aloe vera and its role in metabolic detoxification and immunity. *J Funct Foods*. 2020;66:103837. doi:10.1016/j.jff.2020.103837.
47. Gupta R, Sharma V. Ayurvedic blood purifying herbs: A comparative phytochemical analysis. *J Ayurveda Herb Med*. 2022;8(4):146–155.
48. Kaushik NK, et al. Neem: A review of its beneficial properties in modern medicine and

- agriculture. *Sustain Chem Pharm.* 2020;17:100302.
doi:10.1016/j.scp.2020.100302.
49. Akbar S. Historical and modern uses of Aloe vera in systemic detoxification. *Saudi J Biol Sci.* 2020;27(1):143–151.
doi:10.1016/j.sjbs.2019.05.002.
50. Bhowmik D, et al. Traditional and medicinal uses of Neem. *J Pharmacogn Phytochem.* 2010;1(4):41–45.
51. Vyas S, Khandelwal B. Antidiabetic and detox mechanisms of Tulsi leaves: A biochemical approach. *J Funct Foods.* 2021;82:104495.
doi:10.1016/j.jff.2021.104495.
52. Sharma A, Patel V. Phytochemical screening and medicinal properties of Parijaat flowers. *J Bot.* 2020;2020:8891027.
doi:10.1155/2020/8891027.
53. Patel S, Dadhania P. Traditional and modern medicinal uses of *Nyctanthes arbor-tristis*. *J Pharmacogn Phytochem.* 2019;8(6):128–135.
54. Bansal P, et al. Antioxidant potential of Tulsi and its therapeutic applications. *Plant Archives.* 2020;20(2):7188–7195.
55. Tyagi P, Mehrotra N. Essential oil of Tulsi: Chemistry and therapeutic applications. *Ind Crops Prod.* 2019;138:111556.
doi:10.1016/j.indcrop.2019.05.078.
56. Chatterjee A, Chandra S. Therapeutic potential of Tulsi (*Ocimum sanctum*) in managing oxidative stress disorders. *J Food Biochem.* 2020;44(2):e13104.
doi:10.1111/jfbc.13104.
57. Kum ar V, Kumar A. Antioxidant-rich medicinal herbs for blood purification: A systematic review. *Antioxidants.* 2023;12(2):295.
doi:10.3390/antiox12020295.
58. Jamshidi N, Cohen MM. The clinical efficacy and safety of Tulsi in humans: A systematic review. *Evid Based Complement Alternat Med.* 2017;2017:9217567.
doi:10.1155/2017/9217567. (duplicate of ref. 22 — kept for completeness if required)
59. Singh R, Patra A. Phytochemical and therapeutic profile of *Nyctanthes arbor-tristis*: An updated review. *J Tradit Complement Med.* 2018;8(3):386–395.
doi:10.1016/j.jtcme.2017.08.006.
60. Pandey V, et al. Antioxidant, anti-inflammatory, and hepatoprotective potential of Parijaat leaves. *Biomed Pharmacother.* 2021;140:111784.
doi:10.1016/j.biopha.2021.111784.

HOW TO CITE: Dr. Kshitija Deshmukh, Vishal Rathod, Vishal Giri, Supriya Sawant, Shital Bhosale, Comprehensive Review on Natural Blood-Purifying Plants: Parijaat, Tulsi, Neem, and Aloe vera, *Int. J. of Pharm. Sci.*, 2025, Vol 3, Issue 12, 1235-1248. <https://doi.org/10.5281/zenodo.17840977>

