



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



Review Paper

Herbal Hematinics for Anemia

Gaund Parija*, Ghavit Rutuja, Garg Pushp, Kalegore Sumit, Sirgire Kavita

Shivlingeshwar College of Pharmacy, Almala, Tq- Ausa, District- Latur, Maharashtra.

ARTICLE INFO

Published: 03 Mar 2026

Keywords:

Anemia, Herbal hematinics,
Medicinal plants,
Hemoglobin, Iron
bioavailability, Green
nanotechnology..

DOI:

10.5281/zenodo.18851269

ABSTRACT

Anemia is a public health concern, especially in developing countries, because of nutritional deficiencies and limitations of current therapies. Herbal hematinic agents, which are derived from medicinal plants, are a safe and cost - effective approach to address the anemia problem by promoting hemoglobin, iron metabolism, and erythropoiesis. The review aims to discuss the anti - anemic potential of some selected medicinal plants and the potential of green nano - herbal formulations for managing anemia.

INTRODUCTION

Anemia is a very common nutritional disorder, and it is a serious global public health problem, especially for women and children of developing countries. According to the World Health Organization, it has been estimated that 24 - 25% of the total population of the world is suffering from anemia. Anemia is a major public health problem in India, and its prevalence is very high. Anemia is a major cause of reduced physical

power, mental ability, immunity, and quality of life, which may lead to severe consequences if not treated properly. Although the conventional treatment of anemia is effective, it has some limitations. Hence, there is a need for herbal medicine, which is rich in active principles that enhance iron absorption and hematopoiesis. Because of their safety, availability, and acceptability, herbal hematinics are considered a promising approach for managing anemia.

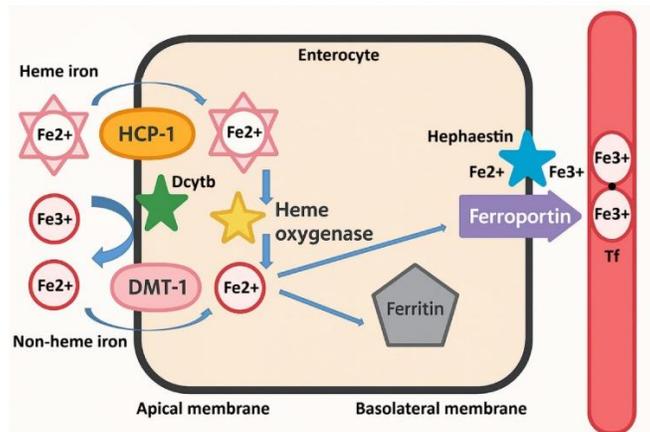
***Corresponding Author:** Gaund Parija

Address: Assistant professor, *Shivlingeshwar College of Pharmacy, Almala, Tq- Ausa, District- Latur, Maharashtra*

Email ✉: gaundparija@gmail.com

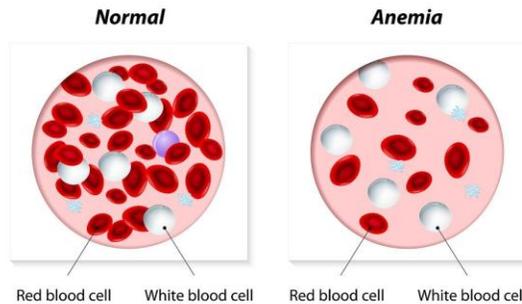
Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.





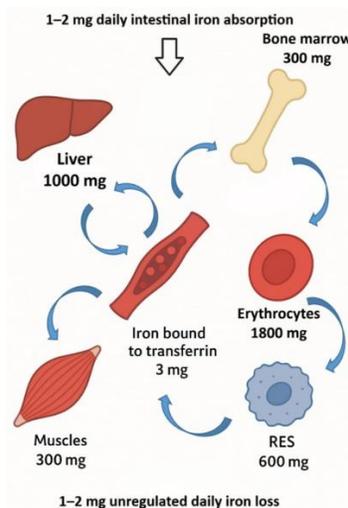
Anemia an overview: Anemia is the clinical and biological entity that results from the decrease in the quantity of hemoglobin in the blood and the quantity of red blood cells. Hemoglobin is the highly essential iron and protein combination in

the red blood cells. It has played a crucial role in the transportation of the oxygen from the lungs to the different parts of the body.



Moreover, it has played a crucial role in the transportation of the carbon dioxide from the different parts of the body to the lungs, where it is finally exhaled out of the body. Additionally, it has played a crucial role in the regulation of the acid - base balance in the blood. The normal

concentration of hemoglobin in the blood of adult males ranges from 13 - 17 g/dL, in the blood of adult females ranges from 12 - 15 g/dL, and in the blood of children ranges from 11 - 14 g/dL.



As a result of the low concentration of hemoglobin in the blood, different forms of anemia occur, and they are:

- Iron - deficiency anemia
- Megaloblastic anemia
- Aplastic anemia
- Hemolytic anemia

One - fourth of the total population in the world is suffering from anemia. The maximum prevalence of anemia is observed in the following places:

- South Asia
- Sub - Saharan Africa
- Southeast Asia

1. Epidemiology:

Anemia is a result of the imbalance between the body's iron needs and the body's iron requirements, which is generally due to the conditions associated with chronic or acute blood loss. The primary factors that lead to anemia are the following.

1. Poor Iron Absorption: This leads to iron deficiency anemia. This is when the body is unable

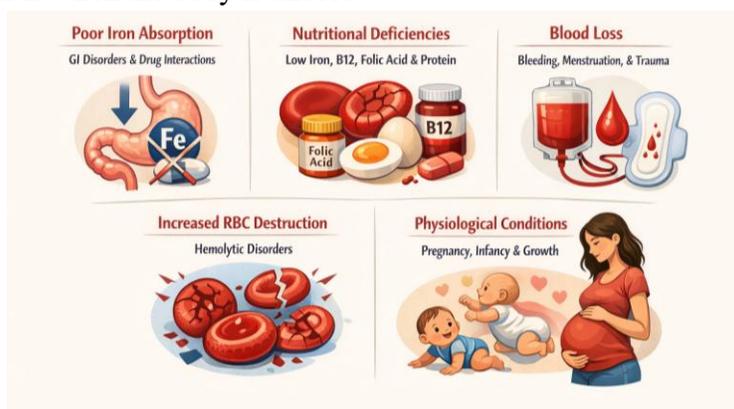
to absorb iron from the diet, even if the iron is ingested in adequate amounts. This is due to gastrointestinal disorders and drug interactions.

2. Nutritional Deficiencies: Iron, vitamin B₁₂, folic acid, and protein deficiencies lead to the body's inability to produce hemoglobin and red blood cells.

3. Blood Loss: Acute or chronic blood loss due to menstruation, gastrointestinal bleeding, trauma, or parasitic infections leads to a decrease in the iron content and red blood cell count in the body.

4. Increased Red Blood Cell Destruction: Hemolytic disorders lead to the premature destruction of red blood cells, which exceeds the body's ability to produce new cells.

5. Physiological Conditions: Pregnancy, infancy, and growth lead to an increase in the iron requirements of the body and anemia.



2. Herbal hematinics:

Herbal hematinics are plant drugs that are used to enhance hemoglobin levels, red blood cell formation, and nutrient deficiencies. Herbal hematinics are more preferable compared to allopathic medicines, especially when treating anemia. For a long time, plants have been a major source of medicine in India and ancient systems.

In Ayurveda, the Charka Samhita and Charka Shshruta give extensive descriptions of medicinal plants. As a result of that, medicinal plants have gained significant interest in recent years owing to their widespread availability, cost - effectiveness, and the general perception that they provide therapeutic benefits with a reduced risk of side effects. The management cost of anemia in

developing countries is expensive, and the majority of the population cannot afford it. Hence, it depends on medicinal plants. Ethnobotanical and pharmacological research has revealed that a substantial number of plant species are used for their medicinal properties. As many traditional medicines have been used successfully by a large number of people for a long time. The medicinally significant hemoglobin levels and red blood cell counts. According to this, pomegranates help maintain healthy blood parameters and encourage erythropoiesis. It contains a lot of flavonoids, anthocyanins, and polyphenols, all of which have been shown to have potent antioxidant qualities. Of various plants has been documented through interaction and interviews with the native people of such areas, including common people, practitioners, knowledgeable people, Vaidya, local physicians, etc. Medicinal plants are a good source of various bioactive compounds, which act as a key active agent. A variety of vital nutrients, including iron, folic acid, vitamins, and bioactive phytochemicals, which aid in the development of red blood cells and the elevation of hemoglobin, can be found in herbal hematinics. Boost iron absorption as well.

3. Herbal remedies:

- **Emblica officinalis:**

Due to the fact that the plant is not just a hematinic but also a restorative agent, the plant Emblica Officinalis which is also known as Indian gooseberry or Amla, is of great importance. It is established that the fruit of the plant is rich in Vitamin C and organic acids such as citric, gallic, malic, tartaric, and many more, as well as other minerals, amino acids, polyphenolic, flavonoid, and tannoid compounds. It is a well-known fact that the antioxidant components of the plant have the ability to form hemoglobin and protect red blood cells, and it is established that the main

active compound of the plant that has the ability to act as a hematinic is Vitamin C, which has the ability to increase the ability of the human body to absorb iron.

- **Spinacia oleracea**

Spinacia oleracea, a nutrient-rich green leafy food, also known as spinach, is known to possess blood-building properties. The nutrient content present in Spinacia oleracea includes iron, folic acid, vitamin C, chlorophyll, and minerals such as calcium, potassium, and magnesium. The iron content present in Spinacia oleracea, which is essential for the production of hemoglobin, possesses hematinic properties. The production of megaloblastic anemia is prevented, and the production of red blood cells is stimulated due to the presence of folic acid. The presence of chlorophyll, which is similar in composition to hemoglobin, stimulates the production of red blood cells, and vitamin C enhances the absorption of iron in the intestines. The digestive and laxative properties of Spinacia oleracea enhance the absorption of nutrients.

- **Moringa oleifera**

A very valuable medicinal plant, the drumstick tree (*Moringa oleifera*), has been used extensively for treating and preventing anemia. *Moringa oleifera* contains proteins, amino acids, iron, folic acid, vitamin B complex, and an antioxidant phytochemical. The leaves of the plant are particularly rich in essential micronutrients. The major reason for the hematinic activity of *Moringa oleifera* is the high iron content of the plant, which stimulates the synthesis of hemoglobin. Folic acid and vitamin B complex stimulate DNA synthesis and red blood cell formation. Amino acids and antioxidants stimulate red blood cell formation and promote blood and management of anemia.

- **Beta vulgaris**



Beta vulgaris, commonly known as beetroot, is rich in iron and is widely used. The ant - anemic principle of beetroot in ethanol. Beetroot is a moderately iron – rich vegetable. 0.8 g of iron is present in 100 g of beet plant. It contains iron, folic acid, natural nitrates, magnesium, potassium, trace minerals, and antioxidant compounds. The se constituents contribute to its nutritional and therapeutic value. The hematinic effect of *Beta vulgaris* is mainly due to its iron and folic acid content, which support hemoglobin synthesis and red blood cell formation. Minerals present in beetroot participate in enzymatic reactions involved in hematopoiesis. Natural nitrates are converted into nitric oxide in the body, which improves blood circulation through vasodilation. Beetroot, particularly in juice form, helps improve hemoglobin levels and acts as a supportive dietary agent in the management of anemia.

- ***Trigonella foenum – graecum***

Iron, folic acid, vitamin B6, trace minerals like copper and magnesium, antioxidant polyphenols, and flavonoids are all found in the seeds of the medicinal plant *Trigonella foenum - graecum*, also known as fenugreek. These components aid in the production of red blood cells and hemoglobin, and their appetite - boosting and digestive properties enhance the absorption of nutrients needed for blood synthesis. Fenugreek exhibits hematinic activity as a result of these characteristics.

- ***Withania somnifera***

Withania somnifera, generally appertained to as Indian ginseng or Ashwagandha. Alkaloids, withanolides, iron, and antioxidants are among the substances set up in *somnifera* that add to its remedial benefits. *Withania somnifera*'s hematinic exertion is linked to its capacity to enhance bone gist function, which in turn promotes the product of blood cells. Iron, folate, and vitamin B12, all

necessary for the conflation of red blood cells, are more absorbed when digestion and metabolism are bettered guard erythrocytes from oxidative damage and promote effective iron uptake.

- ***Asparagus racemosus***

In low - lying areas of India, *Asparagus racemosus*, also known as Shatavari or Satamuli, grows. Research studies have shown that *Asparagus racemosus* extract has a significant protective effect against anemia. Alkaloids, flavonoids, antioxidant compounds, and steroidal saponins (shatavarins) are some of the substances found in *asparagus racemosus* that support its pharmacological properties. *Asparagus racemosus* capacity to enhance hemoglobin concentration and red blood cell production is linked to its hematinic activity. According to experimental research, administering its extract improves nutritional status and raises the red blood cell count. Its antioxidant components support general metabolic function and aid in blood cell protection.

- ***Carica papaya***

The tropical fruit known as *Carica papaya* has been used extensively due to its high nutritional and therapeutic benefits. The medicinal properties of *Carica papaya* are attributed to the presence of polyphenols, flavonoids, tannins, alkaloids, saponins, glycosides, and antioxidant compounds. The phytochemical components of *C. papaya*, which have antioxidant and membrane - stabilizing qualities that shield red blood cells from harm, are primarily responsible for the hematinic activity of the fruit. By raising hemoglobin and hematocrit levels, its extracts enhance hematological parameters. *Papaya*'s anti - sickling activity promotes blood health and preserves the normal structure of red blood cells.

- ***Brassica oleraceae***

Iron content is high in broccoli and other Brassica oleracea vegetables. Its therapeutic qualities are enhanced by the presence of iron, folic acid, vitamin C, dietary fiber, and other vital vitamins and phytochemicals. Brassica oleracea's iron content, which promotes hemoglobin synthesis and red blood cell formation, is primarily responsible for its hematinic activity. While folic acid encourages the maturation of red blood cells, vitamin C improves the body's absorption of iron. Its phytochemical components support healthy hematological parameters and enhance iron utilization even more.

- **Punica Granatum**

Punica granatum is an important fruit for medicine and nutrition, and its positive effects on blood health have been thoroughly investigated. The hematinic activity of *Punica granatum* is attributed to the presence of iron, vitamins A, C, and E, flavonoids, anthocyanins, polyphenols, and antioxidant compounds. *Punica granatum*'s iron content, which promotes hemoglobin synthesis and red blood cell production, is primarily responsible for its hematinic activity. Iron is better absorbed and used by the body when vitamin C is present.

4. Botanical Details and Hematinic Activity of Herbal Plants:

Plant Name	Biological Source (Family)	Chemical Constituents	Mechanism of Action	Uses
Emblica officinalis	Dried fruit of <i>Emblica officinalis</i> (Phyllanthaceae)	Vitamin C, organic acids, polyphenols, flavonoids, tannins	Enhances iron absorption, supports hemoglobin synthesis	Immunomodulatory, hepatoprotective, antidiabetic, antiulcer
Spinacia oleracea	Leaves of <i>Spinacia oleracea</i> (Amaranthaceae)	Iron, folic acid, vitamin C, chlorophyll, minerals	Promotes RBC maturation	Antioxidant, antihypertensive, digestive aid, cardioprotective, eye health
Moringa oleifera	Leaves of <i>Moringa oleifera</i> (Moringaceae)	Iron, folic acid, vitamin B complex, proteins, antioxidants	Promotes hemoglobin synthesis, supports RBC formation	Antidiabetic, antimicrobial, hepatoprotective, nutritional supplement
Beta vulgaris	Root of <i>Beta vulgaris</i> (Amaranthaceae)	Iron, folic acid, nitrates, minerals, antioxidants	Supports hematopoiesis	Antihypertensive, antioxidant, anti-inflammatory
Trigonella foenum-graecum	Seeds of <i>Trigonella foenum-graecum</i> (Fabaceae)	Iron, folic acid, vitamin B6, polyphenols, flavonoids	Promotes hemoglobin synthesis	Antidiabetic, hypocholesterolemic, digestive stimulant
Withania somnifera	Roots of <i>Withania somnifera</i> (Solanaceae)	Withanolides, alkaloids, iron, antioxidants	Bone marrow nutrient, enhances absorption, protects RBCs	Adaptogenic, anti-stress, immunomodulatory
Asparagus racemosus	Roots of <i>Asparagus racemosus</i> (Asparagaceae)	Steroidal saponins, flavonoids, alkaloids	Increases RBC count and hemoglobin	Antiulcer, immunomodulatory, female reproductive tonic, adaptogenic, neuroprotective, rejuvenating tonic

Plant Name	Biological Source (Family)	Chemical Constituents	Mechanism of Action	Uses
Carica papaya	Leaves and fruit of <i>Carica papaya</i> (Caricaceae)	Flavonoids, tannins, alkaloids, saponins, glycosides	Improves hematological parameters, anti-sickling action	Digestive aid, antimicrobial, wound healing, anti-inflammatory, antiplatelet activity
Brassica oleracea	Inflorescence of <i>Brassica oleracea</i> (Brassicaceae)	Iron, folic acid, vitamin C, fibers	Supports RBC formation	Anticancer, antioxidant, cardioprotective, detoxifying, immune supportive
Punica granatum	Fruit of <i>Punica granatum</i> (Lythraceae)	Iron, vitamins A, C, E, flavonoids, anthocyanins	Stimulates erythropoiesis, improves iron absorption, antioxidant action	Antioxidant, cardioprotective, antimicrobial, anticancer, antidiabetic

5. Herbal Nanotechnology Approaches for Anemia Management:

Prospects and research for anemia treatment in the future. Herbal hematinics have gained popularity as safer substitutes due to their natural origin, multi – targeted mechanisms, and conventional medical acceptance. Green nanotechnology, which combines nanoscience and herbal medicine, presents a promising approach to boosting therapeutic potency.

Green nano - herbal formulations that use plant extracts as reducing, stabilizing, and capping agents enable the environmentally friendly synthesis of nanoparticles. Because they don't require harsh chemicals or toxic solvents, green nanoparticles are ideal for biomedical applications. The increased surface area of nanoparticles improves intestinal absorption and dissolution. The dosage needed for therapeutic efficacy may be reduced by green nano herbal hematinics, which improve iron absorption through passive diffusion and carrier - mediated transport. Future studies may concentrate on developing herbal nanoformulations for specific types of anemia. Because of the potential for mass production at a reasonable cost made possible by developments in green synthesis techniques, nano

herbal hematinics might be more appropriate than herbal hematinics.

CONCLUSION

Anemia is still a major global health concern, especially in developing countries, due to a number of factors, such as poor absorption of micronutrients, nutritional deficiencies, and inadequate healthcare facilities. This review highlights several medicinal herbs that have strong anti - anemic properties, including *Asparagus racemosus*, *Carica papaya*, *Brassica oleracea*, *Beta vulgaris*, *Trigonella foenum - graecum*, *Withania somnifera*, *Spinacia oleracea*, *Moringa oleifera*, *Punica granum*, and *Embllica officinalis*. These herbs are said to have hematinic properties through a number of mechanisms, including enhancing iron absorption.

REFERENCES

1. The World Health Organization. The WHO global database on anemia, 1993 - 2005, shows the frequency of anemia worldwide. World Health Organization, Geneva, 2008.
2. Clark SF. Anemia due to iron insufficiency. *Nutr Clin Pract.* 23(2), 2008 128 – 41.
3. de Benoist B, Wojdyla D, Cogswell M, Egli I, and McLean E. Global Anemia Prevalence,



- WHO Vitamin and Mineral Nutrition Information System, 1993 - 2005. Journal of Public Health Nutrition, 12(4), 2009, 444 - 54.
4. A brief review of medicinal shops for the treatment of anemia by Patil RR and Navghare AA. 87 - 92 in J Pharm Sci Innov 2019; 8(3).
 5. Deshna A. A review of shops with anti - anemic parcels. 16(1) 48 – 55 in IOSR J Pharm Biol Sci. 2021.
 6. Kane WA, Tra Bi FH, and Koffi A. Research on the iron content of ethnomedicinal shops used in Côte d'Ivoire's traditional drug to treat anemia. 2012; 9(1) 81 - 7; Afr J Tradit Complement Altern Med.
 7. Saha U, Dharwadkar P, Sur S, et al. Review of factory extracts as a remarkable treatment for anemia. In 2018, Ann Plant Sci. 7(4) 2162 - 70.
 8. A review of the physiological benefits of fenugreek(*Trigonella foenum - graecum*) for health is handed by Srinivasan K. 203 – 24 in Food Rev Int. 22(2).
 9. Owis AI. A review of broccoli, the green beauty. In 2015, J Pharm Sci Res. 7(9) 696 - 703.
 10. Chowdary GS. Creation and in vitro analysis of a herbal hematinic tea for iron supplementation based on phytochemicals. 19(1):45 – 52 in Asian J Pharm 2025.
 11. Bansode FW, Arya KR, Meena AK, Singh RK. Stem bark of *Saraca indica* Linn.: hematinic and anti - anemic effects against rats' anemia caused by phenylhydrazine. 11(5):1210 - 2 in World J Pharm Res. 2022 2.
 12. Nagori BP, Sasmal D, and Goyal M. Root extract from *Asparagus racemosus* Willd. exhibits anti - anemic properties in experimental models. Pharm Sci Res Int. 2011;2(7):1825 - 30.
 13. The pharmacological effects and medicinal uses of *Moringa oleifera* are reviewed by Khan Y, Panchal S, Vyas N, Butani A, and Kumar V. Publ Sci Res Int. 2012; 3(2): 306 - 11.
 14. Shukla S, Mehta A, Mehta P, Bajpai VK. *Withania somnifera* aqueous leaf extract's antioxidant capacity and total phenolic content. J Pharm Sci. Indian, 2009; 71(4):416 - 9.
 15. Jain DL, Khandelwal KR, Baheti AM, and Jain SR. An ethnobotanical survey of the use of medicinal plants by tribes in the Satpura area of Maharashtra's Dhule and Jalgaon districts. Indian Journal of traditional Knowledge, 2009, 9(1), 152 - 7.
 16. Outsuki N, Dang NH, Kumagai E, Kondo A, Iwata S, and Morimoto C. *Carica papaya* leaf aqueous extract has immunomodulatory and anti - tumor properties. 2010;(3):760 – 7.
 17. Aviram M, Rosenblat M, Gaitini D, et al. A randomized double - blind trial found that consuming pomegranate juice lowers oxidative stress, atherogenic modifications to LDL, and platelet aggregation. 71(5), Am J Clin Nut 2000, 16. - 76.
 18. Hematological alterations in iron deficiency anemia treated with supplements of *Beta vulgaris*, Gupta R, Sharma A, Sharma MC, et al. Int J Green Pharm. 2019;3(2):123 - 9.
 19. Iravani S, Varma RS. Green synthesis: application of nanomaterials in biomedical and biotechnological fields 2000;22:264 - 83.
 20. Fraceto LF, Das G, Patra JK, et al. Nano - based drug delivery systems: current advancements and potential applications. J Nanobiotechnology, 16(1), 71 (2018).

HOW TO CITE: Gaund Parija, Ghavit Rutuja, Garg Pushp, Kalegore Sumit, Sirgire Kavita, Herbal Hematinics for Anemia., Int. J. of Pharm. Sci., 2026, Vol 4, Issue 3, 142--150. <https://doi.org/10.5281/zenodo.18851269>

