



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



Review Article

Pharmacotherapeutic Significance and Antidiabetic Potential of *Grewia asiatica* Linn.: An In-Depth Analytical Review

Chandresh Maurya*

Om Sai Vindhya College of Pharmacy, Tisui Marihan, Mirzapur, Uttar Pradesh, India

ARTICLE INFO

Published: 13 May, 2026

Keywords:

Grewia asiatica, Phalsa,
Antidiabetic activity, Herbal
pharmacotherapy, Oxidative
stress, Flavonoids

DOI:

10.5281/zenodo.20160731

ABSTRACT

Diabetes mellitus continues to emerge as a serious global health issue, particularly in developing nations where lifestyle transitions and genetic predisposition contribute to its rising incidence. Conventional pharmacological interventions, though effective in glycemic control, often present limitations in terms of adverse effects and long-term safety. In this context, medicinal plants have received renewed scientific attention for their multi-targeted therapeutic actions and comparatively favorable safety profiles. *Grewia asiatica* Linn., commonly known as Phalsa, is one such plant traditionally valued in indigenous systems of medicine. The present review attempts to provide a detailed and critical analysis of the pharmacotherapeutic properties of this plant, with particular emphasis on its antidiabetic potential. The plant is a rich source of biologically active compounds such as flavonoids, anthocyanins, and phenolic acids, which are known to exhibit potent antioxidant and metabolic regulatory effects. Experimental studies conducted on various animal models suggest that extracts of *Grewia asiatica* can significantly lower blood glucose levels, improve insulin sensitivity, and protect pancreatic β -cells against oxidative damage. The antidiabetic action appears to be mediated through multiple pathways, including inhibition of carbohydrate-hydrolyzing enzymes, modulation of glucose uptake, and reduction of oxidative stress. In addition to this, the plant also demonstrates hepatoprotective, anti-inflammatory, and cardioprotective properties, which are particularly beneficial in preventing secondary complications associated with diabetes. Despite encouraging preclinical evidence, there remains a noticeable gap in well-structured clinical studies. Future research should therefore focus on clinical validation, standardization of extracts, and formulation development.

INTRODUCTION

Diabetes mellitus is not merely a metabolic disorder but a complex condition that affects

*Corresponding Author: Chandresh Maurya

Address: *Om Sai Vindhya College of Pharmacy, Tisui Marihan, Mirzapur, Uttar Pradesh, India*

Email ✉: chandreshmaurya2001@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.



multiple physiological systems. It is characterized by chronic hyperglycemia resulting from either insufficient insulin production, impaired insulin action, or both. Over time, uncontrolled diabetes leads to severe complications such as cardiovascular disease, renal dysfunction, nerve damage, and visual impairment. In recent decades, the increasing prevalence of diabetes has prompted extensive research into alternative therapeutic approaches. Although synthetic drugs such as sulfonylureas, biguanides, and insulin therapy remain the cornerstone of diabetes management, their associated limitations—including side effects, cost, and patient compliance issues—have encouraged the exploration of plant-based remedies. Medicinal plants occupy a central role in traditional healthcare systems, particularly in countries like India. Among these, *Grewia asiatica* Linn. has attracted considerable attention due to its diverse therapeutic applications. Commonly known as Phalsa, this plant is widely cultivated in tropical and subtropical regions and is valued not only for its nutritional content but also for its medicinal properties. Traditionally, the fruit has been used as a cooling agent and for the treatment of conditions such as fever, inflammation, and blood disorders. However, recent pharmacological investigations suggest that its therapeutic potential extends far beyond these traditional uses, particularly in the management of metabolic disorders like diabetes.

2. Materials and Methods

2.1 Literature Review Approach

The present review was carried out using a structured and systematic approach to identify, collect, and analyze relevant scientific literature related to *Grewia asiatica* and its pharmacotherapeutic as well as antidiabetic properties. A comprehensive search strategy was designed to ensure maximum coverage of

available data. Electronic databases such as PubMed, Google Scholar, and ScienceDirect were systematically explored. These databases were selected due to their wide indexing of peer-reviewed biomedical, pharmaceutical, and life sciences research. The search process was conducted in multiple stages to improve accuracy and relevance:

- **Stage 1: Initial Keyword Search**
Basic keywords such as “*Grewia asiatica*” and “Phalsa” were used to identify general literature.
- **Stage 2: Advanced Keyword Combination**
Boolean operators (AND, OR) were applied to refine the search. Examples include:
 - “*Grewia asiatica* AND antidiabetic activity”
 - “Phalsa AND pharmacology”
 - “Herbal antidiabetic plants AND oxidative stress”
- **Stage 3: Focused Filtering**
Results were further narrowed down by applying filters such as:
 - Publication type (research articles, reviews)
 - Subject area (pharmacology, pharmacognosy, biochemistry)
 - Language (English)
- **Stage 4: Manual Screening**
Titles and abstracts were carefully screened to identify studies directly related to the pharmacological and antidiabetic potential of the plant.



Additionally, reference lists of selected articles were manually reviewed to identify any relevant studies that might have been missed during database searches.

The literature considered in this review primarily spans publications from the last two decades, ensuring that both classical and recent advancements are included.

2.2 Selection Criteria

To maintain the scientific rigor and reliability of this review, a well-defined inclusion and exclusion framework was followed.

2.2.1 Inclusion Criteria

Studies were included in the review if they satisfied the following conditions:

- **Peer-reviewed Publications:**
Only articles published in recognized, peer-reviewed journals were considered to ensure scientific credibility.
- **Relevance to Study Objective:**
Studies focusing on pharmacological, phytochemical, or therapeutic properties of *Grewia asiatica* were included. Special emphasis was given to those evaluating **antidiabetic activity**.
- **Experimental Evidence:**
Both in vivo (animal studies) and in vitro experimental studies were included. These studies provided measurable outcomes such as blood glucose reduction, enzyme inhibition, and antioxidant activity.
- **Phytochemical Investigations:**
Research articles reporting isolation, identification, or quantification of bioactive compounds present in the plant were

considered essential for understanding the mechanism of action.

- **Review Articles (Supportive Role):**
High-quality review articles were included to support background information and comparative discussion.

2.2.2 Exclusion Criteria

Certain studies were excluded to avoid bias and maintain the quality of the review:

- **Non-peer-reviewed Sources:**
Articles from blogs, magazines, or unpublished reports without scientific validation were excluded.
- **Insufficient Methodological Details:**
Studies lacking clear experimental design, sample size, or statistical analysis were not considered reliable and were excluded.
- **Irrelevant Studies:**
Research not directly related to *Grewia asiatica* or not addressing pharmacological or antidiabetic properties was omitted.
- **Duplicate Publications:**
Repeated data or duplicate studies across multiple platforms were carefully identified and excluded.

2.2.3 Data Extraction and Synthesis

Relevant data from selected studies were systematically extracted and organized under the following categories:

- Phytochemical composition
- Pharmacological activities
- Experimental model used

- Observed antidiabetic effects
- Proposed mechanisms of action

The extracted data were then critically analyzed and synthesized to provide a coherent understanding of the therapeutic potential of *Grewia asiatica*.

2.2.4 Limitations of Methodology

Although efforts were made to ensure a comprehensive review, certain limitations exist:

- Limited availability of human clinical trials
- Variability in extraction methods across studies
- Differences in experimental models and dosages

These limitations were considered during interpretation to avoid overgeneralization of findings.

3. Results

3.1 Phytochemical Profile

The phytochemical composition of *Grewia asiatica* reveals the presence of several bioactive constituents. These include flavonoids such as quercetin and kaempferol, anthocyanins responsible for the characteristic color of the fruit, tannins, and various phenolic compounds.

These constituents are widely recognized for their ability to influence metabolic pathways and protect biological systems from oxidative stress.

3.2 Pharmacotherapeutic Properties

3.2.1 Antioxidant Activity

One of the most significant properties of *Grewia asiatica* is its strong antioxidant potential. Oxidative stress is known to play a central role in the progression of diabetes and its complications. The presence of phenolic compounds in the plant contributes to the neutralization of free radicals and enhancement of endogenous antioxidant defense mechanisms.

3.2.2 Anti-inflammatory Effects

Chronic inflammation is closely associated with insulin resistance. Extracts of Phalsa have been shown to reduce inflammatory markers, thereby contributing to improved metabolic function.

3.2.3 Hepatoprotective Role

The liver plays a key role in glucose metabolism. Studies indicate that *Grewia asiatica* helps maintain liver integrity and function, thereby supporting better glycemic control.

3.2.4 Cardioprotective Effects

Cardiovascular complications are common in diabetic patients. The plant has demonstrated lipid-lowering effects and improved cardiovascular markers in experimental studies.

3.3 Antidiabetic Activity

Experimental findings suggest that *Grewia asiatica* exhibits a significant capacity to regulate blood glucose levels. In animal studies, administration of plant extracts resulted in:

- Reduction in fasting blood glucose
- Improvement in glucose tolerance
- Decrease in glycated hemoglobin (HbA1c)

3.4 Mechanistic Insights



The antidiabetic activity of the plant appears to involve multiple mechanisms:

- Enhancement of insulin secretion from pancreatic cells
- Increased uptake of glucose by peripheral tissues
- Inhibition of digestive enzymes responsible for carbohydrate breakdown
- Protection against oxidative damage

DISCUSSION

The findings compiled in this review clearly indicate that *Grewia asiatica* holds considerable promise as a natural therapeutic agent for diabetes management. Its multifaceted mechanism of action distinguishes it from conventional drugs that often target a single pathway. The antioxidant properties of the plant play a particularly important role in mitigating oxidative stress, which is a major contributor to pancreatic β -cell dysfunction. By preserving the integrity of these cells, the plant helps maintain insulin production and secretion. Furthermore, the inhibition of carbohydrate-digesting enzymes leads to a slower release of glucose into the bloodstream, thereby preventing sudden spikes in blood sugar levels. This effect is particularly beneficial in managing postprandial hyperglycemia. However, despite these encouraging findings, it is important to acknowledge the limitations of current research. Most studies have been conducted on animal models, and there is a lack of large-scale human clinical trials. Additionally, variations in extraction methods and dosage make it difficult to standardize results.

CONCLUSION

Based on the available evidence, *Grewia asiatica* Linn. can be considered a promising candidate for the development of plant-based antidiabetic therapies. Its ability to act through multiple mechanisms, combined with its additional pharmacological benefits, makes it particularly valuable in the holistic management of diabetes.

Nevertheless, further research is required to translate these findings into clinical practice.

REFERENCES

1. Sharma, P., Sharma, J. D., & Verma, P. (2013). Phytochemical and pharmacological properties of *Grewia asiatica* Linn.: A comprehensive review. *International Journal of Pharmaceutical Sciences Review and Research*, 21(2), 72–78.
2. Gupta, R., Singh, R. L., & Singh, S. (2015). Evaluation of antidiabetic and antioxidant potential of *Grewia asiatica* fruit extract. *Journal of Ethnopharmacology*, 168, 1–7.
3. Patel, D. K., Kumar, R., Laloo, D., & Hemalatha, S. (2012). Natural medicines from plant source used for therapy of diabetes mellitus: An overview of its pharmacological aspects. *Asian Pacific Journal of Tropical Disease*, 2(3), 239–250.
4. Kaur, C., & Kapoor, H. C. (2002). Antioxidant activity and total phenolic content of some Asian vegetables. *International Journal of Food Science & Technology*, 37(2), 153–161.
5. Singh, M., Soni, P., & Upadhyay, R. (2014). Herbal plants used in management of diabetes mellitus. *Pharmacognosy Reviews*, 8(15), 1–12.
5. World Health Organization (WHO). (2019). *Global report on diabetes*. Geneva: WHO Press.

6. International Diabetes Federation (IDF). (2021). IDF Diabetes Atlas (10th ed.). Brussels, Belgium.
7. Sahu, R. K., Kar, M., & Routray, R. (2016). Antidiabetic potential of medicinal plants: A review. *Journal of Pharmacognosy and Phytochemistry*, 5(4), 1–7.
8. Kumar, S., Narwal, S., Kumar, V., & Prakash, O. (2011). α -glucosidase inhibitors from plants: A natural approach to treat diabetes. *Pharmacognosy Reviews*, 5(9), 19–29.
9. Modak, M., Dixit, P., Londhe, J., Ghaskadbi, S., & Devasagayam, T. P. A. (2007). Indian herbs and herbal drugs used for the treatment of diabetes. *Journal of Clinical Biochemistry and Nutrition*, 40(3), 163–173.
10. Grover, J. K., Yadav, S., & Vats, V. (2002). Medicinal plants of India with anti-diabetic potential. *Journal of Ethnopharmacology*, 81(1), 81–100.
11. Tiwari, A. K., & Rao, J. M. (2002). Diabetes mellitus and multiple therapeutic approaches of phytochemicals. *Current Science*, 83(1), 30–38.
12. Bhuyan, D. J., et al. (2021). Role of plant phenolics in diabetes management. *Biomedicine & Pharmacotherapy*, 137, 111315.
13. Kumar, D., Kumar, S., Kohli, S., Arya, R., & Gupta, J. (2011). Antidiabetic activity of methanolic bark extract of *Grewia asiatica*. *Journal of Applied Pharmaceutical Science*, 1(7), 120–124.
14. Yadav, P., Sarkar, S., & Bhatnagar, D. (1997). Lipid lowering effect of *Grewia asiatica*. *Phytotherapy Research*, 11(4), 277–279.
15. Arulselvan, P., et al. (2016). Role of antioxidants in diabetes and its complications. *Saudi Pharmaceutical Journal*, 24(3), 230–238.
16. American Diabetes Association (ADA). (2022). Standards of medical care in diabetes. *Diabetes Care*, 45(Suppl 1), S1–S264.
17. Kumar, V., Abbas, A. K., & Aster, J. C. (2020). *Robbins and Cotran Pathologic Basis of Disease* (10th ed.). Elsevier.
18. Harborne, J. B. (1998). *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis*. Springer.

HOW TO CITE: Chandresh Maurya*, Pharmacotherapeutic Significance and Antidiabetic Potential of *Grewia asiatica* Linn.: An In-Depth Analytical Review, *Int. J. of Pharm. Sci.*, 2026, Vol 4, Issue 5, 3010-1015. <https://doi.org/10.5281/zenodo.20160731>