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

OPEN ACCESS

Review Article

A Review on Pharmacological and Therapeutic Potential of Ficus benghalensis (BANYAN TREE)

Anmol chandel*, Abhishek Soni, Chinu Kumari, Richa Agnihotri, Akanksha

School of Pharmacy, Department of Pharmaceutical Chemistry Abhilashi University, Chail Chowk, Distt. Mandi, H.P, India

ARTICLE INFO

Published: 16 May. 2026
Keywords:
Ficus benghalensis, Banyan tree, Medicinal plant, Phytochemistry, Antidiarrheal activity, Antidiabetic activity, Pharmacological activity, Herbal drug development, Toxicology, Traditional medicine
DOI:
10.5281/zenodo.20225864

ABSTRACT

Medicinal plants have long been recognized as a vital source of therapeutic agents due to their diverse bioactive compounds and relatively low toxicity profiles. Ficus benghalensis, commonly known as the banyan tree, belongs to the family Moraceae and holds significant importance in traditional systems of medicine such as Ayurveda, Siddha, and Unani. Various parts of the plant, including bark, aerial roots, leaves, fruits, and latex, have been extensively used for the treatment of numerous ailments such as diarrhoea, dysentery, diabetes, inflammation, microbial infections, and wound healing. The pharmacological activities of Ficus benghalensis are attributed to its rich phytochemical composition, including flavonoids, tannins, saponins, terpenoids, glycosides, and phenolic compounds. This comprehensive review aims to provide detailed insights into the botanical aspects, phytochemistry, physicochemical properties, pharmacological activities, mechanisms of action, toxicological evaluation, and future prospects of Ficus benghalensis. Special emphasis is given to its antidiarrheal potential, which is supported by experimental studies using castor oil-induced diarrhoea models. Additionally, recent advances in drug development, structure–activity relationships, and potential applications in modern medicine are discussed. Overall, Ficus benghalensis represents a promising candidate for the development of novel plant-based therapeutics.

INTRODUCTION

Medicinal plants represent a major reservoir of biologically active compounds that play a crucial role in contemporary drug discovery. Reports from the World Health Organization (WHO) indicate that a large proportion of the global population, nearly 80%, depends on herbal medicines for primary healthcare needs. Among these medicinal

***Corresponding Author:** Anmol chandel
Address: *School of Pharmacy, Department of Pharmaceutical Chemistry Abhilashi University, Chail Chowk, Distt. Mandi, H.P, India*
Email ✉: chandelanmol7474@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.

plants, Ficus benghalensis has attracted significant scientific interest due to its broad spectrum of traditional uses and pharmacological activities [1].



The genus Ficus includes more than 800 species that are widely distributed in tropical and subtropical regions. Within this genus, Ficus benghalensis holds particular importance because of its extensive therapeutic applications and rich bioactive profile. Traditionally, it has been employed in the management of conditions such as diarrhoea, diabetes, inflammatory disorders, and various skin diseases [2]. Recent experimental studies have provided scientific support for many of these traditional claims, highlighting its antioxidant, antimicrobial, anti-inflammatory, and antidiabetic properties. These diverse biological activities are mainly attributed to the presence of multiple phytoconstituents, which enable the plant to exert effects on various physiological targets [3].

2. Botanical Description and Taxonomy:

Ficus benghalensis is a large, evergreen, perennial tree belonging to the family Moraceae, a group well known for latex-bearing plants with significant medicinal value. It is widely distributed across tropical and subtropical regions, particularly in the Indian subcontinent, where it holds ecological, cultural, and therapeutic importance. Taxonomically, the plant is classified under the genus Ficus, which comprises a diverse group of species characterized by unique reproductive structures known as syconia (fig-type fruits) [4]. Morphologically, Ficus benghalensis is distinguished by its massive canopy and extensive aerial prop roots that originate from branches and grow downward into the soil, eventually forming additional trunks that provide structural support. The leaves are large, simple, leathery, and ovate in shape with a glossy green surface, while the bark is greyish and exudes a milky latex upon injury. The plant produces small, globose fruits that turn reddish or purplish upon ripening and serve as an important food source for birds and other wildlife. These distinctive botanical features, along with its adaptability to various environmental conditions, contribute to its prominence as both a medicinal and ecological species [5].

3. Morphological Characteristics:

Ficus benghalensis is a massive, long-lived evergreen tree recognized for its distinctive growth habit and structural complexity. It typically develops a broad, spreading crown that can cover a large area, supported by numerous aerial prop roots that descend from horizontal branches and penetrate the soil, gradually thickening into trunk-like structures. The main trunk is stout with a rough, greyish bark that exudes a characteristic milky latex when cut or injured. The leaves are simple, alternate, and large, usually ovate to elliptic in shape, with a thick, leathery texture and a glossy dark green upper surface; they possess prominent veins and a short petiole [6]. The plant produces small, spherical inflorescences known as syconia, which function as enclosed flower structures and later develop into fig-like fruits. These fruits are initially green and turn reddish or purplish upon maturation. The root system is extensive and includes both underground roots and aerial roots, contributing to its remarkable ability to spread laterally and form large colonies. Overall, the morphological features of Ficus benghalensis not only support its ecological dominance but also play a significant role in its medicinal utility [7].

4. Ethnomedicinal Uses:

Ficus benghalensis has been widely utilized in traditional systems of medicine such as Ayurveda, Siddha, and Unani for centuries, owing to its broad spectrum of therapeutic applications. Various parts of the plant—including the bark, aerial roots, leaves, fruits, and latex—are employed in the treatment of numerous ailments. The bark is commonly used as an astringent and is particularly effective in managing diarrhoea, dysentery, and other gastrointestinal disorders due to its tannin content. Aerial roots are traditionally used to strengthen body tissues and are also incorporated in remedies for reproductive disorders and urinary complaints [8]. The leaves are applied externally to treat wounds, ulcers, and inflammatory conditions, while the milky latex is used for healing cuts, treating toothache, and managing skin infections. The fruits are considered nutritive and are often used as a mild laxative and general health tonic. In addition, different preparations of the plant are used in the management of diabetes, rheumatism, and microbial infections. These traditional uses, passed down through generations, have provided a strong foundation for modern pharmacological studies investigating the therapeutic potential of Ficus benghalensis [5].

5. Phytochemical Constituents:

Ficus benghalensis possesses a rich and complex phytochemical profile that contributes significantly to its wide range of pharmacological activities. The plant contains both primary metabolites, such as carbohydrates, proteins, and lipids, which are essential for basic cellular functions, as well as a diverse group of secondary metabolites that are primarily responsible for its therapeutic properties. Among these, flavonoids are one of the most prominent classes, including compounds like quercetin, kaempferol, and rutin, which are well known for their potent antioxidant, anti-inflammatory, and free radical scavenging activities. These compounds play a crucial role in protecting biological systems from oxidative stress and related disorders [9]. Tannins are another major group of phytoconstituents found abundantly in the bark and aerial roots of Ficus benghalensis. They exhibit strong astringent properties, which contribute to the plant's effectiveness in treating diarrhoea and dysentery by reducing intestinal secretions and forming protective layers over mucosal tissues. Saponins present in the plant are known for their surface-active properties and demonstrate antimicrobial,

anti-inflammatory, and immunomodulatory effects. In addition, alkaloids, although present in smaller quantities, may influence physiological processes through interactions with neurotransmitter systems and enzymes [10]. The plant also contains terpenoids and phytosterols, which are associated with anti-inflammatory, anticancer, and hepatoprotective activities. These compounds are known to modulate signalling pathways involved in inflammation and cell proliferation. Phenolic compounds, widely distributed throughout the plant, contribute significantly to its antioxidant potential by donating hydrogen atoms and neutralizing reactive oxygen species. Glycosides, another important class of compounds, are involved in various biological effects, including cardioprotective and metabolic regulation [11]. Furthermore, the phytochemical composition of Ficus benghalensis may vary depending on factors such as the plant part used, geographical location, environmental conditions, and extraction methods. The synergistic interaction among these bioactive compounds enhances the overall therapeutic efficacy of the plant. This diverse chemical composition not only supports its traditional medicinal uses but also highlights its potential as a valuable source for the development of novel pharmaceutical agents [12].

6. Physicochemical Properties:

The physicochemical characteristics of Ficus benghalensis play an important role in determining the stability, extraction efficiency, and biological effectiveness of its bioactive constituents. These properties vary depending on the plant part used and the nature of the solvent employed for extraction. Polar solvents such as water, ethanol, and methanol are commonly utilized to extract hydrophilic compounds like flavonoids, tannins, and phenolic acids, whereas less polar solvents may isolate lipophilic components such as terpenoids and sterols. Solubility is a key factor influencing the bioavailability of these compounds, as it governs their absorption and distribution within biological systems. Lipophilicity, often associated with compounds like terpenoids, enhances membrane permeability but may reduce aqueous solubility, thereby affecting pharmacokinetic behaviour [13]. The stability of phytoconstituents in Ficus benghalensis is influenced by environmental factors such as temperature, light, and pH. Many phenolic compounds are sensitive to heat and prolonged exposure to light, which can lead to degradation and loss of activity. Similarly, pH variations can alter the ionization state of certain compounds, affecting their solubility and interaction with biological targets. Moisture content and ash values are also important physicochemical parameters used in the standardization and quality control of plant materials. Additionally, the extraction technique—such as maceration, Soxhlet extraction, or advanced methods like ultrasound-assisted extraction—can significantly impact the yield and purity of phytochemicals. Overall, understanding these physicochemical properties is essential for optimizing extraction processes, ensuring stability, and enhancing the therapeutic efficacy of Ficus benghalensis in pharmaceutical applications [14].

7. Pharmacological Activities:

Ficus benghalensis exhibits a wide range of pharmacological activities that validate its traditional medicinal uses and highlight its potential in modern drug development. These activities are primarily attributed to the presence of bioactive phytoconstituents such as flavonoids, tannins, saponins, phenolic compounds, and terpenoids, which act synergistically on multiple

biological targets. One of the most extensively studied effects is its antidiarrheal activity, where extracts from bark and aerial roots reduce intestinal motility and secretion, mainly due to the astringent action of tannins and inhibition of prostaglandin-mediated pathways [15]. The plant also shows significant antidiabetic activity by helping in the regulation of blood glucose levels, improving insulin sensitivity, and possibly protecting pancreatic β-cells from oxidative damage. Its anti-inflammatory potential is well documented, where it suppresses the production of inflammatory mediators and reduces edema formation in experimental models. In addition, strong antioxidant activity has been reported due to the presence of phenolic and flavonoid compounds, which neutralize free radicals and protect cells from oxidative stress-related damage [16]. Furthermore, Ficus benghalensis demonstrates antimicrobial activity against a variety of bacterial and fungal strains by disrupting microbial cell walls and inhibiting essential metabolic enzymes. Wound healing properties are also notable, as the plant promotes tissue regeneration, collagen synthesis, and faster wound contraction when applied topically. Some studies have also suggested its potential anticancer, hepatoprotective, and immunomodulatory effects, although these areas require further scientific validation. Overall, the broad pharmacological profile of Ficus benghalensis supports its importance as a valuable medicinal plant with significant therapeutic promise.[17]

8. Mechanism of Action:

The pharmacological effects of Ficus benghalensis are mediated through multiple and interconnected biochemical and cellular mechanisms, mainly due to the presence of flavonoids, tannins, phenolic compounds, saponins, and terpenoids. In antidiarrheal activity, the plant extracts act by reducing intestinal motility and inhibiting excessive secretion of fluids and electrolytes in the gut. This is largely associated with the inhibition of prostaglandin synthesis and the astringent action of tannins, which precipitate proteins on the intestinal mucosa and form a protective layer, thereby reducing irritation and fluid loss[18]. In anti-inflammatory activity, Ficus benghalensis exerts its effects by suppressing the release of inflammatory mediators such as histamine, prostaglandins, and cytokines. It also inhibits key signalling pathways like cyclooxygenase (COX) and lipoxygenase (LOX), leading to a reduction in edema, redness, and tissue damage. The antioxidant mechanism is primarily due to the ability of phenolic and flavonoid compounds to scavenge reactive oxygen species (ROS) and reactive nitrogen species (RNS), thereby preventing oxidative stress and cellular damage [19]. For antidiabetic activity, the plant may enhance insulin secretion, improve glucose uptake in peripheral tissues, and reduce oxidative stress in pancreatic β-cells, thereby helping in glycaemic control. Its antimicrobial mechanism involves disruption of microbial cell membranes, inhibition of nucleic acid synthesis, and interference with essential enzymatic systems required for microbial growth and survival. In wound healing, the extract promotes fibroblast proliferation, collagen synthesis, and angiogenesis, leading to faster tissue regeneration and wound closure [20]. Overall, the therapeutic actions of Ficus benghalensis are the result of multi-target interactions involving enzymatic inhibition, receptor modulation, antioxidant Defence enhancement, and regulation of inflammatory signalling pathways, making it a promising candidate for natural drug development.

9. Toxicological Studies: Toxicological investigations on Ficus benghalensis have generally indicated a favourable safety profile

when extracts are used within experimentally validated dose ranges. Acute toxicity studies, typically conducted in rodent models such as Swiss albino mice or Wistar rats following OECD guidelines, have shown that oral administration of various extracts (aqueous, ethanolic, and methanolic) of aerial roots, bark, and leaves does not produce mortality or severe behavioural abnormalities at doses up to 2000 mg/kg body weight, suggesting a relatively high margin of safety. Subacute and sub chronic toxicity assessments, involving repeated dosing over 14 to 28 days, further reveal no significant alterations in body weight, food and water intake, or organ weights, indicating the absence of overt systemic toxicity [21]. Haematological parameters such as haemoglobin levels, red and white blood cell counts, and biochemical markers including serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), urea, and creatinine remain within normal physiological limits, supporting the non-toxic nature of the plant extracts on liver and kidney functions. Histopathological examinations of vital organs like the liver, kidney, and intestine typically show preserved cellular architecture without signs of necrosis, inflammation, or degeneration. Additionally, no significant neurotoxic or genotoxic effects have been reported in standard assays, although detailed long-term carcinogenicity studies are still limited. Mild gastrointestinal irritation has occasionally been noted at very high doses, possibly due to the presence of bioactive phytoconstituents such as tannins and flavonoids. Overall, these findings suggest that Ficus benghalensis possesses low toxicity and can be considered safe for pharmacological applications, although further chronic toxicity, reproductive toxicity, and clinical studies are necessary to fully establish its safety profile in humans [22].

10. Structure Activity Relationship (SAR):

A conventional structure–activity relationship (SAR) analysis for Ficus benghalensis is complex because the plant does not contain a single active compound; instead, its biological effects arise from a mixture of phytochemicals such as flavonoids, tannins, triterpenoids, sterols, and glycosides. Nevertheless, meaningful SAR insights can be drawn by examining how the structural features of these classes contribute to their pharmacological activities. Flavonoids present in the plant, including compounds structurally related to quercetin and kaempferol, exhibit strong antioxidant and anti-inflammatory effects due to the presence of hydroxyl (–OH) groups on their aromatic rings, particularly the catechol structure in the B-ring, which enhances free radical scavenging and metal-chelating ability. Increased hydroxylation generally improves antioxidant potential but may reduce lipophilicity, thereby influencing membrane permeability [11]. Tannins, which are polyphenolic compounds with high molecular weight, contribute significantly to the antidiarrheal activity of Ficus benghalensis. Their multiple phenolic hydroxyl groups enable protein precipitation, forming a protective layer over the intestinal mucosa and reducing secretion. The degree of polymerization and the number of galloyl groups in tannins are directly related to their astringent and antimicrobial effects. Triterpenoids such as lupeol and β-amyrin derivatives exhibit anti-inflammatory and antimicrobial properties; their pentacyclic structure and functional groups like hydroxyl or carboxyl moieties play a key role in modulating enzyme inhibition and membrane interactions. For instance, the presence of a hydroxyl group at specific positions enhances binding affinity to inflammatory mediators such as cyclooxygenase enzymes [7].

Steroidal compounds like β-sitosterol contribute to hypoglycaemic and anti-inflammatory activities, where structural similarity to cholesterol allows interaction with biological membranes and enzymes involved in glucose metabolism. Glycosides found in the plant show varied activity depending on the nature of the sugar moiety and the aglycone; glycosylation generally improves solubility and bioavailability, while hydrolysis releases the active aglycone responsible for pharmacological effects. Overall, the SAR of Ficus benghalensis phytoconstituents highlights that biological activity is largely governed by the number and position of hydroxyl groups, degree of conjugation, molecular size, and presence of functional groups such as carbonyl or carboxyl groups, all of which influence antioxidant capacity, protein binding, enzyme inhibition, and membrane permeability. These relationships collectively explain the plant's broad spectrum of activities, including antidiarrheal, antidiabetic, antimicrobial, and anti-inflammatory effects [23].

11. Drug Development Potential:

The drug development potential of Ficus benghalensis is considerable due to its rich and diverse phytochemical composition and long history of traditional medicinal use. Extracts obtained from its aerial roots, bark, and leaves contain biologically active constituents such as flavonoids, tannins, triterpenoids, and sterols, which collectively contribute to multiple pharmacological effects including antidiarrheal, antidiabetic, anti-inflammatory, antimicrobial, and antioxidant activities. This multi-target activity profile makes the plant a promising candidate for the development of novel therapeutics, especially for complex disorders where a single-target drug may be less effective [24]. From a drug discovery perspective, Ficus benghalensis offers opportunities both for the isolation of lead compounds and for the development of standardized herbal formulations. Bioactive molecules like flavonoids can serve as lead scaffolds for designing semi-synthetic derivatives with improved potency, selectivity, and pharmacokinetic properties. The presence of tannins supports the development of plant-based antidiarrheal agents through mechanisms such as protein precipitation and intestinal mucosal protection, while triterpenoids provide a basis for anti-inflammatory drug design via enzyme inhibition pathways. Additionally, the relatively low toxicity profile observed in preclinical studies enhances its suitability for further pharmaceutical development [25].

12. Clinical Studies and Evidence:

Clinical evidence for Ficus benghalensis is still emerging, and most of the current knowledge is derived from preclinical and traditional medicine data rather than large, well-controlled human trials. A limited number of small-scale clinical and observational studies have explored its therapeutic potential, particularly in metabolic disorders such as diabetes. In these investigations, formulations containing bark or aerial root extracts have shown modest reductions in fasting blood glucose levels and improvement in glycaemic control, which are thought to be linked to the presence of flavonoids, tannins, and sterol compounds that may enhance insulin sensitivity or delay carbohydrate absorption. However, these studies often involve small sample sizes, short durations, and lack rigorous controls, which restricts the strength of their conclusions [26]. In the context of gastrointestinal disorders, especially diarrhoea, direct clinical trials specifically evaluating Ficus benghalensis are scarce. Most evidence is extrapolated from animal models demonstrating reduced intestinal motility and secretion, along with mucosal protective effects. Some traditional

formulations used in Ayurvedic practice have been applied in patients with mild gastrointestinal disturbances, where symptomatic relief has been reported, but these observations are largely anecdotal or part of broader polyherbal interventions, making it difficult to isolate the plant's specific contribution [27].

13. Future Perspectives:

The future perspective of Ficus benghalensis in pharmaceutical and biomedical research is highly promising, driven by its diverse phytochemical composition and broad spectrum of biological activities. As interest in plant-based therapeutics continues to grow, this species offers significant opportunities for the discovery of novel bioactive compounds that can serve as leads for drug development. Future research is likely to focus on advanced techniques such as bioassay-guided isolation, metabolomics, and molecular docking to identify specific active constituents and clarify their precise mechanisms of action at the molecular level. These approaches will help bridge the gap between traditional knowledge and modern scientific validation [28]. Another important direction involves the development of standardized and reproducible formulations. Variability in phytochemical content due to geographical, environmental, and seasonal factors remains a major challenge, so establishing quality control parameters and standardization protocols will be essential for ensuring consistency and efficacy. The integration of nanotechnology and novel drug delivery systems, such as nanoparticles or liposomal carriers, could further enhance the bioavailability, stability, and targeted delivery of Ficus benghalensis-derived compounds, making them more suitable for clinical applications [29]. In addition, future work should emphasize comprehensive toxicological and pharmacokinetic studies, including chronic toxicity, reproductive safety, and herb–drug interaction assessments. Well-designed clinical trials with larger populations and longer durations are necessary to confirm efficacy and safety in humans. There is also potential for exploring synergistic effects in polyherbal formulations, where Ficus benghalensis could be combined with other medicinal plants to enhance therapeutic outcomes. Overall, with systematic research, technological advancement, and rigorous clinical validation, Ficus benghalensis has the potential to contribute significantly to the development of safe, effective, and affordable natural therapeutics in the coming years [30].

14. Limitation and Challenges:

The use of Ficus benghalensis in drug development and therapeutic applications is associated with several important limitations and challenges that must be addressed to ensure its scientific and clinical viability. One of the primary issues is the lack of standardization in plant extracts, as the phytochemical composition can vary significantly depending on geographical location, climate, soil conditions, and harvesting time. This variability makes it difficult to achieve consistent efficacy and reproducibility across studies and formulations. In addition, most of the existing evidence is derived from in vitro experiments and animal models, with limited well-designed human clinical trials, which restricts the ability to draw definitive conclusions about its safety and effectiveness in humans [31]. Another major challenge lies in the complexity of its phytochemical profile. Since Ficus benghalensis contains multiple bioactive compounds acting synergistically, isolating and identifying the specific constituents responsible for particular pharmacological effects can be difficult. This complexity also complicates the understanding of its precise mechanisms of action and may lead to

variability in therapeutic outcomes. Furthermore, although acute toxicity studies suggest a favourable safety profile, comprehensive data on long-term toxicity, reproductive safety, and potential herb–drug interactions are insufficient, raising concerns about its use in chronic conditions or in combination with conventional medications [32].

CONCLUSION:

Ficus benghalensis stands out as a valuable medicinal plant with a wide range of pharmacological properties supported by its rich phytochemical profile. Compounds such as flavonoids, tannins, triterpenoids, and sterols contribute to its demonstrated antidiarrheal, antidiabetic, anti-inflammatory, antimicrobial, and antioxidant activities. Preclinical studies indicate a favourable safety margin, and traditional usage further supports its therapeutic relevance. However, despite these promising findings, the transition from experimental research to clinical application remains limited due to insufficient large-scale human studies and lack of standardized formulations. For this plant to achieve its full potential in modern medicine, further research is essential, particularly in the areas of mechanism-based studies, pharmacokinetics, long-term toxicity, and well-designed clinical trials. Establishing consistent quality control measures and exploring advanced drug delivery systems will also play a critical role in enhancing its applicability. Overall, Ficus benghalensis holds significant promise as a source of novel therapeutic agents, and with rigorous scientific validation, it may contribute meaningfully to the development of safe, effective, and affordable plant-based medicines.

REFERENCES

1. World Health Organization. WHO traditional medicine strategy 2014–2023. Geneva: World Health Organization; 2013.
2. Kirtikar KR, Basu BD. Indian medicinal plants. 2nd ed. Dehradun: International Book Distributors; 2006.
3. Kumar S, Kumar V, Prakash O. Pharmacological activities of Ficus benghalensis: a review. Int J Pharm Sci Rev Res. 2011;6(1):1–7.
4. Evans WC. Trease and Evans Pharmacognosy. 16th ed. London: Saunders Elsevier; 2009.
5. Indian Medicinal Plants. Nadkarni KM. Indian materia medica. 3rd ed. Mumbai: Popular Prakashan; 2007.
6. Flora of British India. Hooker JD. The flora of British India. Vol. 5. London: L Reeve & Co; 1888.
7. Singh V, Pande PC, Jain DK. Botany of flowering plants: taxonomy, morphology and embryology. New Delhi: Rastogi Publications; 2012.
8. Warrier PK, Nambiar VPK, Raman Kutty C. Indian medicinal plants: a compendium of 500 species. Vol. 3. Chennai: Orient Longman; 1995.
9. Harborne JB. Phytochemical methods: a guide to modern techniques of plant analysis. 3rd ed. London: Chapman & Hall; 1998.
10. Shah B, Seth AK. Textbook of pharmacognosy and phytochemistry. 2nd ed. New Delhi: Elsevier; 2010.
11. Patrick GL. An introduction to medicinal chemistry. 5th ed. Oxford: Oxford University Press; 2013.
12. Natural products as sources of new drugs. Newman DJ, Cragg GM. Natural products as sources of new drugs over the last 25 years. J Nat Prod. 2007;70(3):461–77.
13. Rowland M, Tozer TN. Clinical pharmacokinetics and pharmacodynamics:

concepts and applications. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2011.
14. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 49th ed. Pune: Nirali Prakashan; 2014.
15. Awouters F, Niemegeers CJ, Lenaerts FM, Janssen PA. Delay of castor oil diarrhoea in rats: a new way to evaluate inhibitors of prostaglandin biosynthesis. J Pharm Pharmacol. 1978;30(1):41–5.
16. Grover JK, Yadav S, Vats V. Medicinal plants of India with anti-diabetic potential. J Ethnopharmacology. 2002;81(1):81–100.
17. Fabricant DS, Farnsworth NR. The value of plants used in traditional medicine for drug discovery. Environ Health Perspect. 2001;109(Suppl 1):69–75.
18. Rang HP, Ritter JM, Flower RJ, Henderson G. Rang and Dale's pharmacology. 8th ed. London: Elsevier Churchill Livingstone; 2016.
19. Halliwell B. Free radicals and antioxidants: updating a personal view. Nutr Rev. 2012;70(5):257–65.
20. Biswas TK, Mukherjee B. Plant medicines of Indian origin for wound healing activity: a review. Int J Low Extrem Wounds. 2003;2(1):25–39.
21. Organisation for Economic Co-operation and Development. Organisation for Economic Co-operation and Development. OECD guidelines for the testing of chemicals: acute oral toxicity. Paris: OECD; 2001.
22. Klaassen CD. Casarett and Doull's toxicology: the basic science of poisons. 8th ed. New York: McGraw-Hill; 2013.
23. Dewick PM. Medicinal Natural Products: A Biosynthetic Approach. 3rd ed. Chichester (UK): Wiley; 2009.
24. Sen S, Chakraborty R. The role of plant-derived natural products in drug discovery. Phytother Res. 2011;25(9):1291–306.
25. Cowan MM. Plant products as antimicrobial agents. Clin Microbial Rev. 1999;12(4):564–82.
26. Patel SS, Verma NK, Gauthaman K. A comprehensive review on the medicinal plants used in diabetes mellitus. J Adv Pharm Technol Res. 2012;3(4):214–21.
27. Mukherjee PK, Wahile A. Integrated approaches towards drug development from Ayurveda and other Indian system of medicines. J Ethnopharmacology. 2006;103(1):25–35.
28. Balunas MJ, Kinghorn AD. Drug discovery from medicinal plants. Life Sci. 2005;78(5):431–41.
29. Singh S, Nautiyal CS. Herbal drugs and nanotechnology: a promising approach for drug delivery systems. Curr Sci. 2010;99(3):343–8.
30. Parasuraman S. Toxicological screening. J Pharmacol Pharmacother. 2011;2(2):74–9.
31. Ekor M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. Front Pharmacol. 2014; 4:177.
32. Sasidharan S, Chen Y, Saravanan D, Sundram KM, Yoga Latha L. Extraction, isolation and characterization of bioactive compounds from plants' extracts. Afr J Tradit Complement Altern Med. 2011;8(1):1–10.

HOW TO CITE: Anmol chandel*, Abhishek Soni, Chinu Kumari, Richa Agnihotri, Akanksha, A Review on Pharmacological and Therapeutic Potential of Ficus benghalensis (BANYAN TREE), Int. J. of Pharm. Sci., 2026, Vol 4, Issue 5, 3854-3863. https://doi.org/10.5281/zenodo.20225864