

A REVIEW ON FICUS ELASTICA PLANT PROFILE, CHEMICAL CONSTITUENTS AND USES

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ABSTRACT

Ficus elastica Roxb plant is commonly known as rubber plant, its (family Moraceae). It is a widely distributed in Asia and tropical species. *Ficus elastica* Roxb medicinal plant is cultivated worldwide as an ornamental. From ancient times, this plant has been used in the treatment of various diseases such as gastrointestinal disorders, inflammation, infections and wounds. Recently researchers have been found and reported that *Ficus elastica* Roxb having potential chemical constituents such as sterols, flavonoids, phenolics and terpenoids. The pharmacological activities of *Ficus elastica* Roxb are antioxidant, antimicrobial, anti-inflammatory, and antihypertensive effects. In this review articles is covered information related to taxonomy, morphology, phytochemistry, traditional uses and pharmacological properties of *F. elastica*.

KEYWORDS: *Ficus elastica* Roxb, rubber plant, phytochemical composition, inflammation, infections, wounds, and gastrointestinal disorders.

1. INTRODUCTION

Herbal medicinal plants are having sources of potential therapeutic agents. Among them, genres *Ficus* (family Moraceae) are the significant ethnomedicinal value. *Ficus elastica* Roxb plant is commonly known as rubber plant, its (family Moraceae). It is a widely distributed in Asia and tropical species. *Ficus elastica* Roxb medicinal plant is cultivated worldwide as an ornamental. From ancient times, this plant has been used in the treatment of

various diseases such as gastrointestinal disorders, inflammation, infections and wounds. Recently researchers have been found and reported that *Ficus elastica* Roxb having potential chemical constituents such as sterols, flavonoids, phenolics and terpenoids. The pharmacological activities of *Ficus elastica* Roxb are antioxidant, antimicrobial, anti-inflammatory, and antihypertensive effects (Arsyad et al., 2023). Short profiles of *Ficus elastica* Roxb is shown in Fig 1.

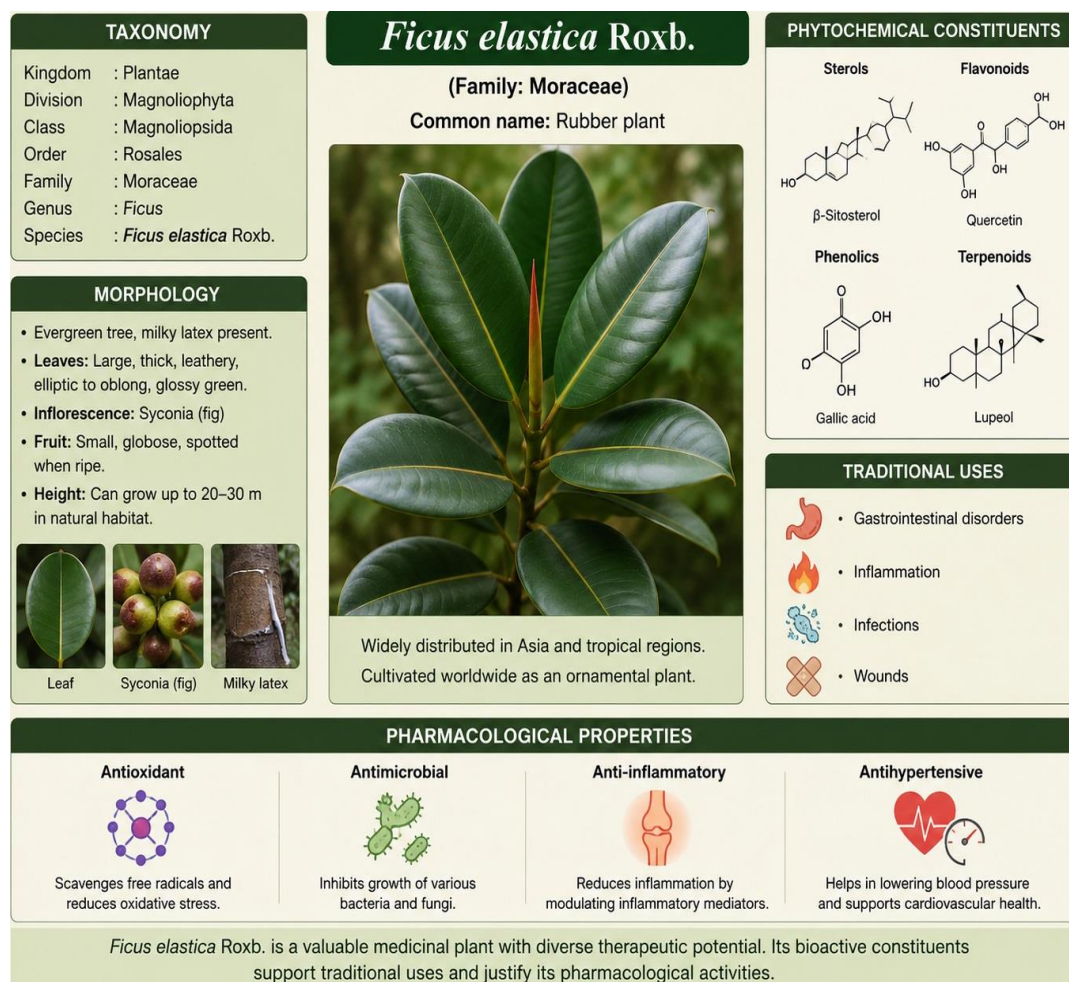


Fig 1: Taxonomy, morphology, phytochemicals and pharmacological properties

2. Taxonomy and Classification

Table 1: Taxonomy and classification of *Ficus elastica* Roxb.

Kingdom	Plantae
Division	Angiosperms
Class	Eudicots
Order	Rosales
Family	Moraceae
Genus:	<i>Ficus</i>
Species	<i>Ficus elastica</i> Roxb. ex Hornem

3. Botanical Description

Ficus elastica Roxb is a large evergreen tree that can grow up to 30–40 meters in height.

Table 2: Taxonomy and classification of *Ficus elastica* Roxb.

Leaves	Large, glossy, leathery, elliptic
Stem	Woody with milky latex
Roots	Adventitious aerial roots
Latex	White, sticky, rich in polyisoprene
Fruit	Small fig (syconium), rarely formed in cultivation

Ficus elastica Roxb plant has been found to exhibit typical characteristics, including latex secretion and aerial root formation.

4. Geographical Distribution

Ficus elastica Roxb plant is geographically grown well in humid, warm climates, widely cultivated in tropical regions worldwide found in Northeast India, Nepal, Bhutan, and Southeast Asia.

5. Traditional and Ethnomedicinal Uses (Arsyad et al., 2023)

All the parts of *Ficus elastica* Roxb medicinal plant are traditionally used in the treatment of various diseases. The applications of therapeutic uses are tabulated in Table 3 below:

Table 3: The applications of therapeutic uses and their organized parts.

Plants parts	Traditional uses
Leaves	Wound healing, skin diseases
Barks	Anti-inflammatory, analgesic
Latex	Treatment of infections and cuts
Roots	Used in diarrhea and digestive disorders

6. Phytochemical Composition and Chemical Profiling

6.1. They were extracted from *Ficus elastica* Roxb and found to be low molecular weight potential fatty acids present such as caprylic (29.2%), capric (20.3%), and isovaleric acids, which are used in the development and formulations of cosmetic products at large scale (Saeed et al., 2017).

6.2. *Ficus elastica* Roxb having 68 potential bioactive compounds identified by using GC-MS. The names of specific potential bioactive compounds are phytol, lanosterol, lupeol, β -sitosterol, and vitamin E (Strelyaeva et al., 2022).

6.3. A numerous researchers have been studied, confirmed and found to be alkaloid, flavonoid, tannins, sponins and volatile components are present. All of these potential bioactive components are responsible for therapeutic activities (Jain et al., 2015; Oyebamiji et al., 2024).

6.4. *Ficus elastica* Roxb having been isolated and found to be some multifunctional bioactive compounds such as quercitrin, myricitrin, elastiquinone, ficososide B, and elasticamide (Arsyad et al., 2023; Mboosso Teinkela et al., 2017).

7. Pharmacological Activities

7.1 Antioxidant Activity

Extracts of *Ficus elastica* Roxb have been found to be significant antioxidant activity due to presence of phenol (Quarcetin) and flavonoidal compounds. These compounds are having strong free radical scavenging activity and provide protections against a number of chronic diseases. Protection mechanisms of these compounds are neutralizing the oxidative stress.

7.1.1. They were found that methanolic and ethanolic extracts of *Ficus elastica* Roxb showed strong dose-dependent antioxidant activity using DPPH, ABTS, FRAP, and H₂O₂ assays (Jain et al., 2015; Ginting et al., 2020).

7.1.2. Extracts of *Ficus elastica* Roxb having flavonoids (quercitrin, myricitrin, morin) are key responsible of antioxidant activity and free radical scavenging activity. Therefore *Ficus elastica* Roxb plant is having potential properties against to combating oxidative stress-related disorders.

7.2 Antimicrobial and Anti-parasitic Activity

7.2.1. *Ficus elastica* Roxb having significant activities against bacterial and fungal strains of common infections causing microbes.

7.2.2. Anti-microbial mechanism: *Ficus elastica* Roxb having antimicrobial activities due to disruption of microbial cell walls and inhibition of enzyme systems Studies indicate potential use as a natural antimicrobial agent.

7.2.3. Extracts of *Ficus elastica* Roxb confirmed broad-spectrum antibacterial activity against pathogens such as *E. coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus* (Jain et al., 2015; Oyebamiji et al., 2024).

7.2.4. Isolated compounds like as ficusoside B, elastiquinone of *Ficus elastica* Roxb are found to be strong antimicrobial potency (Mbosso Teinkela et al., 2017).

7.2.5. Extracts of *Ficus elastica* Roxb have been found to be significant antiplasmodial and antitrypanosomal activity, these activities represented that *Ficus elastica* Roxb plants can be used for new alternative for antiparasitic drug development (Mbosso Teinkela et al., 2018).

7.3 Anti-inflammatory and Antiarthritic Activity

7.3.1 *Ficus elastica* Roxb inhibited the inflammation through the inhibiting inflammatory mediators such as protacycline. Therefore it is use in the treatment of rheumatism and swelling.

7.3.2 The ethanolic leaf extract of *Ficus elastica* Roxb has been found to be significant antiarthritic activity on arthritis in rats' model, they were reported that extract of plant reducing the inflammation of paw edema up to 71.56% (Kumar et al., 2024). They were reported that *Ficus elastica* Roxb exhibited strong anti-inflammatory activity through the inhibition of oxidative and inflammatory mediators (Ondua et al., 2019).

7.4 Antihypertensive Activity

Ficus elastica Roxb traditional used in the treatment and management of hypertension.

7.4 Wound Healing and Dermatological Applications

Ficus elastica Roxb of Latex and leaf extracts has been found to capable of promote tissue regeneration due to enhance collagen synthesis and epithelialization process. Therefore *Ficus elastica* Roxb possess good antimicrobial, antioxidant properties and skin protective properties. It is traditionally used for treating allergies, skin infections and wound healing and reported wound healing activity (Arsyad et al., 2023). The polyphenols and tannins bioactive compounds are responsible for topical skin protective of *Ficus elastica* Roxb.

7.6 Antidiabetic Potential

Ficus elastica Roxb having potential antidiabetic activity due to presence of phytochemicals .

7.7 Anti-preeclampsia Activity

Recent studies were suggested that presence of potential phytochemicals compounds responsible for managing the preeclampsia, antioxidant and vascular effects.

7.8 Cytotoxic and Anticancer Potential

Extracts of *Ficus elastica* Roxb exhibited **dose-dependent anticancer activity** (Jain et al., 2015). They were suggested potential bioactive compounds of *Ficus elastica* Roxb safe and economic anticancer drug development (Mbosso Teinkela et al., 2018).

8. Toxicity and Safety

Extracts of *Ficus elastica* Roxb generally considered safe in traditional use. Further toxicological studies are needed for clinical validation

9. Nanotechnology and Environmental Applications

9.1 Plant extracts of *Ficus elastica* Roxb have been used for synthesis of green nanoparticles (e.g., NiO–SnO₂ nanocomposites), developed nanoparticles of plant exhibited efficient photocatalytic degradation of pollutants (Haq et al., 2022, Elsherif et al., 2026). These developed nanoparticles of *Ficus elastica* Roxb able to use in plant stress tolerance and soil health (Elsherif et al., 2026).

9.2 Latex of *Ficus elastica* Roxb components also has applications in nanotechnology and biomaterials for sustained release for environmental protection (Samrot et al., 2022).

9.3 Industrial Applications

Ficus elastica Roxb is due to presence of fatty acids and latex. These fatty acids and latex successfully used at large scale industry for the production of soaps, paper, pulps, detergents and cosmetics products (Saeed et al., 2017).

10. Future Perspectives

Ficus elastica Roxb having promising pharmacological properties, several researches have been published and reported but still need to do more clinical trials, standardization of extracts and isolate to identification of active compounds. These isolated bioactive compounds use in the development of novel drug delivery systems for anti-cancer and neuroprotective and cosmeceutical applications (Charde et al., 2011, Gupta et al., 2015, Gupta et al., 2013).

11. CONCLUSION

Ficus elastica Roxb is a very common medicinal plant with various therapeutic activities due to presence of rich phytochemical profile components such as phenol, flavonoid, alkaloid and terpenoids etc. These bioactive components are having multiple pharmacological activities

such as antioxidant, antimicrobial, and anti-inflammatory effects. Conversely, further experimental work still need to do more clinical trials, standardization of extracts and isolate to identification of active compounds to validate its efficacy and safety for modern drug development.

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