Ficus: A Magical Plant

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Abstract

Medicinal plants have been used as traditional medicines for centuries. Empirical knowledge of their benefits has been passed down through generations. Plants with medicinal properties are first mentioned in the "Rig-Veda", the oldest source of human knowledge. Indian medicine considers the Ficus to be one of the primary medicinal plants that belongs to Moraceae family. The conventional medication system utilizes plant parts such as leaves, stem bark, aerial roots, fruit, buds, and latex to treat a wide range of illnesses in humans. This review has been designed to summarize the Pharmacological properties of Various species of Ficus such as Ficus benghalensis, and Ficus carica.

Keywords: Pharmacological Action, Rig-Veda, Medicinal Plants

1. Introduction

India has a rich history of using medicinal plants as part of traditional medicine systems like Unani, Ayurveda, and Siddha. The World Health Organization (WHO) has too developed the guidelines for assessing herbal medicines. From ages i.e Vedic era the medicinal plants have been in use to treat or to prevent numerous diseases¹. Every portion of the plant has its own medicinal value. Different types of secondary metabolites found in the medicinal plants which play an important role in many kinds of diseases and also has potential application in pharmaceutical product development². Ficus is regarded as the largest and most abundant genera in the Plant Kingdom that has been reported to possess thousands
of phytoconstituents that are responsible for the therapeutic activities [3]. Ficus contains phytoconstituents such as monoterpenes, diterpenes, sesquiterpene, triterpenes, alkaloids, and flavonoids [4]. These isolated compounds or phytoconstituents has been found to possess Antioxidant, Hypoglycaemic, Hepatoprotective anti-microbial and anti-viral activities, wound healing activity, anti- oxidant, anti-convulsant activity, immunomodulatory activity, anti-ulcer activity, anti-cancer activity, anti-inflammatory and analgesic activities, anti-asthmatic activity, anti-acetylcholinesterase activity [5-6]. As already discussed, that Ficus is the largest species so in this review, an update about the pharmacological profile of Ficus benghalensis and Ficus carica, is discussed that are abundantly found in Asia. We had discussed all the therapeutic benefits of Ficus so that further studies can be carried out preclinically and clinically in order to fill all the research gaps.

2. Ficus carica (Fig)
In traditional medicine, Ficus carica has been used for treating a variety of ailments, including anemia, cancer, diabetes, leprosy, liver diseases, paralysis, skin diseases, and ulcers [7]. Pharmaceutical biology considers it as a promising candidate for developing/formulating new drugs and using them clinically in the future. Phytochemical studies on fruits and leaves of fig plant have been carried out and it has been documented that they are rich in phenolics, organic acids and volatile compounds which in return are responsible for the various biological activities such as antioxidant, anti-inflammatory, antibacterial, anticancer, hepatoprotective, antidiabetic, antifungal, antiviral, antimutagenic, antipyretic, antituberculosis, anti-angiogenic, antiparasitic, hematostatis, anticonstipation and antiwarts activities [8].

Fig 1: Fruit of Ficus carica (Anjeer)
Not only this, *Ficus carica* latex is used in milk clotting in cheese production, meat tenderization, bioactive peptides production, and natural rubber production [9]. Oral administration of *Ficus carica* bud and leaf extracts at a dose of 200mg/kg in rats can help in the treatment of alloxan-induced diabetes and Gentamicin induced nephrotoxicity [10-11]. Further, the ethanolic extract of *Ficus carica* has potential to inhibit the carbohydrate and lipid metabolism that are elicited to play a pivotal role in pathogenesis of Obesity and Diabetes. Mopuri and Islam in 2016 whereas Ghanbari and co-workers in 2019 suggested that the Fig latex downregulated the expression level of HPV oncoproteins, E6 and E7 as well as p16 (marker for HPV infection) and elevate the expression of P53 and Rb genes on the cervical cancer cell [12-13]. The findings reveal the cytotoxic potential of Fig Latex in cervical cancer [13]. *F.carica* fruit has been found beneficial in the management of various cardiovascular diseases (CVD), as they are rich source of polyunsaturated fatty acids (PUFA) and omega-6 fatty acid [14]. Despite of the pharmacological role, *Ficus carica* mediated silver nanoparticles have been used for fresh apple slice preservation [15]. Recently the role of Cyanidin-3-rhamnoglucoside common constituent in Fig been elicited in the management of CPVID-19 [16]. Table 1 indicated the therapeutic Potential of Fig.

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3. Ficus Benghalensis

*F. benghalensis* commonly called as Banyan tree, Indian fig, and Sacred Fig is the species of Ficus that belongs to *Urostigma* subgenus [19]. A young tree is epiphytic, with petioles of 1.25 to 5 cm in length, ovate sessile lamina, and reddish hypanthodia. Female flowers are small, elongated, and pedicellate. The same stalk, however, lacks male flowers [20].

![Fig 2: Ficus bengalensis (Sacred Banyan tree)](image)

The Literature Review indicates that the leaves and bark of *F. benghalensis* are rich in flavonoids, phenols, terpenoids, and terpenes whereas leaves contain quinone rhein, psoralen, and bergapten. The root extract has sterols, organic and fatty acids, while the fruit was reported to be rich in fatty acids. Ficus tree extracts have shown to have antioxidant, antidiabetic, hypolipidemic, anthelmintic, antihyperglycemic, immunomodulatory, antihyperlipidemic, hypocholesterolemic, anti-inflammatory, analgesic, antimicrobial, larvicidal, anti-diarrhoeal, antimutagenic, hepatoprotective, anti-arthritis, antiallergic, and immunostimulatory effects [21-24].

Various researchers have elucidated the effect of Ethanolic extract of *Ficus bengalensis* on 2,4,6-trinitrobenzenesulfonic acid (TNBS administrated once) induced IBD in rats for 21 days [25]. Not only this Aqueous extracts of *Ficus bengalensis* when used at a concentration of 20 mg/ml concentration showed significant paralysis of worms at 3.44 min and death at 4.34 min, whereas methanolic extract shows paralysis at
3.02 min and death at 4.36 min. Results indicated that both these two extracts possess anthelmintic activity [26]. Evidences indicated that the hydroalcoholic extract of bark of *F. benghalensis* have antidiabetic potential by ameliorating the process of glycolysis and attenuating gluconeogenesis via PI3K/Akt signalling pathway and downregulating the function of protein tyrosine phosphatase 1b [27]. Recently investigators predicted that petroleum, ethanolic and aqueous extracts of *F. benghalensis* leaves possess significant wound-healing activity by significantly decreasing the process of epithelization and increase in the wound contraction rate [28]. In the year 2022 Protective Effects of Ficus bengalensis was investigated in Streptozotocin (STZ)-Induced Diabetic Zebrafish (Danio rerio) Model. The finding of this study suggested that hydroethanolic extract of *F. bengalensis* as a promising candidate for treating diabetes [29]. Recently, antimicrobial activity of leaves and fruit of *F. benghalensis* was elucidated by evaluating Zone of Inhibition (ZOI) and Minimum Inhibitory Concentration (MIC) against gram-positive (Bacillus subtilis and Staphylococcus aureus) and gram-negative (Salmonella typhi and Escherichia coli) bacteria; and fungal strains (Aspergillus niger, Fusarium oxysporum, and Rhizopus oryzae). Methanolic extracts was found to possess higher antimicrobial activity [30]. *Ficus bengalensis* leaf extract is found to be beneficial in stimulating hair follicle maturation by inhibiting the action of enzyme 5α-reductase II. Hence, they may be employed in *de novo* drug designing to manage alopecia [31]. In 2023, *in vitro* and *in silico* study was performed to evaluate the glucose uptake and elucidate the phytoconstituents, A total of 17 phytoconstituents from *F. bengalensis* were identified to possess the anti-diabetic effects [32].

Conclusion

In the current review article, we have only focused on the pharmacological properties of two species of *Ficus*. Researchers from various regions too have explored that *Ficus* as an alternative therapy to current medication for the management of various disorders. *In vitro, in vivo* and various clinical studies have been carried out to find their efficacy and mechanism of action. Concluding the current literature-based review, it is noted that *Ficus carica* and *Ficus bengalensis* have a series of benefits in all the pathological conditions. Hence, this review open vista to explore more pharmacological interventions by using Insilco models and clinical studies.
REFERENCES


