



## A Review on Pharmacological Activities and Therapeutic Potentials of *Ficus Religiosa* (Pipal).

### KEYWORDS

*Ficus religiosa*, History, Origin, Phytochemistry, Pharmacological activities, Therapeutic potential.

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### ABSTRACT

Human life has existed and survived on this planet only due the presence of one of the greatest gift of god that is PLANTS. *Ficus religiosa* commonly known as "Peepal" has played a significant role in improving health and alleviate illness of mankind. *Ficus religiosa* is a large evergreen tree found throughout India. It was explored and used in various systems of medicine like Ayurveda, Siddha, Unani and Homeopathy. Various parts of *F religiosa* are used for the treatment of diabetes, burns, gynaecological problems, diarrhea, nervous disorders etc in traditional system of medicine. The Bioactive constituents found in *F religiosa* after the phytochemical analysis are tannins, saponins, flavonoids, steroids, terpenoids and cardiac glycosides etc. The present work is an attempt to compile a comprehensive review of *F religiosa* that covers its taxonomy, phytochemistry and its medicinal uses.

### INTRODUCTION:

From past thousands of years plants have been used in treating human diseases. Due to the presence of a number of complex chemical substances of different composition, which are found as secondary plant metabolites in one or more parts of these plants thus they possess curative properties. The principle behind Herbal medicine is that plants contain natural substances that can promote health and cure diseases. Recently plant research has grabbed the focus throughout the world and has proved the immense potential of medicinal plants used in various traditional systems of medicine.

### FICUS RELIGIOSA :

The *Ficus* genus contains 800 species and 2000 varieties of trees, shrubs and vines. These plants grow in different climatic zones varying from the tropical forest, the Middle East, Africa and the United States. It is found throughout the plains of India upto 170m altitude in the Himalayas. It is largely planted as an avenue and roadside tree especially near temples<sup>1</sup>. *Ficus religiosa* is a big widely branched tree with leathery, heart shaped long tipped leaves on long slender petioles and purple fruits growing in pairs. It is popular as bodhi tree and has got mythological,

religious, and medicinal importance in Indian culture since times immemorial<sup>2</sup>.

In Ayurveda, *F. religiosa* belongs to a class of drugs called rasayana. Rasayana are rejuvenators, antioxidants and relieve stress in the body<sup>3,4</sup>. *F. religiosa* is gaining great attention because it has many compounds which are beneficial in treatment of many diseases like diabetes, skin diseases, respiratory disorders, central nervous system disorders, gastric problems. In Bangladesh, it has been used in the treatment of various diseases such as cancer, inflammation and infectious diseases<sup>5</sup>.

### ORIGIN AND HISTORY OF FICUS:

Ficus trees have been on earth for 60 to 80 million years. The Common Fig tree is a *Ficus* variety and can be traced

back to Adam and Eve in the Garden of Eden, mentioned in Genesis<sup>6</sup>. One of the oldest *Ficus* trees is in Sri Lanka. That tree was planted in 249 B.C<sup>7-8</sup>. It was cultivated from [Afghanistan](#) to [Portugal](#) and also grown in [Pithoragarh](#) in the Kumaon hills of India. From the 15th century onwards, it was grown in areas including Northern [Europe](#) and the [New World](#)<sup>9</sup>.

### MYTHOLOGICAL IMPORTANCE OF FICUS TREE:

Trees being nature's greatest gift they are worshipped in every religion as a matter of gratitude. [Puranic](#) Literature divides our earth into seven concentric [islands](#). All these islands are named after [trees](#) or [plants](#) in [Sanskrit](#). The seven islands are:

1. **Jambudvipa:** [Jambu](#) *Syzygium cumini*.
  2. **Plakshadvipa:** [Plaksha](#) *Ficus religiosa*.
  3. **Salmalidvipa:** [Salmali](#) *Bombax ceiba*.
  4. **Kushadvipa:** [Kusha](#) *Desmostachya bipinnata*.
  5. **Kraunchadvipa:** [Krauncha](#) *Curlwe-heron*.
  6. **Shakadvipa:** [Shaka](#) *Tectona grandis*,
  7. **Pushkaradvipa:** [Pushkara](#) *Nelumbo nucifera*.
- Plakshadvipa:** [Plaksha](#) *Ficus religiosa*

[Plaksa](#) is a Sanskrit term for the sacred fig which is botanically known as *Ficus religiosa*. According to Vamana Purana, the Sarasvati was rising from the [Plaksa](#) tree (Pipal tree). In the Rigveda Sutras, [Plaksa](#) Pra-sravana refers to the source of the Sarasvati<sup>10-12</sup>.

Some trees are considered sacred due to their association with prophets and holy men. The Peepal, for example, is sacred to Hindus because according to Hindu mythology all the Hindu gods and goddess reside in peepal tree. *F. religiosa* tree is associated with the Buddhism because according to the mythology Lord Buddha attained enlightenment under the fig tree known as [bhodi](#) tree. The [Bhodi](#) tree became the symbol of the [bhuddha's](#) presence and an object of worship<sup>13-14</sup>.

### BOTANICAL DESCRIPTION:

#### Taxonomy:

Plant Taxonomy is the science that finds, identifies, describes, classifies, and names plants.

Seeds	Refrigerant, laxative
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**Table 1: Taxonomy of *Ficus religiosa*.**

Domain	Eukaryota
Kingdom	Plantae
Subkingdom	Viridiaeplantae
Phylum	Tracheophyta
Subphylum	Euphyllophytina
Class	Magnoliopsida
Subclass	Dilleniidae
Order	Urticales
Family	Moraceae
Tribe	Ficeae
Genus	<i>Ficus</i>
Specific epithet	<i>Religiosa</i> Linnaeus
Botanical name	<i>Ficus religiosa</i>
	Source : Classification USDA plants

**Table 1**

### BIOACTIVE CONSTITUENTS ISOLATED FROM FICUS:

Preliminary phytochemical screening of different parts of *F. religiosa*, showed the presence of large number of phytochemicals shown in table 2.<sup>15-16</sup>.

**Table 2: Bioactive constituents isolated from *Ficus religiosa*.**

PART OF FICUS TREE	PHYTOCHEMICAL CONSTITUENTS
Leaves	Campesterol, Stigmasterol, Isofucosterol, $\alpha$ -amyrin, Lupeol, Tannic acid, Arginine, Serine, Aspartic acid, Glycine, Threonine, Alanine, Proline, Tryptophan, Tyrosine, Methionine, Valine, Isoleucine, Leucine, Nonacosane, n-Hentricontanen, Hexa-cosanol and n-Octacosan <sup>17-19</sup> .
Fruits	Asgaragine, Tyrosine, Undecane, Tridecane, Tetradecane, Ocimene, Quercetin, and Myricetin, Limonene, Dendrolasine, Germacrene, Cadinene <sup>20</sup> .
Seeds	Alanine, Threonine, Tyrosine <sup>21</sup> .
Bark	Bergapten, Bergaptol, Lanosterol, B-Sitosterol, Stigmasterol, Lupen-3-One, B-Sitosterol-D-Glucoside, Vitamin K1 <sup>22-25</sup> .

**Table 2**

### THERAPEUTIC POTENTIALS:

*Ficus religiosa* have been used in traditional Indian medicine for various range of ailments. Traditionally the bark, leaves, fruits and other parts are used as medicines for treatment of various diseases. Bark is used for treating gonorrhoea, ulcers, and the leaves are used for skin diseases. The leaves also reported to possess antivenom activity and regulate the menstrual cycle<sup>26-27</sup>. Fruits are used as laxatives<sup>28</sup>, latex is used as a tonic, and fruit powder is used to treat asthma<sup>29-30</sup>.

**Table 3: Therapeutic Potentials of different parts of *F. religiosa*.**

Plant parts	Traditional uses (as/in)
Bark	Diarrhoea, dysentery, anti-inflammatory, antibacterial, cooling, astringent, gonorrhoea, burns.
Leaves	Hiccups, vomiting, cooling, gonorrhoea
Shoots	Purgative, wounds, skin disease
Leaf juice	Asthma, cough, diarrhoea, gastric problems
Dried fruit	Fever, tuberculosis, paralysis

**Table 3**

### PHARMACOLOGICAL ACTIVITIES:

Each part of the *Ficus religiosa* exhibit wide spectrum of pharmacological activities :

#### 1. Antibacterial activity:

According to Uma et al different extracts of the bark of *F. religiosa* has inhibitory effect on the growth of three enteroxigenic *E. coli*, isolated from the patients suffering from diarrhea<sup>31</sup>.

#### 2. Antifungal Activity:

The test was performed against two fungi: *Candida albicans* (IMI 349010) and *Aspergillus niger* (IMI 076837). The results showed that antifungal effect against the two fungi was less<sup>32</sup>.

#### 3. Wormicidal Activity:

Iqbal et al. explored that *F. religiosa* bark methanolic extract was 100% lethal for *Haemonchus contortus* worms during *in vitro* testing<sup>33</sup>.

#### 4. Wound healing activity:

It has been reported that tannins possess ability to increase the collagen content, which is one of the factor for promotion of wound healing<sup>34-35</sup>. This activity was explored by incision and excision wound models using *F. religiosa* leaf extracts which was prepared as lotion (5 and 10%) and applied on Wistar albino strain rats. High rate of wound contraction, decrease in the period for epithelialisation, high skin breaking strength were detected in animals treated with 10% leaf extract ointment when compared to the control group of animals.

#### 5. Analgesic activity:

The analgesic activity of stem bark of *F. religiosa* is explored by Sreelekshmi et al. using the acetic acid induced writhing (extension of hind paw) model in mice. It showed dropping in the number of writhing of 71.56 and 65.93%, respectively at a dose of 250 mg/kg and 500 mg/kg body weight. Thus, it can be concluded that extract showed the analgesic effect probably by inhibiting synthesis or action of prostaglandins<sup>36</sup>.

#### 6. Antidiabetic activity:

Pandit et al. explored that aqueous extract of *F. religiosa* in doses of 50 and 100 mg/kg exhibited pronounced reduction in blood glucose levels. It has been also proved that *F. religiosa* significantly increases serum insulin, body-weight, glycogen content in liver. Bark of *F. religiosa* shows similar effects and exhibits maximum fall of the blood sugar level<sup>37</sup>.

#### 7. Anticonvulsant activity:

In Ayurveda it is claimed that leaves of *F. religiosa* also possess anticonvulsant activity<sup>38</sup>. The anticonvulsant effect of the extract obtained from the leaves of *F. religiosa* was evaluated against pentylene tetrazole induced convulsions PTZ (60mg/kg, i.p) induced convulsion in albino rats. The study revealed 80 to 100 % protection against PTZ induced convulsions when given 30-60minutes prior to induced convulsion, respectively<sup>39</sup>. Figs of the plant *F. religiosa* have been reported to contain highest amount of Serotonin which is responsible for its anticonvulsant effect<sup>40</sup>.

#### 8. Antilucer activity

The ethanol extract of stem bark showed potential antiulcer activity. The activity was evaluated *in vivo* against indo-

methacin and cold restrained stress induced gastric ulcers and pylorus ligation assay<sup>41</sup>. The extract (100, 200 & 400 mg/kg) significantly reduced the ulcer index in all assay used<sup>42</sup>.

### 9. Anti-inflammatory activity

Viswanathan et al investigated the anti-inflammatory and mast cell proliferative effect of aqueous extract of bark of *F. religiosa*<sup>43</sup>. The anti-inflammatory effect was evaluated against acute (carrageenan induced hind paw oedema) and chronic (cotton pellet implantation) models of inflammation. *F. religiosa* has found to be potential anti-inflammatory & analgesic property. It was found that the leaf extract of *F. religiosa* has potential anti-inflammatory activity against carrageenan induced paw oedema<sup>44</sup>.

### 10. Anti-amnesic activity:

To investigate the anti-amnesic activity of *F. religiosa* methanol extract of figs of *F. religiosa* were used. Figs are known to comprise a high serotonergic content and modulation of serotonergic neurotransmission which plays a crucial role in the pathogenesis of amnesia. The anti-amnesic activity was investigated using methanolic extract of figs of *F. religiosa* on scopolamine-induced anterograde and retrograde amnesia in mice. The result showed anti-amnesic activity against scopolamine induced amnesia, in a dose-dependent manner<sup>45</sup>.

### 11. Anthelmintic activity

Methanolic extract *F. religiosa* bark was 100% lethal for *Haemonchus contortus* worms<sup>46</sup>. The stem and bark extracts of *F. religiosa* proved lethal to *Ascaridia galli* *in vitro*. The pharmacological studies has accepted that anthelmintic activity is due to a proteolytic fraction called ficin. It is evident from above that methanolic extracts of *F. religiosa* possibly exerted anthelmintic effect because of ficin<sup>47</sup>.

### 12. Immunomodulatory activity

To study the immunomodulatory effect of alcoholic extract

of the bark of *F. religiosa* various hematological and serological tests were carried out in mice. Administration of extract remarkably ameliorated both cellular and humoral antibody response. It is concluded that the extract possessed promising immune stimulant properties<sup>48</sup>.

### 13. Antioxidant activity

The aqueous extract of *F. religiosa* reduces oxidative stress in experimentally induced type 2 diabetes in rats. Type 2 diabetic rats gained relatively less weight during the course of development as compared to normal rats. The aqueous extract of *F. religiosa* improved the body weight of diabetic rats<sup>49</sup>.

### 14. Hypolipidemic activity

Dietary hemicelluloses peepalbanti (*F. religiosa*) has cellulose, and lignin as predominating constituents it showed a significant negative correlation with serum and liver cholesterol and a significant positive correlation with fecal bile acids. The dietary fiber influenced total lipids, cholesterol, triglycerides, and phospholipids of the liver to varying extents<sup>50</sup>.

### 15. Hypoglycemic activity:

From the root bark of *F. glomerata* and *F. religiosa*, -Sitosterol-D-glycoside was isolated which has a peroral hypoglycemic activity<sup>51</sup>.

### CONCLUSION:

The present review describes the history, origin, mythological, phytochemical, pharmacology and therapeutic potential of *Ficus Religiosa* (Moraceae). The present review reveals that *F. religiosa* contains several phytoconstituents like sitosterol-D-glucoside, vitamin K, noctacosanol, kaempferol, quercetin, and myricetin. The plant has been studied for its various pharmacological activities like antibacterial, antifungal, anticonvulsant, immunomodulatory, antioxidant, hypoglycemic, hypolipidemic, anthelmintics, and wound healing activities. *F. religiosa* has a great therapeutic potential for the treatment of diseases like asthma, diabetes, epilepsy, cancer, hyperlipidemia, inflammatory disorders, infectious disorders etc..

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