Phytopharmacological Properties of Randia dumetorum as a Potential Medicinal Tree: An Overview

Patel Ritesh G, Pathak Nimish L, Rathod Jaimik D, Dr. L. D. Patel and Bhatt Nayna M

ABSTRACT

*Randia dumetorum* family Rubiaceae is highly reputed ayurvedic medicinal tree commonly known as the Mainphal, Mindhal. A large deciduous thorny shrub grows up to 5 meters of height. It occurs in almost throughout India up to 4,000 ft attitude. It is found in Himalaya from Jammu east wards ascending to 1300 and from the Kashmir to east word’s up to 4000. It is seen in Gujarat, Tamilnadu forest of Dehradun, Suralik range, Bengal, Bihar, Orissa & South Maharashtra and costal districts of south India. In dry deciduous forests in India. Root bark of *Randia dumetorum* contains triterpene, -1-keto-3-hydroxyoleanane, Bark of *Randia dumetorum* contains manitol, saponins, coumarin glycosides, Leaves contain an iridoid-10-methylixoside. An iridoid glycoside, Ripe fruit contains glycosides, randioside A, mollisidial triterpenoid glycosides and randianin, six saponins-dumetortonins A to F. It cures abscess, ulcers, inflammation, wounds, tumours, skin diseases and have antibacterial activity. The pulp of fruit is believed by many practitioners to also have anthelmintic properties, and also used as an abortifacient as folklore remedy. Various phytopharmacological evaluations have been reported in this literature for the important potential of the *Randia dumetorum*.

Keywords: Randia dumetorum, Phytopharmacological Properties, Medicinal plants.

INTRODUCTION

*Randia dumetorum* is a large deciduous thorny shrub belonging to family Rubiaceae. It is also known as a *Catunaregam spinosa* (Thumb.) Tirveng. It occurs in almost throughout India up to 4,000 ft attitude. Leaves simple, obovate, wrinkled, shiny and pubescent. Flowers white, fragrant, solitary, seen on at the end of short branches. Fruits globose, smooth berries with longitudinal ribs; yellow when ripe. Seeds many, compressed, embedded in the dark fetid pulp. *Randia dumetorum* contains glycosides, triterpenoid glycosides and randianin. Saponins named as dumentoronin A, B, C, D, E and F etc. It has rasa, guna, virya, ipaka like Ayurvedic property. It has Anti-bacterial, Anti-allergic, Anti-inflammatory, Analgesic and Immunomodulatory activity (Kirtikar et al., 1991).

REGIONAL AND OTHER NAMES

<table>
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<tr>
<th>Language</th>
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<tr>
<td>Arabic</td>
<td>Jauzulaki, Jijul kai</td>
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<td>Assam</td>
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<td>Bengali</td>
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<td>Gujarati</td>
<td>Mindhal, Mindhola, Midhola</td>
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<td>Hindi</td>
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Malyalam : Kara  
Marathi : Ghela, Peralu, Mindhal, Wagatta, Gelphal  
Oria : Palova  
Tamil : Marukkalanka1y, Madkarai  
Telugu : Manga  
Unani : Jauzulaki (Kirtikar et al., 1991).

AYURVEDIC DESCRIPTION

**Botanical name**  
Randia dumetorum

**Sanskrit name**  
Madana, Vamanaphala, Teevragandhi

**Synonyms**  
Catunaregam spinosa (Thumb.) Tirveng.

**Properties**

- **Rasa**  
  - Kashaya
  - Tikta
  - Madhura

- **Guna**  
  - Guru

- **Virya**  
  - Ushna

- **Vipaka**  
  - Katu karma

**Karma (Actions)**  
Plant pacifies vitiated pitta, kapha, cough, skin diseases, ulcers, asthma, flatulence, colic, and is widely used as a medicine for emesis therapy in ayurveda.

**Therapeutic uses**

**Fruit**  
It cures abscess, ulcers, inflammation, wounds, tumours, skin diseases and have antibacterial activity. The pulp of fruit is believed by many practitioners to also have anthelmintic properties, and also used as an abortive and as a folklore remedy (Agrawal et al., 1999).

**Bark**  
The bark is astringent and is given in cases of diarrhoea and dysentery (Chopra, et al., 1956). It is administered internally and applied externally in the form of paste in rheumatism and to relieve pain of bruises and boneaches during fevers and to disperse abscesses. The aqueous extract of the root bark of the tree is used as an active insecticide (Dastur et al., 1962).

**DISTRIBUTION**

It occurs throughout the India up to 4,000 ft attitude. It is found in Himalaya from Jammu east words ascending to 1300 and from the Kashmir to east word’s up to 4000. It is seen in Gujarat, Tamilnadu forest of Dehradun, Suralik range, Bengal, Bihar, Orrisa & South Maharashtra and costal districts of south India. In dry deciduous forests in India; also cultivated for medicinal purpose (Kirtikar et al., 1991).

**Climate & Environmental Condition**

*Randia dumetorum* is found in high attitude in wet climate. Mostly found in High attitude wet forest. Its occur about 3000 ft attitude.

**Morphology and Macroscopy**

A large deciduous thorny shrub grows up to 5 meters of height. Leaves simple, obovate, wrinkled, shiny and pubescent. Flowers white, fragrant, solitary, seen on at the end of short branches. Fruits globose, smooth berries with longitudinal ribs; yellow when ripe. Seeds many, compressed, embedded in the dark fetid pulp. Fruit, 1.8-4.5 cm long, globose or broadly ovoid, longitudinally ribbed or smooth yellowish-brown, crowned with persistent calyx-limb, fruit, contains numerous seeds, 0.4-0.6 cm long, compressed, smooth, brown and very hard (Kirtikar et al., 1991).

**Fig.1 (a) Leaves, (b) Flowers, (c) Fruits green, (d) Fruits dried.**

**Chemical Constituents**

**Bark**

- Root bark of Randia dumetorum contains triterpene, -1-keto-3-hydroxyoleanane.
- Bark of Randia dumetorum contains mannitol, saponins, coumarin glycosides.

**Leaf**

- Leaves contain an iridoid-10-methylxoside. An iridoid glycoside from leaves of *Randia dumetorum* (Sati et al., 1986).

**Fruit**

- Ripe fruit contains glycosides, randioside A, mellisdial triterpenoid glycosides and randinan, six saponins-dumetoronins A to F (Agrawal et al., 1999).
- Saponins named as dumentoronin from fruit pulp of *Randia dumetorum* Dumetoronin A, B, C,D, E and F etc. A hemolytic triterpenoid saponins that is Randianin, from fruit of R. dumetorum (Subramaniam et al., 1989).

**PHARMACOLOGICAL STUDIES**

**Antibacterial**

The preliminary antibacterial activity of Methanolic extract of *Randia dumetorum* Lamk. (Xeromphis spinosa Thumb.)
belonging to family Rubiaceae toward some phytopathogenic bacteria. The antibacterial activity of the extract was done on some standard and wild pathogenic bacterial strains such as Staphylococcus aureus, Staphylococcus epidermidis, Bacillus cereus, Bacillus subtilis Escherichia coli and Salmonella typhi. The testing was done by the agar cup plate method using sterile top agar. Zone of inhibition of extract (50, 100 and 150 mg/ml) was compared with that of standard Amoxicillin (0.5 and 1 mg/ml) prepared in DMSO. The methanolic extract of Randia dumetorum show that the inhibition of the bacterial growth was more pronounced on Escherichia coli as compared to the other tested organisms (Movalia et al., 2009).

**Anti-Allergic**
In Ayurveda, Randia dumetorum is used in treatment asthma, rhinitis, bronchitis, cold, cough, pain, inflammation etc. anti-inflammatory activity of Randia dumetorum. Extract and its fraction on milk induced leucocytosis and eosinophilia in mice, passive paw anaphylaxis and mast cell degranulation in rat models. Randia dumetorum extract was obtained from dried and powdered fruits of Randia dumetorum using 95% methanol and its fractions were obtained by using increasing polarity of solvents like Petroleum ether, chloroform, ethylacetate and methanol. Milk was used to induce leucocytosis and eosinophilia in mice model, eggalburn was used as sensitizer in passive paw anaphylaxis in rat model and clonidine was used to degranulate the mast cells in rats model. The extract and its fractions significantly inhibited leukocytosis and eosinophilia in blood of mice. The extract and its fractions also significantly inhibited the passive paw oedema and mast cell degranulation in rats (Kumar et al., 2011).

**Anti-inflammatory**
The crude methanol extracts of fruit of Randia dumetorum was showed presence of multiple chemical constituents with presence of glycosides, randioside A, mollisidial triterpenoid glycosides and randianin, six saponins-dumetoronins mannotol, saponins, coumarin glycosides. The extract effectively and significantly reduced the Carrageenin induced oedema in hind paw of the rats at the dose level of 100 mg/kg, p.o. significant reduction in granular tissue formation was recorded. Thus, extract shows anti-inflammatory activity at various acute phases of inflammation and on formation of granular tissue. This activity appears to be significant at various acute phases of inflammation and on formation of granular tissue (Ghosh et al., 1983).

**Analgesic Activity**
Analgesic activity was tested in mice (King Instt. Strain) weighing between 20-250 with six numbers of animals in each group by Acetic acid induced writhing response and Hot-plate response in mice. 500 mg/kg methanolic extract of fruit Randia dumetorum give analgesic activity in both models (Ghosh et al., 1983).

**Immunomodulatory Activity**
Immunomodulatory activity of R. dumetorum was explored by evaluating its effect on antibody titre, DTH response, cyclophosphamide induced myelosuppression in mice. Administration of methanol extract and its fractions showed immunostimulatory activity. R. dumetorum has immunostimulant activity and chloroform fraction which strongly affected immune system seems to be bioactive fraction of this plant (Satpute et al., 2009).

**REFERENCES**


