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

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### 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 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. Root bark of *Randia dumetorum* contains triterpene, -1-keto-3-hydroxyoleanane, Bark of *Randia dumetorum* contains mannitol, saponins, coumarin glycosides, Leaves contain an iridoid-10-methylxoside. An iridoid glycoside, Ripe fruit contains glycosides, randioside A, mollisidial triterpenoid glycosides and randianin, six saponins-dumetoronins 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 dumetoronin A, B, C, D, E and F etc. It has rasa, guna, virya, vipaka like Ayurvedic property. It has Anti-bacterial, Anti-allergic, Anti-inflammatory, Analgesic and Immunomodulatory activity (Kirtikar *et al.*, 1991).

### REGIONAL AND OTHER NAMES

<b>Arabic</b>	: Jauzulaki, Jijul kai
<b>Asam</b>	: Behmona
<b>Bengali</b>	: Mainphal
<b>English</b>	: Emetic nut tree
<b>Gujarati</b>	: Mindhal, Mindhola, Midhola
<b>Hindi</b>	: Mainphal, Madan

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<b>Malyalam</b>	: Kara
<b>Marathi</b>	: Ghela, Peralu, Mindhal, Wagatta, Gelpal
<b>Oria</b>	: Palova
<b>Tamil</b>	: Marukkalankaly, Madkarai
<b>Telugu</b>	: Manga
<b>Unani</b>	: Jauzulaki (Kirtikar <i>et al.</i> , 1991).

## AYURVEDIC DESCRIPTION

<b>Botanical name</b>	<i>Randia dumetorum</i>
<b>Sanskrit name</b>	Madana, Vamanaphala, Teevragandhi
<b>Synonyms</b>	<i>Catunaregam spinosa</i> (Thumb.) Tirveng.
<b>Properties</b>	<b>Rasa</b> Kashaya, Tikta, Madhura
	<b>Guna</b> Guru
	<b>Virya</b> Ushna
	<b>Vipaka</b> Katu karma
<b>Karma (Actions)</b>	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 abortifacient as 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 India up to 4,000 ft altitude. It is found in Himalaya from Jammu eastwards ascending to 1300 and from the Kashmir to eastwards up to 4000. It is seen in Gujarat, Tamilnadu forest of Dehradun, Suralik range, Bengal, Bihar, Orissa & South Maharashtra and coastal 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 altitude in wet climate. Mostly found in High altitude wet forest. It occurs about 3000 ft altitude.

## 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-lobes, fruit, contains numerous seeds, 0.4-0.6 cm long, compressed, smooth, brown and very hard (Kirtikar *et al.*, 1991).

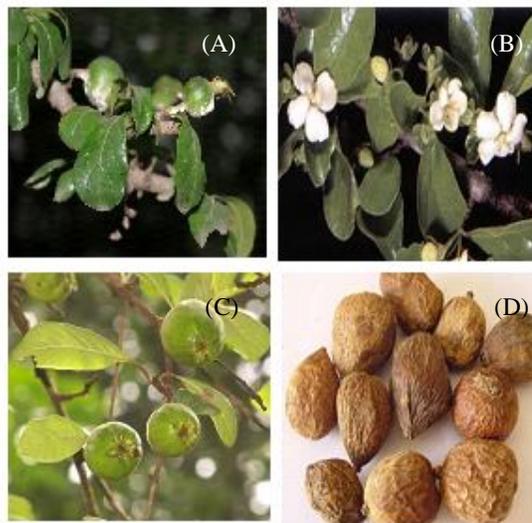


Fig.1 (a) Leaves, (b) Flowers, (c) Fruits green, (d) Fruits dried.

## 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, mollisidial triterpenoid glycosides and randianin, six saponins-dumetoronins A to F (Agrawal *et al.*, 1999).
- Saponins named as dumetoronin from fruit pulp of *Randia dumetorum* Dumetoronin A, B, C, D, E and F etc. A hemolytic triterpenoid saponin 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 (Moivalia 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, eggalbumin was used as sensitizer in passive paw anaphylaxis in rat model and clonidine was used to degranulate the mast cells in rat 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, randsioside A, mollisidial triterpenoid glycosides and randianin, six saponins-dumetoronins mannitol, 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. 500mg/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).

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