



# Phytochemical Constituents and Pharmacological Activity of *Tecomella Undulata*: A Comprehensive Review

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**ABSTRACT:** *Tecomella undulata*, commonly known as the Rohida tree or Marwar teak, is a valuable plant species with a wide range of traditional uses and medicinal properties. This review aims to provide a comprehensive overview of the phytochemical constituents identified in different parts of *Tecomella undulata* and their potential bioactivities. Phytochemical studies have revealed the presence of various bioactive compounds in *Tecomella undulata*, including flavonoids, triterpenoids, phenolic compounds, sterols, lignans, and alkaloids. These compounds have been associated with diverse pharmacological properties, such as antioxidant, anti-inflammatory, antimicrobial, anticancer, and antidiabetic activities.

**KEYWORDS:** *Tecomella undulata*, Rohida tree, phytochemical constituents, traditional uses, medicinal properties, bioactivities.

## I. INTRODUCTION

*Tecomella undulata*, commonly known as the Rohida tree or Marwar teak, is a species of flowering plant belonging to the family Bignoniaceae [1]. It is a deciduous tree native to the arid and semi-arid regions of the Indian subcontinent, including India, Pakistan, and parts of Nepal. The tree is highly valued for its timber, medicinal properties, and ecological significance. The Rohida tree typically grows to a height of 10 to 20 meters, with a spread of about 7 to 10 meters. It has a sturdy, erect trunk and a broad, irregular crown. The bark of the tree is grayish-brown and rough in texture [2]. The leaves are compound, with each leaflet being lance-shaped and having undulating or wavy margins, giving the species its specific epithet "undulata." One of the remarkable characteristics of *Tecomella undulata* is its ability to thrive in arid and semi-arid environments with low rainfall. It has adapted to these harsh conditions by developing an extensive root system that allows it to access deep groundwater reserves. The tree also possesses a high degree of drought tolerance, making it well-suited for dry regions.

*Tecomella undulata* is highly valued for its durable and termite-resistant timber, often referred to as "Marwar teak." The wood is used in construction, furniture-making, and for various utility purposes. In addition to its economic importance, the tree also holds cultural significance in traditional practices and rituals. Medicinally, various parts of the Rohida tree, including the leaves, bark, and flowers, have been traditionally used in Ayurvedic and traditional medicine systems [3]. They are believed to possess anti-inflammatory, antimicrobial, and antioxidant properties [4]. Extracts from the plant are used to treat ailments such as skin disorders, fever, digestive issues, and respiratory problems. *Tecomella undulata* plays an essential ecological role in its native habitat. It provides shade and shelter for a variety of birds, animals, and insects. The tree's flowers attract pollinators such as bees and butterflies, contributing to local biodiversity. Its deep-rooted system also helps prevent soil erosion in arid regions. This is a remarkable plant that has adapted to survive in challenging environments. It serves as a valuable resource for local communities, both economically and medicinally, while also playing a vital role in supporting the ecosystem of arid and semi-arid regions.

## II. TAXONOMIC CLASSIFICATION

The taxonomic classification of *Tecomella undulata* is as follows:

Kingdom: Plantae

Phylum: Tracheophyta

Class: Dicotyledons

Order: Lamiales



Family: Bignoniaceae  
Genus: Tecomella  
Species: Tecomella undulata

### III. TRADITIONAL USE OF THE PLANT

Tecomella undulata, or Rohida tree, has a long history of traditional use in various cultures. Here are some of the traditional uses of Tecomella undulata:

**Medicinal Uses:** Different parts of Tecomella undulata have been used in traditional medicine for their therapeutic properties. The bark, leaves, flowers, and seeds are used to prepare remedies for various ailments. The plant is believed to have anti-inflammatory, antimicrobial, and antioxidant properties. It has been used to treat skin diseases, digestive disorders, fever, respiratory problems, and as a general tonic [5].

**Timber and Woodcraft:** The durable and termite-resistant wood of Tecomella undulata is highly valued for its use in construction, furniture-making, and woodcraft. The timber is known as "Marwar teak" and is sought after for its strength and durability.

**Fuelwood:** The wood of Tecomella undulata is used as a source of fuelwood due to its high calorific value. It provides a reliable source of energy for cooking and heating purposes, particularly in areas where other sources of fuel are scarce.

**Fodder:** The leaves and twigs of Tecomella undulata are used as fodder for livestock during periods of scarcity. They provide nourishment and help sustain the animals during dry seasons when other vegetation is limited.

**Traditional Crafts:** Various parts of the Tecomella undulata tree, such as the branches, bark, and seeds, are used in traditional crafts. The branches are used to make baskets, mats, and other woven items. The seeds are sometimes used in jewelry making or as decorative elements.

**Soil Erosion Control:** The deep-rooted system of Tecomella undulata helps stabilize the soil and prevent erosion, particularly in arid and semi-arid regions. The tree is often planted as a part of afforestation and land restoration projects to mitigate the effects of soil degradation [6].

**Cultural Significance:** Tecomella undulata holds cultural significance in various communities. It is often associated with rituals, festivals, and traditional practices. In some regions, the tree is considered sacred and is protected as a symbol of cultural heritage.

### IV. PHYTOCHEMICAL ANALYSIS

Phytochemical studies of Tecomella undulata [7-10], or the Rohida tree, have revealed the presence of various bioactive compounds in different parts of the plant. Here are some of the phytochemical constituents that have been identified:

**Flavonoids:** Flavonoids are a class of compounds known for their antioxidant and anti-inflammatory properties. Studies have identified the presence of flavonoids such as quercetin, kaempferol, and rutin in Tecomella undulata. These compounds contribute to the plant's medicinal properties and antioxidant activity.

**Triterpenoids:** Triterpenoids are natural compounds with diverse biological activities. Tecomella undulata contains triterpenoid compounds, including betulinic acid, ursolic acid, and oleanolic acid. These compounds have shown potential anticancer, anti-inflammatory, and antimicrobial activities.

**Phenolic Compounds:** Phenolic compounds are secondary metabolites that possess antioxidant and antimicrobial properties. Studies have identified the presence of phenolic compounds such as gallic acid, ellagic acid, and caffeic acid in Tecomella undulata. These compounds contribute to the plant's antioxidant and medicinal activities.

**Sterols:** Tecomella undulata contains sterols, including  $\beta$ -sitosterol and stigmasterol. These compounds have been associated with anti-inflammatory, antidiabetic, and anticancer properties.

**Lignans:** Lignans are phytochemicals known for their antioxidant and anticancer activities. Tecomella undulata has been found to contain lignans such as pinoresinol and lariciresinol. These compounds contribute to the plant's potential medicinal properties.



**Alkaloids:** Alkaloids are nitrogen-containing compounds that often exhibit pharmacological activities. Some studies have reported the presence of alkaloids in *Tecomella undulata*, although specific alkaloids and their biological activities have not been extensively explored.

## V.CONCLUSION

Further research is needed to explore the full range of phytochemicals and their potential bioactivities in different parts of the plant. Phytochemical studies play an important role in understanding the therapeutic potential and medicinal applications of *Tecomella undulata*.

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