

Cleome brachycarpa: A Review on Ethnobotany, Phytochemistry, and Pharmacology

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ABSTRACT

Cleome brachycarpa acknowledged as Ponwar and found very effective against soreness, irritation, burning, contagious diseases, white patches of the skin, joint pain, ligaments disorder, bones diseases (arthritis, rheumatism), muscles swelling, skin rash and as an antioxidant. It has unpleasant taste and found chiefly in India, Iran and Pakistan.

Its leaves, roots, and flowers were assessed for their medicinal uses and the outcomes were very startling regarding their medicinal compositions. According to the various survey reports *Cleome* species have admirable medicinal values and the compounds isolated from them would be the great source of new therapeutic goods.

Many great pharmacological effects of the plant have been reported. The current assessment is a plentiful interpretation of the traditional, ethnobotanical, phytochemical, and pharmacological uses of the plant.

Keywords: *Cleome brachycarpa*, medicinal plant, pharmacological effects, ayurvedic use.

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INTRODUCTION

Botanical Description of *Cleome brachycarpa*

Kingdom: Plantae

Phylum: Magnoliophyta

Class: Magnoliopsida

Order: Capparales

Family: Capparaceae

Genus: *Cleome*

Common Names: Arabic Name: ربران (بربران); Hindi Name: Ponwar; Sindhi Name: Shamako [1].

It is a woody 50 cm tall, branched with oblong leaflets, yellow flowers, smooth pedicels, broad petals and 6 stamens [2, 3].

Geographical Distribution

Punjab and Sindh provinces of Pakistan are the places where rich supply of the plant is present mainly in stony and sandy plains. Globally it is found in different regions of Iran, Afghanistan, Pakistan, North Africa, Egypt, Saudi Arabia, and India. *Cleome* is the main genus with approx. 180-200 species of Capparaceae family [4, 5].

Scanning of Pollen Grain and Anther of Plant

Pollen grains scanning by microscope:

Different characteristics of *brachycarpa*'s pollen grain were studied through light and scanning microscope [6].

Study on plant anther:

Many cotyledons including *Cleome brachycarpa* of Karachi, Pakistan were studied and examined for its beautiful anther structure [7].

Active Constituents

1. **Trinortriterpenoid (X-ray crystallography):**

By the help of x-ray crystallography brachycarpon, a new trinortriterpenoid was isolated having 228°C melting point and 7 membered lactone ring from the alcoholic extract of *Cleome brachycarpa* [8, 9].

2. **Triterpenoid (X-ray crystallography):**

Cleocarpone, a novel triterpenoid isolated from the whole plant and evaluated for its medicinal uses by chemical and spectral studies which will then confirmed through x-ray crystallography [10].

3. **Flavonoids:**

Aerial parts of the plant was evaluated and tested for flavonoids and reported approx. 10 methylated flavonoids from *Cleome brachycarpa* [11, 12].

4. **Isolation of Glycoside:**

Isolation of megastigmane glycoside from aerial parts of the plant is responsible for its cytotoxic, anti-proliferative and antitumor effects [13].

5. **Essential Oil Composition:**

GC and GC-MS chromatographic techniques were used to analyze essential oil composition of the plant and about 43 important components were reported [14].

6. **Chemotaxonomic Markers:**

HPLC analysis of ethanol extract of *Cleome brachycarpa* contributed in identification of about seven kaempferol and quercetin compounds [15].

The leaves of the plant (*Cleome brachycarpa*) have very pleasant smell and can be used for different purposes [17].

Throughout the world approximately 25% of the prescribed medicines are plants based (natural) like quinidine, vincristine, vinblastine, digoxin, morphine, codeine and atropine, etc. [18].

In the light of many surveys and research some popular uses of *Cleome brachycarpa* are listed below:

1. **Black carbon paint:**

In the region around the Aegean Sea different methods were used in order to prepare black paints like by smoke, by organic Black pottery substance, by the use of clay, by graphite rubbing or by *Cleome* species [19].

2. **Anti-inflammatory effects:**

The leaves of *Cleome brachycarpa* were mentioned to be used in the management of moderate to severe pain conditions like in rheumatism, scabies and leucoderma and inflammation [20]. The whole plant has carminative and anti-emetic properties and can reduce inflammation significantly [21].

Dhanar Khathuri is the indigenous appellation of *Cleome brachycarpa* and testified to be beneficial in the treatment of joint pain [22].

Desiccated residue of *Cleome brachycarpa* customs for the handling of snags related to stomach, lower belly pain, infants fever, over the irritated parts of the body, to increase appetite and also as feedstuff in Pakistan [23]. Moreover, it is used to tolerate intestinal worms and liver disorders [24].

3. **In leucoderma:**

In northwestern Rajasthan *Cleome brachycarpa* is known as Madhio and whole plant parts were broadly used in different skin conditions like inflammation, scabies, itching and leucoderma [25, 26].

4. **In scabies:**

In Dera Ismail Khan, *Cleome brachycarpa* used for management of a wide range of diseases after drying (underneath the shade), grinding, mixing with sugar. This sugar mixture will then be assorted with water and implement in decreasing abdominal pain, in handling of scabies and against pathogenic plant microorganisms [27, 28].

AYURVEDIC, ALLOPATHIC AND UNANI SYSTEMS USE

The plant, *Cleome brachycarpa* used as a popular medication for assortment of different complaints as renowned in ayurvedic, allopathic and Unani system. These mentioned systems elaborated the use of plant (*Cleome brachycarpa*) very extensively and enlighten the natural remedies and treatments for various diseases [16].

5. **Eliminate maggots in the nostrils:**

Cleome brachycarpa is a prevalent monsoon and spring plant for camel nibbling in Cholistan Desert. Dried leaves are used to eradicate maggots in the nostrils [29-31].

6. **Antimicrobial activities against bacteria:**

People of Cholistan Desert (Pakistan) exploited *Cleome brachycarpa* as vermifugal and anthelmintic and antimicrobial agent against intestinal worms and bacteria. The plant is an ionic foundation of terpenes, triterpenoids, steroids, flavonoids, quinines and antioxidants [32].

7. **Appetizer and carminative:**

In the Eastern Desert of Egypt, numerous medicinal plant species (e.g. *Cleome brachycarpa*) were recorded which were used as deodorant, appetizer, carminative and as an antibacterial [33].

8. **Scorpion bite and snake bite:**

An ethnobotanical survey of Iran exposed use of plant *Cleome brachycarpa* in throbbing complaints related to skin, GIT concerns, venomousness snake and scorpion bite [34].

9. **Diuretic, astringent, narcotic:**

Cleome brachycarpa is a perpetual rosemary and used as a diuretic, astringent, narcotic and as a source of animal feed [35].

PHARMACOLOGICAL ACTIVITY

1. **Activity against different microorganisms:**

The aqueous extract of *Cleome* has great antibacterial and antimicrobial potential among various wild plants [36] and has been reported as nematocidal (toxic against eggs of nematode) and chiefly used to increase plant growth [37].

2. **Antioxidant potential:**

Antioxidant action of *Cleome brachycarpa* was evaluated in United Arab Emirates and it was accepted as foundation of antioxidants and food preservatives. Leaf part of the plant has greater phenolic content as compared to any other part of the plant [38].

3. **Antiemetic activity:**

Leaf extract of *Cleome brachycarpa* at 150 mg/kg oral dose in chicks produced significant

antiemetic effects which were comparable to the marketed chlorpromazine [39].

4. **Anxiolytic and CNS depressant effects:**

Anxiolytic and depressant effects of *Cleome brachycarpa* were evaluated in mice at 300 mg/kg oral dose which resulted in decreased number of cage crosses, Central Square, head dip and peripheral square crossings. These results justified the CNS tranquilizing properties of *Cleome brachycarpa* [40].

5. **Hypolipidemic and hepatoprotective effects:**

To evaluate the effects of *Cleome brachycarpa* on lipid profile researchers administered 300 mg/kg oral dose to albino rabbits (1000 g – 1600 g) for seven days and clinched its noteworthy hypolipidemic properties as the plant extract significantly decreased Alkaline Phosphatase (ALP) and total as well as direct bilirubin [41].

6. **Hepatoprotective potentials:**

Cleome brachycarpa has been evaluated up to the maximum dose of 5000 mg/kg but even at this high dose it resulted in significant decrease in ALT, AST, ALP levels with no any sign of organ toxicity when compared with the acetaminophen [42].

CONCLUSION

The present review concluded that the plant *Cleome brachycarpa* has many great pharmacological activities and can be a good source for treating many diseases without severe harmful effects.

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