

A DETAILS STUDY ON *URENA LOBATA*

¹Raj Ravi, ^{2*} Samanta Krishanu

¹ Research Scholar, Pharmacy College, Azamgarh, Uttar Pradesh, India.

²Associate Professor, Pharmacy College, Azamgarh, Uttar Pradesh, India.

Correspondence author

Krishanu Samanta

Associate Professor

Pharmacy College

Itaura, Chandeshwar, Azamgarh 276128

Uttar Pradesh, India

krishanusamanta@yahoo.com

ABSTRACT

The information about traditional medicinal plants must have been accumulated in the course of many centuries but it is our misfortune that proper chemical and pharmacological evaluation of most of these plants have not done till now. Keeping this view, details studies on *Urena lobata* (Family- Malvaceae) along with phytochemical & pharmacological study have done. It is a very medicinal significant plant as a gift of the nature for living beings. In traditional medicinal system it is used in different troubles as well as it possesses different important pharmacological activities. *Urena lobata* commonly known as Caesar weed or Congo jute. In India, it is widely available in Andhra Pradesh, southern and some parts of northern regions. Its leaves, roots, stem, and bark have some beneficiary activities for medicinal and purposes such as antioxidant, inflammatory, antimicrobial, antidiarrheal, antidiabetic, and antihyperlipidemic. This plant has the potential to cure many more disease and disorders. The branches, leaves or whole trees are used to treat injuries, bruises, rheumatism, mastitis, and bites. In this study, phytochemical investigation of the n-hexane and ethyl acetate extract of leaves and twigs of *Urena lobata* L. led to the isolation of β -sitosterol, β -sitosterol-3-O- β -D-glucopyranoside, 2-acetylamino-3-phenylpropyl-2-benzoylamino-3-phenylpropanoate, quercetin and trans-tiliroside

Key words: Malvaceae, *Urena lobata*, Pharmacological Activity, Antioxidant activity

INTRODUCTION

In many developing countries a large proportion of the population depends on traditional medicinal plants for health care needs. Herbal plants are wonderful origin of traditional & modern medicine, useful for primary health care system. The pharmacological treatment of disease began long years ago with the use of herbs. Methods of folk healing throughout the world commonly used herbs as part of their tradition. The important healing practices around the world that used herbs for this purpose [1]. Herbal plants are huge sources of nutraceuticals, prevent the different disease or maintain healthy life. Herbal plants have ability for the formation of secondary metabolites such as glycoside, alkaloids, steroids, phenolic substances, flavonoids, terpenoids etc. These secondary metabolites are used to treatment of many diseases. Indian traditional system of medicine Ayurveda, is a medical

system primarily practiced in India that has been known for nearly 5000 years. It includes diet and herbal remedies, while emphasizing the body, mind and spirit in disease prevention and treatment [2]. The indigenous systems of medicines, developed in India for centuries, make use of many medicinal herbs. In one of the studies of the World Health Organization, it is estimated that 80 per cent of the population of developing countries relies on traditional plant-based medicines for their health requirements [3-6]. India is the largest producer of herbal medicine and is rightly called the “Botanical garden of the world”. India has number of approved indigenous systems of medicine viz-Ayurveda, Siddha, Unani, Homeopathy, Naturopathy are applied for the health care of mankind [7]. Herbal medicine (HM) is the complementary and alternative medicine, which in recent times is increasingly gaining widespread popularity all over the world. The use of HM cuts across gender, social and racial classes in both developing and developed countries of the world [8]. Herbal medicines are one type of dietary supplement. They are sold as tablets, capsules, powders, teas, extracts, and fresh or dried plants. People use herbal medicines to try to maintain or improve their health [9]. Even in many of the modern medicines, the basic composition is derived from medicinal plants and has become acceptable for easy availability, least side effects, low prices, environmental friendliness and lasting curative property. This is in large part due to the complexity of herbal and botanical preparations, they are not pure compounds. It is also a function of the traditionally-held belief that the synergistic combination of several active principles in some herbal preparations is responsible for their beneficial effects [10]. World Health Organization (WHO) has stressed the need to promote the indigenous systems of medicine among the rural population of the Third world countries [11].

Under the family Malvaceae, *Urena lobata*, is evergreen very important plant as a gift of the nature for living beings. In traditional medicinal system it is used in different troubles as well as it possesses different important pharmacological activities. It also possesses therapeutic uses in Ayurvedic and Siddha system of medicine. *Urena lobata* having important medicinal value and they are usually shrubs. It is commonly known as Caesarweed or Congo jute belongs to the family Malvaceae. *Urena lobata* One of the medicinal significant plant contains different groups of phytoconstituents. The plant *Urena lobata* was also studied for antioxidant, inflammatory, antimicrobial, antidiarrheal, antidiabetic, and antihyperlipidemic.. The branches, leaves or whole trees are used to treat injuries, bruises, rheumatism, mastitis, and bites. *Urena lobata* shrub has the simple and opposite leaves which are pinnate in venation and light green in appearance. It is elliptic to ovate in shape, acute in apex, petiolet, entire to partially serrate in margin and the length of leaf is 5-6.5 cm long and 1-1.5 cm in width [12]. Dried leaves are grayish green in color, rough texture, and slight bitter in taste and brittle in nature [13]. The leaflets of the plant were dorsiventral in symmetry with circular midrib and thin lamina forming wings on either side of the midrib. The midrib has consisted of outer ground tissue and complex vascular structure. Epidermal layer was thin with small cell and prominent cuticle [14]. The upper epidermis was found to be formed of two layers of epidermal cells whereas lower epidermis has consisted of single layer of epidermal cells.

The inner portion of the abaxial part consisted of fairly wide zone of collenchyma cells which have thick walls without intercellular space and somewhat starch grains found to be present. The vascular tissues formed a complex structure [15]. These types of cells are very big in size with compare to cells present in between upper and lower epidermis. The midrib consisted of a circular vascular bundle consisting of 6-13 longitudinal arrangement of xylem strand present in the center of midrib along with highly compacted phloem cells. Diameter of xylem cells was about 3-6 cm unicellular sharp pointed trichomes were also found above the upper epidermis at midrib [16]. The various common names or vernacular names of the plant are hibiscus bur, aramina, pink Chineseburr, bur mallow, grand cousin, cadillo, carrapicho do mata, malva, mahot cousin, cousin petit, cousinrouge, jut africain, cooze mahot, dadangsi, and mautofu. Common names of Caesarweed are as follows in Hindi: Bachita, Unga, Lapetua; in Manipuri: Sampakpi; in Marathi: Vanbhendi; in Tamil: Ottatti; in Telugu: Nalla Benda, Pedda Benda; in Kannada: Otte [17]. Medicinal plants and their derived products are one of the potential sources of modern medicines. The use of medicinal plants or their parts is long standing and increasing day by day *Urena lobata* a sub-shrub, is traditionally used in many countries, including Bangladesh, India and China to treat various ailments [18]. The scientific reports also suggest that *Urena lobata* may be a good source of promising phototherapeutic chemical moieties. Common names of *Urena lobata* is Aramina, Bur mallow, Caesar weed, Caesar's weed, Caesarweed, Congo jute, Hibiscus burr, Pink burr, Pink Chinese burr, Pink-flowered Chinese burr, Urena burr, Urena weed [19]. It is erect shrub that grows up to 10 feet in height. The plant is single stalked, with free-branching stems that comprise a bushy appearance. Leaves: simple, alternate, with the upper surface rough and the lower surface grayish, broadly ovate, often with 3-5 shallow, angular lobes at apex [20]. Each individual plant grows as a single stalk that freely sends out bushy stems. The leaf shape is palmately lobed (having lobes that spread out like fingers on a hand). Like the stem, the leaves also have tiny hairs [21]. Flowers of the plant are pink-violet and grow one centimeter in width. The fruit is also hairy and may stick to clothing or fur [22]. Now almost always regarded as being naturalized in northern and eastern Australia (i.e. in northern Western Australia, the northern parts of the Northern Territory, northern and eastern Queensland and the coastal districts of northern New South Wales) [23]. Also naturalized in south-eastern USA (i.e. Louisiana and Florida), La Reunion, Papua New Guinea and on numerous Pacific islands (e.g. American Samoa, the Cook Islands, the Federated States of Micronesia, Fiji, French Polynesia, Guam, Niue, the Solomon Islands, Tonga and Hawaii) [24].

Taxonomical Classification of the plant *Urena lobata*

Kingdom: Plantae

Subkingdom: Tracheobionta

Super division: Spermatophyta

Division: Mangoliophyta

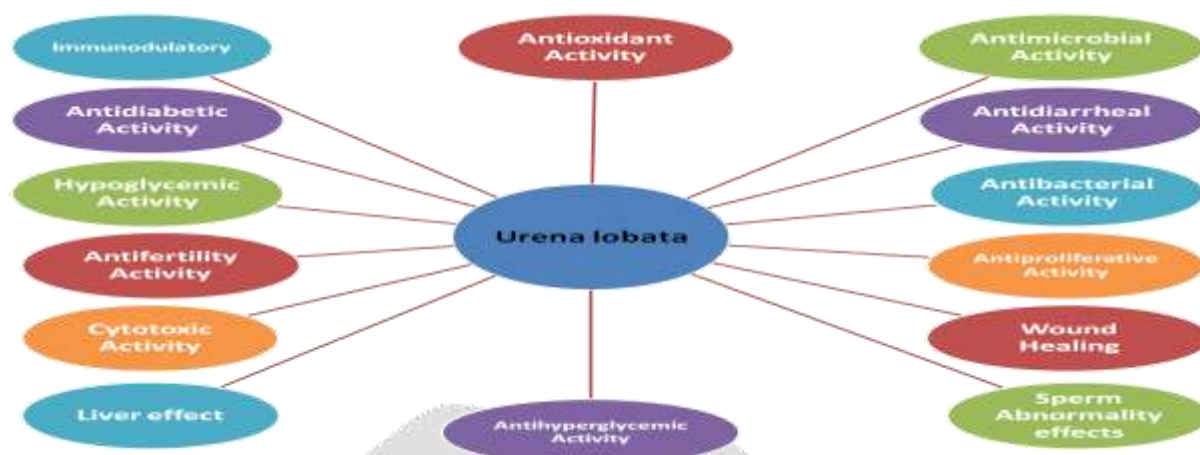
Class: Mangoliopsida
Sub class: Dilleniidae
Order: Malvales
Family: Malvaceae
Genus: Urena
Species: Lobata



Fig1: Image of plant *Urena lobata*

Chemical constituents of *Urena lobata*

Roots contain carbohydrate 33%, protein 1.9%, fat 1.8%, fiber 51.7%, moisture 6.6%, and ash 5%. Preliminary phytochemical analysis of methanol extract of leaves shown presence of alkaloids, flavonoids, saponins, and tannins. Ethyl acetate portion and n- butanol portion of a 95% ethanol extract of branches and leaves found ten flavonoid compounds, viz. kaempferol, rutin, quercetin, afzelin, astragaln, tiliroside, kaempferol 3 O β D glycopyranoside 7 O α L rhamnoside, kaempferol 7 O α L rhamnoside, kaempferol 7 O α L rhamnoside 4' O β D glycopyranoside, and crenuloside. Raw leaves are reported to contain 81.8% moisture, 54 cal, 3.2 g of 57 protein, 0.1 g fat, 12.8 g carbohydrates, 1.8 g fiber, and 2.1 g ash, 558 mg calcium, and 67 mg of phosphorous per 100 g[25,26].

Pharmacological activity of *Urena lobata*:**Antioxidant Activity**

Effects of *Irvingia grandifolia*, *Urena lobata*, and *Carica papaya* on the oxidative status of normal rabbits: With recognized therapeutic effects, the plants were studied for toxic side effects. Results showed no evidence of oxidative damage on liver and pancreatic malondialdehyde (MDA) levels on rabbits and even seemed to provide protection against lipid peroxidation [27].

Antimicrobial Activity

In this study, isolated 3 compounds from *Urena lobata* leaf extract contains Kaempferol, quercetin, and tiliroside which showed strong antimicrobial activity against *Escherichia coli*, *Bacillus subtilis*, and *Klebsiella pneumonia*. The study supports the traditional use of the plant for treatment of infectious diseases [28].

Antidiarrheal Activity

A study reports the antidiarrheal potential of seed extracts of *Urena lobata* used in the traditional medicine by the Naga tribes of India. This plant showed significant inhibitory activity against castor oil induced diarrhea and prostaglandin E₂ (PGE₂) induced intra fluid accumulation. Both showed a significant reduction in gastrointestinal motility with no signs of toxicity. Results help explain its traditional use as an antidiarrheal agent [29].

Antibacterial Activity

A study of the methanol extract of *Urena lobata* showed a broad spectrum of antibacterial activity. Comparative study of a methanolic extract of *Urena lobata* root and a standard herbal formulation showed antibacterial activity [30].

Immunomodulatory

A study of the methanolic extract of *Urena lobata* showed phagocytosis and intracellular killing potency of human neutrophils. The study concludes that *Urena lobata* possesses immunomodulatory property [31].

Antidiabetic Activity

Study of aqueous extracts of *Urena lobata* (roots and leaves) in STZ induced diabetic rats showed recognizable hypoglycemic/antidiabetic and anti hyperlipidemic effects [32].

Hypoglycemic Activity

Study in rabbits showed *Urena lobata* aqueous extract of roots significantly reduced body weight and fasting glucose. It exerted an initial toxic effect on hepatocytes and also caused bile obstruction. However, the effects were not severe and not sustained. A reduction in dose, frequency, and duration of administration may reduce the side effects observed in the study [33].

Antifertility Activity

Study of *Urena lobata* roots for antifertility activity in adult male Wistar albino rats. Results showed *Urena lobata* reversibly inhibited spermatogenesis and steroidogenesis indicating reversible antifertility activity [34].

Cytotoxic Activity

Study evaluated a methanolic extract of leaves for antioxidant and cytotoxic potentials. The extract showed potent antioxidant activity with effective scavenging of free radicals and potent cytotoxic activity in the brine shrimp lethality assay [35].

Hepatoprotective effect

Study evaluated the effects of aqueous extract of root on the liver of adult Wistar rats. Results show that biochemical and morphological organization of the liver can be significantly altered with continued and increased use of the extract [36].

Antihyperglycemic Activity

Study of methanolic extract of leaves showed antihyperglycemic and antinociceptive effects. Alkaloids, flavonoids, saponins, and tannins present in the methanolic extract may be responsible for the antinociceptive effect [37].

Sperm abnormality effects

In a pilot toxicity study, in albino rats, *Urena lobata* caused a significant increase in headless tail sperm cell abnormality, a primary sperm abnormality caused by a disruption in the course of spermatogenesis [38].

Wound healing

Study evaluated a methanolic extract for wound healing activity in albino rats. Results showed significantly wound healing activity in excision, incision, burn, and dead space wound models, comparable to the Povidone Iodine formulation [39].

Antiproliferative Activity

Study of methanol extracts of *Urena lobata* showed significant antiproliferative and antioxidant properties on MB MDA435 breast cancer cell line [40].

Analytical potential of flower dye extract

Study showed the flower extract of *Urena lobata* can be used as an acid base indicator in all types of titration, with potential preference over synthetic indicators because of easy availability, inertness, ease of preparation, and cost effectiveness [41].

RESULT AND DISCUSSION

The present article reviews a details study on *Urena lobata*. Different species of whole plant as well as its extracts both possess the various pharmacological properties like Antioxidant activity, analgesic properties, anti-convulsion activity, anthelmintic activity, hepatoprotective effect. This review provides a profile on the botanical, phytochemical, and biological and other activities of *Urena lobata*.

CONCLUSION

A details study of the *Urena lobata* under different species study concluded that its different extracts possess the various pharmacological properties like antioxidant activity, analgesic properties, anti-convulsant activity, anthelmintic activity, hepatoprotective effect. Phytochemical screening will also help in the presence of compounds, which is responsible for the medicinal importance of the plant. Although the different extract of the plant has numerous pharmacological importance but medicinal application and clinical application can be made only after extensive research on its bio-activity, mechanism of action, pharmacotherapeutics and extensive safety studies. It also requires research on pharmacognostical, phytochemical and pharmacological aspects. However, research going on it would be easier to develop new drugs after extensive studies on mechanism of action & pharmacological effects. It is expected that it may find application as a novel drug in the future to control various diseases.

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