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Jhuma Deb

Netaji Subhas Chandra Bose
Institute of Pharmacy, Tatla,
Chakdaha, Nadia, West Bengal,
India

Soumya Saha

Netaji Subhas Chandra Bose
Institute of Pharmacy, Tatla,
Chakdaha, Nadia, West Bengal,
India

Nilip Kanti Deb

Netaji Subhas Chandra Bose
Institute of Pharmacy, Tatla,
Chakdaha, Nadia, West Bengal,
India

Review on *Glochidion velutinum* Wight, (Euphorbiaceae): A medicinal plant

Jhuma Deb, Soumya Saha and Nilip Kanti Deb

Abstract

Glochidion velutinum Wight., a small monoecious tree belonging to the Euphorbiaceae family; commonly known as Chinna usiri, Velvety melon; grows up to 9 m with flattened branches and leaves. The plant is mainly distributed in India, Burma, and Pakistan. The whole plant as well as individual parts of the plant are used traditionally to cure a variety of human ailments like diabetes, inflammation, cancer, healing of wounds, anti-diarrheal activity etc. The presence of triterpenoid, glycosides, alkaloids, proteins, tannins, steroids, flavonoids, and saponins are reported to be present in the plant. Various extracts of the plant have been reported to possess antidiabetic, antioxidant, antiurolithiatic, antibacterial activity etc. There are various other activities which may be evaluated to provide scientific validity to the various ethnomedicinal claims.

Keywords: *Glochidion velutinum* Wight., euphorbiaceae, traditional, ethnopharmacology, phytochemistry

1. Introduction

Glochidion velutinum Wight., is a small monoecious small tree or large shrub belonging to the Euphorbiaceae family, commonly known as Chinna usiri, Velvety melon, melon feather foil, or feather foil downy^[1] grows up to 9 m with flattened branches and leaves. Bark is brown in colour with rough surface and its wood is brownish- white and soft in appearance. All other parts are evenly to densely whitish- to rusty-velvety in appearance. Leaves are elliptic-ovate to elliptic-oblong; 5-10cm in length and 2-6 cm in width, apex pointed or shortly obtusely long-pointed, and the base is wedge-shaped or rounded-wedged. Leaf-stalks are 2-3 mm in length. Male flowers are carried on slender stalks 5-9 mm long. Sepals are 6 in number, oblong-lance shaped, 2-3 mm long, blunt, thick and yellow in colour^[2]. Stamen-column (of 3 fused sessile anthers) is 1.5 mm in length, with 3 separate connectives conical in appearance and yellow in colour. Female flowers are present on stalks 1-2 mm long, extending to 4-6 mm in fruit. Sepals are shorter than the male sepals, green, otherwise similar to them, persistent. Ovary is 4-7-celled, 8-14-lobed, 1 mm diameter^[3,4]. Styles are fused into a column 1.5 x 1 mm, 4-7-toothed at the apex, pubescent. Fruit is depressed-globose to discoid, 8-14-lobed, 4 x 10 mm, evenly velvety with the style persistent in the depression. Seeds irregularly obovoid, 3-4 x 4-5 mm, smooth, shiny, red, often remaining attached to the axis after the splitting of the fruit. Flowering season is from May-July^[3-5].



Fig 1: *Glochidion velutinum* Wight.

1.1 Common Vernacular Names

Malayalam - Chathakkadambu, kayara, kaira.
Tamil - Panickaavu.
Nepali - kaalikaath, Leti kath^[1].

Correspondence**Jhuma Deb**

Netaji Subhas Chandra Bose
Institute of Pharmacy, Tatla,
Chakdaha, Nadia, West Bengal,
India

2. Geographical Distribution

Glochidion velutinum Wight. is mainly distributed in India, Burma, and Pakistan. In India it can be easily found on road sides or on the edges of field and waste places. It mainly grows in evergreen forest between 600 and 2000 m. It is mainly available in Solas and grassland Akani of Tadi Likhu watershed and in Nuwakot district. It grows occasionally along the streams in moist deciduous Forests near Akkagarla guide in Tirumala besides the water fall streams in Talakona, Kambakam. It is usually found on dry hills. It also grows in South Andaman Islands. This plant is widespread in the world as a weed, in Baluchistan, Ceylon, Tropical Asia, Africa, Australia and America [5-7].

3. Ethnopharmacology

The whole plant as well as individual parts of *Glochidion velutinum* Wight. is used traditionally to cure a variety of human ailments. Joshi AR *et al.*, 2007, reported that the paste of the crushed fruit of *Glochidion velutinum* Wight. is used by Villagers of Kali Gandaki, Baghmati and Tadi Likhu Watersheds of Nepal and is applied for curing pimples and against various Skin Diseases [8]. Narayan P Manandhar 1998, reported that Raute' tribes of Aampani and Rajaura of Dadeldhura district, in Nepal apply the paste of the bark of *Glochidion velutinum* Wight. in the treatment of dislocated bones [9]. It was also reported that the whole plant is used by the natives of Chittoor district for anti-inflammatory and wound healing property [4]. J.R. Forster *et al.*, 2018, reported that the native inhabitants of Vietnam use the juice of the leaves of *G. velutinum* Wight. to treat against snakebites, oedema and in kidney troubles; the roots are however used to treat dysentery, fever and cough [10]. Sandhya S *et al.*, 2010, reported that this plant is well known among the tribes for its anti-cancer, hypotensive, diuretic and various other properties [11]. B. Doley *et al.*, 2010, reported that the plant has been widely used traditionally in the treatment of diabetes, inflammation, cancer, healing of wounds and anti-diarrheal activity [12]. Shreekar Pant *et al.*, 2010, reported that the plant is used widely in Fuel and Tanning industry [13].

4. Phytochemistry

Sandhya S. *et al.*, 2011, reported the presence of alkaloids in Petroleum ether extract; carbohydrate, alkaloids, proteins, tannins, steroids, flavonoids, and saponins in Chloroform extract; carbohydrates, flavonoids and saponins in n-Butanol extract; and carbohydrates and saponins in Methanolic extract of leaves of *Glochidion velutinum* Wight. [14]. Sandhya S. *et al.*, 2011, also reported the presence of alkaloids in Petroleum ether extract; Carbohydrate, alkaloids, proteins, tannins, steroids and saponins in chloroform extract; carbohydrates, proteins, tannins, saponins in n-Butanol extract; and carbohydrates, proteins, alkaloids, in Methanolic extract of root of the plant [2]. Sandhya S. *et al.*, 2011, reported that Gallic acid is present in the chloroform extract of leaves of *Glochidion velutinum* Wight. [14]. The presence of triterpenoid, glycosides and alkaloids are reported to be present in the plant [11]. Sandhya *et al.*, 2011, also reported the presence of carbohydrate, flavonoids, tannins, saponins, steroids, proteins and alkaloids in n-butanol extract of stem [3]. Madhavachetty, *et al.*, 2008, reported that the plant also contains tannins and steroidal saponins [4]. Tufikul Islam *et al.*, 2015, reported the presence of carbohydrates, saponins, Glycoside, Glucoside, Alkaloids, steroids, tannins, flavonoid in the Methanolic extract; Glycoside, carbohydrate, glucoside, flavonoid, alkaloids, tannin, saponins in the Ethyl Acetate extract; and

Glycoside, Glucoside, carbohydrate, alkaloid, tannin in the n-Hexane extract of leaf [15]. Mallikarjuna, 2016, reported the presence of lupine-type triterpenes, Glochieriosides A, B and flavone glycosides. [16].

5. Bioactivity

Few reports on the pharmacological activities on the plant are found in the literature.

5.1 Antioxidant and cytotoxic activity

S. Sandhya *et al.*, 2011, reported the antioxidant and cytotoxic activity in chloroform extract of root and leaves; and petroleum ether extract of stem of *Glochidion velutinum* Wight. [3]. Tufikul Islam *et al.* 2016 reported that methanol extract of leaves of *Glochidion velutinum* Wight. is said to be toxic to Brine Shrimp nauplii with LC₅₀ of 428.47µg/ml and ethyl acetate and n-hexane extracts can be said to weakly toxic with 651.92µg/ml and 598.54µg/ml respectively [15].

5.2 Antidiabetic activity

PurnaChander Are *et al.*, 2011, reported the antidiabetic activity of ethanolic extract of *Glochidion velutinum* Wight. leaves in the Wistar albino rats at a dose of 200 and 400mg/kg body weight when administrated orally as a fine suspension [7]. Nallani Venkata Rama Rao *et al.*, 2013, reported the Anti-diabetic activity in the Methanolic extract of dried leaves in Alloxan induced Diabetic Type-II in male Wistar albino rats, at adose of 400mg/kg, when administrated orally [6].

5.3 Anti-Urolithiatic activity

Nallani Venkata Rama Rao *et al.*, 2013, reported the Anti-urolithiatic activity in the Methanolic extract of dried leaves of *Glochidion velutinum* Wight. using Wistar albino rats at a dose of 500mg/kg, when administrated orally [17].

5.4 Membrane stabilizing activity

Chaitanya RSNACK, *et al.*, 2011, reported that the root, stem and leaf of *Glochidion velutinum* Wight. has shown the HRBC Membrane stabilizing property [18].

5.5 Antibacterial activity

Karuppusamy *et al.*, 2009, reported that the extract of stem bark having potential antibacterial activity against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus subtilis* [19].

6. Conclusion

The thorough literature survey available from all scientific sources revealed various information on *Glochidion velutinum* Wight. The plant is reported to contain a number of secondary metabolites like glycosides, triterpenoid, alkaloids, proteins, tannins, steroids, flavonoids, saponins etc. It is well known that different pharmacological activities attributed by plant is mainly due to the various chemical constituents in the plant. The important ethnomedicinal information of the plant are encouraging to the researchers to prove their medicinal value scientifically Therefore there is a scope for research on this plant to find out the possible pharmacological activities including discovery of new bioactive molecules. In this context, the paper will provide valuable information to the future investigators for further study.

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