
***Centella asiatica* and its Adulterants**

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Published on: September 30, 2023

ABSTRACT

***Centella asiatica* is a traditional medicinal herb which is called as Indian pennywort and Asiatic Pennywort in English, Mandukaparni in Sanskrit and Vallarai in Tamil. As the pharmaceutical and cosmetic importance of *Centella asiatica* is being explored, the other species being mixed by its name is also surging out. The article discusses on the plant species being used or misidentified in the name of Indian Pennywort.**

INTRODUCTION

Centella asiatica is one of the major medicinal plant used in traditional systems of medicine. In modern medicine also its potentiality has been proved in various ailments. *Centella asiatica* is used in wound healing, skin disease treatments, as sedative and memory tonic. *Centella asiatica* is not commercially cultivated but its demand in the global pharmaceutical and cosmetic market is exponentially increasing (Prabhu *et al.*, 2008). It is found to be in the market in various forms such as liquid extract, smoothing cream, serum, acne gel, tablets, dry leaves, hand soap, *Centella* essence, *Centella* oil, *Centella* powder, hand sanitizer, vermicelli and hydrating cleanser. For all these products to reach the consumers there is no commercial cultivation which obviously means it has been collected from wild habitat. Hence there is a need for commercial cultivation before it has been endangered.

BOTANY

Centella asiatica is commonly known as Indian pennywort is a perennial, creeping plant which can be multiplied through its stolons. The stems may be prostrate or semi erect and roots at the nodes. Leaves are reniform simple with long petiole. Margins are crenate and upper surfaces are glabrous. Flowers are pink purple coloured, three to four in umbels. Fruit is a flattened samara with single seed.

MEDICINAL IMPORTANCE

Centella asiatica is used as adaptogen, detoxifier, diuretic and emenagogue. It is reported to be used in healing skin disease. In Ayurveda system of medicine *Centella asiatica* is being used for healing neurological disorders. Siddha system uses *Centella* for mouth ulcers, diarrhoea and dysentery. Diuretic, antipyretic and nerve tonic are the uses in Chinese system of medicine. It is reported to constitute many phytochemicals of medicinal importance. The triterpenoids asiatic acid, madecassic acid and their derivatives asiaticoside and madecassoside has well defined medicinal properties.

POTENTIAL ADULTERANTS

Earlier it was a misconception between *Bacopa monnieri* and *Centella Asiatica* due to the name 'Brahmi'. Both are mentioned by the same common name which lead to confusion. Even there is a report that *Bacopa monnieri* is Indian Pennywort and *Centella asiatica* is Asiatic Pennywort. But the above misconception is now cleared that National Medicinal Plants Board mentions *Bacopa monnieri* as 'Brahmi' and *Centella asiatica* as 'Mandukaparni'. Indian Pennywort and Asiatic pennywort are same indicating *Centella asiatica*. Hence the confusion due to the common name has now been cleared.

There are palette of species related to *Centella asiatica* with the genus *Hydrocotyle*. *Centella asiatica* was named as *Hydrocotyle asiatica* earlier and has been characterized as *Centella asiatica* by Urban (1879) under genus *Centella*. As the commercial demand for *Centella asiatica* is exponentially increasing without commercial cultivation, use of other species adulterants has been reported. The following are most commonly misidentified and intentionally adulterated with *Centella asiatica*.

- 1) *Hydrocotyle bonariensis*
- 2) *Hydrocotyle verticillata*
- 3) *Hydrocotyle javanica*
- 4) *Hydrocotyle javanica*
- 5) *Hydrocotyle sibthorpioides*
- 6) *Merremia emarginata*

There is significant morphological difference among these species the market demand for *Centella asiatica* leads to the adulteration. Obviously, there are chances for the common people for misconception among those species and the same is found in many websites also. But purposeful adulteration is done through there is stark botanical difference among the species. The extent of this issue so deep which is reflected by comparison of these species through various biochemical and biotechnological tools. The biochemical analysis is done to differentiate

and express the superiority of *Centella asiatica* in its medicinal properties. Biotechnological tools help in easy and conformed identification of *Centella asiatica* from other species.



Centella asiatica



Hydrocotyle verticillata



Hydrocotyle bonariensis



Hydrocotyle sibthorpioides



Hydrocotyle javanica



Merremia emarginata

Subramanian and Subramanian (2013) reported that *Merremia emarginata* is sold as *Centella asiatica* in Tamil Nadu. *Centella asiatica* is used as a green leafy vegetable. Since *Merremia emarginata* is also edible it does not pose a serious threat when substituted use as green leafy vegetable. But when marketed for pharmaceutical use, the quality control on the botanical herbs should be strictly taken into consideration. Chua *et al* (2022) compared and proved the difference in the phytochemicals between *Centella asiatica* and *H. verticillata*. As the need for comparison for the bioactivity of these species used for adulteration has been demanded by the industry, many works are being reported (Maulidiani *et al.*, 2012; Maulidiani *et al.*, 2013; Maulidiani *et al.*, 2014; Subositi *et al.*, 2016; Maruzy *et al.*, 2020).

Table 1. Comparison of *Centella asiatica* and possible adulterants

Characteristics	<i>Centella asiatica</i>	<i>Hydrocotyle verticillata</i>	<i>H. bonariensis</i>	<i>H. javanica</i>	<i>H. sibthorpioides</i>	<i>Merremia emarginata</i>
Habitat	Tropical & Subtropical; shady, damp	Marshy aquatic areas	Coastal region in gardens	Hilly, shady moist places	Shady places in low land	Dry tropics
Family	Apiaceae	Araliaceae	Araliaceae	Araliaceae	Araliaceae	Araliaceae
Habit	Perennial; creeper	Creeping aquatic macrophyte	Creeper	Creeper	Creeper	Prostrate/ creeping herb
Leaf	Reniform	Orbicular peltate	Round	Circular – heart shaped	Round to kidney shape	Orbicular or ovate to reniform

Leaf margin	Crenate-dentate	Shallowly 8-14 lobed	Scalloped	Shallow lobed	Shallowly 5-7 lobed	Coarsely crenate
Leaf surface	Upper-smooth Bottom-hairy	Glabrous	Glabrous	Pubescent on both sides	Glabrous on upper surface, sparsely pubescent lower surface	Glabrous on sparsely pilose
Petiole	Long marginal	Peltate central	Central	Long	Marginal	Marginal
Stolon	Greenish-reddish	Green	White	Green	Green	Green-reddish brown
Inflorescence	Umbel	Spike	Compound	Umbel	Umbel	Solitary/cymose
Flower	Pink-purple	Cream	White; yellow	Greenish white	Greenish white	Yellow

CONCLUSION

As the market demand for *Centella asiatica* increase the possibility of adulteration with cheaper material will happen. A strict quality control measure has to be taken to prevent the adulteration. Further misidentification by common public of the other *Hydrocotyle* species as *Centella asiatica* should be precluded by creating awareness on the proper identification of the herb while using it as a vegetable.

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