

Short Communication

TUSSILAGO FARFARA L., A PROMISING ETHNOMEDICINAL PLANT OF SIKKIM

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ABSTRACT: *Tussilago farfara* L., a native of Europe now wide spread in many countries of the world including India. In Sikkim, this plant is used by the Lepcha tribe for remedy and treatment of some diseases like cough, cold, fever etc. Decoction of the freshly collected shoot is taken as medicine. This plant is known to have different minerals, chemical components and vitamins. In this communication, use of this plant is analyzed in the perspective of related previous reports.

Key words: Ethnomedicine, Sikkim, *Tussilago farfara*.

The state Sikkim is with vast floristic diversity and is one of the rich phytodiversity regions of the Eastern Himalaya. The state harbors about 4600 vascular plants representing 26% of total diversity of the country (Rai and Sharma 1994, Maity 2005). Sikkim is quite rich in medicinal plant diversity and about 424 species of plants are used in different medicinal purposes (<http://www.sikkimforest.gov.in/Biodiversity.htm>). This plant diversity is tremendously influenced by rich ethnic cultural diversity of tribal communities including aboriginal Lepcha tribe. The tribal communities have profound knowledge on medicinal plants and their usage. The dwellers of the fringe areas primarily depend on forest resources for sustaining their lives. These medicinal plants have become an integral part of inhabitants and are often source of their social income (Maity *et al.* 2003, Maity *et al.* 2004, Maity 2013).

The genus *Tussilago* L. (Asteraceae) is monotypic with its sole representative *T. farfara* L. The member is commonly known as coltsfoot and now wide spread in N. America, W. Europe, Russia, SW Asia, N. Africa, Pakistan, China, Nepal and India (Mabberley 2008, Nordenstam and Chen 2011). In India, this species is found to grow in the Himalayan regions from Jammu & Kashmir to Sikkim. It is a cold loving plant and grows in the subtropical to temperate forest at 600–3400 m

elevations. It is a proteranthous species and vegetative period (leaves) starts towards the end of the reproductive (flowering) phase. The name '*Tussilago*' is derived from the Latin term 'Tussis' meaning 'cough' and 'ago' meaning to 'cast' or to 'act on' (Booth 1836) referring to the specific use of the plant.

The present study deals with the medicinal value, ethnomedicobotany and taxonomy of the species. Moreover, the chemical composition of the species is also highlighted. The habitat information, horticultural importance, nutritional values are also discussed.

Plant specimen

The plant specimens were collected from Lachen of North Sikkim. Field photographs were taken to elucidate the habit and habitat characteristics. The specimens were properly preserved and the herbarium specimens are deposited at Calcutta University Herbarium (CUH). Specimens were identified with the help of relevant literatures.

Taxonomy

Tussilago farfara L., Sp. Pl. 2: 865. 1753; Grierson and Springate in Grierson and Long, Fl. Bhutan 2(3):187.2001. Nordenstam and Chen in Wu *et al.*, Fl. China 20-21:461.2011. (Fig. 1)

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Cineraria farfara (L.) Bernh. Syst. Verz. (Bernhardi) 146. 1800.

Perennial, rhizomatous, erect, herb to 16 cm high; leaves basal, develop after flowering; lamina triangular–ovate or orbicular–cordate, with undulating margin, white tomentose beneath; scapes few with scale–like leaves; capitulum solitary, terminal, radiate, nodding at young; involucre black glandular hairy with purple tinge; ray florets numerous, functionally female, many seriate, linear, 8–13 × 0.3–0.5 mm, yellow; disk florets few to several, 5–lobed, usually sterile; cypselas cylindrical–oblongoid; pappus white to 15 mm long.

Flowering and Fruiting – March to June.

Distribution

In India, it is found in the Himalayan regions - Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim etc. It is also found in China, Nepal, Africa, North America, Pakistan, Russia, West European countries etc.

Habitat

It grows in open slopes, grassy fields, amongst boulders in the subtropical to temperate forests at 600–3400 m elevations commonly in association with *Fragaria nubicola*, *Geranium nepalensis*, *Persicaria capitata*, *P. runcinata*, *Primula capitata*, etc.

The species often found in disturbed places, limestone quarry heaps, coastal dunes, rubble, river beds and scree (Myerscough and Whitehead 1966, Bostock 1980).

Ethnomedicinal use in Sikkim

The whole plant including flower head (capitulum) is used by the tribal communities of Sikkim, particularly at Lachen area in the treatment of cold, cough and in fever. The local medicinal practitioners have adequate knowledge about the medicinal use of the plant. They uprooted the whole plant very carefully and properly washed it with fresh water. One complete fresh shoot is crushed and mixed in a glass of water. The whole mixture is boiled and the whole decoction is given as a single dose. Usually, one glass of decoction is prescribed for a day. However, the dose varies depending on the severity of the disease and age of the patient.

Previous reports

Traditional uses

The leaves are sometimes applied to wounds in Europe. Roots and leaves are used as a remedy for obstinate colds and coughs. Coltsfoot has been used for thousands of years as an herbal remedy in ancient Chinese medicine (Meseyton 2004). In China, the flowers are used as an expectorant in cough, asthma, apoplexy, and phthisis

(Kirtikar and Basu 1933). Röder (1995) cited the use of this plant in influenza, gastro–enteritis, diarrhoea, blood purification and for metabolic stimulation. The herbal tea prepared from very young capitula is used to cure cold and cough (Meseyton 2004). Leaves are smoked to cure asthma and coughs (Mabberley 2008). Chanaj-Kaczmarek *et al.* (2013) reported the use of young capitula as cough expectorant and suppressant, soothing agent for mucosa, skin diseases, wounds and pimples. The use of this plant against bronchitis, asthma and emphysema has been reported by Adamczak *et al.* (2013). The crushed leaves or a decoction can be applied externally for insect bites, inflammations, general swellings, burns, erysipelas, leg ulcers, sores, and phlebitis (www.medicinalherbinfo.org). Coltsfoot is traditionally used as a folk medicine in China. The use of immature capitula and leaves in relieving coughs and breathing improvement is recorded by Nordenstam and Chen (2011). However, this herb should be avoided in high blood pressure and related heart disorder (herbpathy.com). Pregnant and breast feeding mothers should avoid this plant as it may have adverse effect in infants (medicinalherbinfo.org). Over consumption may cause excitation, restlessness, irritability, and increased respiration (herbpathy.com). Various medicinal uses, antimicrobial effect, carcinogenic activity as well as adverse effects of the plant are discussed by Nguyen *et al.* (2005) and Kačaniová *et al.* (2013).

Other uses

The leaves are also taken instead of tobacco leaf (Booth 1836). Leaves are also used in tincture as ingredient of common hairsprays (Mabberley 2008). People of Ukraine and Romania use Coltsfoot leaves to wrap sarma rolls (Adamczak *et al.* 2013).

Nutritional value

The nutritional value of Coltsfoot is high due to the presence of diverse minerals, like Zn, Cu, Ca, K, Mn, S, P and Fe coupled with vitamins as Vitamin A, B and C. (www.medicinalherbinfo.org).

Medicine preparation

The leaves are used in the preparation of pectoral and diaphoretic teas and also used to reduce muscle spasms. The ointment prepared from young capitulum is effective in soothing cuts and killing bacteria (Kačaniová *et al.* 2013). As the shoot of the plant is taken directly as medicine, study on actual efficacy of the succulent shoot extract may be performed. The succulent part extracts of reported medicinal plants may be used directly as medicine commercially after validation and toxicity study (Pattanayak *et al.* 2016).



Fig. 1. *Tussilago farfara* L. A. Habit; B. Outer involucre bract; C. Inner involucre bract; D. Disc floret (split open) with immature cypselas; E. Ray floret with immature cypselum F. The flower.

Chemical constituents

The chemical composition of the plant is more or less well analyzed. The plant contains several active compounds including alkaloids. The main components as well as active principles are tannins, mucilage, flavonoids and phenolic acids. The pyrrolizidine alkaloids, *viz.* senkirkine and senecionine are found in leaves (Adamczak *et al.* 2013). Integerrimine and seneciphylline types of minor PAs are also reported in this plant (Nedelcheva *et al.* 2015). The major flavonoids reported in leaves are Kaempferol, Astragalin, Nicotiflorin, Guajaverin, Isoquercitrin, Rutin, etc. and in flower buds are Kaempferol, Quercetin, Astragalin, Nicotiflorin, Guajaverin, Isoquercitrin, Hyperoside, Rutin, etc. (Chanaj-Kaczmarek *et al.* 2013). Yaoita and Kikuchi (1998) recorded three triterpenoids, *viz.* Bauer-7-ene-3 α , 16 α -diol and Bauerenol and Isobauerenol in the dried flower buds. The presence of Sesquiterpenoid Tussilagone in the flower buds is reported by Park *et al.* (2008). Metabolomic profiling of the flower buds and

inflorescence rachis of the plant with antitussive and expectorant effects on mice was discussed by Li *et al.* (2012).

The plant contains several chemical compounds in high or low concentration which may be toxic when used in over doses. It causes liver disease in rats and can cause cancer in liver (Wiedenfeld 2011).

Specimen examined

Lachen to Thangu, 3000–3300 m, 28.03.2014 Dey & Siddhanta 308; Lachen 3000 m, 29.03.2014, Dey & Siddhanta 314 (CUH).

The immense medicinal potentiality of the plant has been reported from various corners of the world including Sikkim. Moreover, the plant is used in asthma, bronchitis, cold, cough and fever which are very much prevalent now a day. Therefore, a scientific exploitation of the plants is needed for better management practices. Scientific exploitation may also uplift the socio-economy of the inhabitants of the fringe areas of Sikkim.

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