

Short Communication

FOLK-MEDICINAL USES OF *ALLIUM SIKKIMENSE* BAKER (ALLIACEAE) IN SIKKIM HIMALAYA

Mrimoy Middy¹, Jayanta Ghosh¹, D. K. Pradhan², D. Maity*¹

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ABSTRACT: *Allium sikkimense* Baker (Alliaceae), wild garlic is used as a substitute of commercial garlic (*Allium sativum* L.) by the Lachenpa community of Thangu–Lachen regions of North Sikkim. Traditionally, it is used in treatment of common cold and cough, diarrhoea, gastritis, in breathing problem, to cure body pain and to keep body warm in severe cold. The traditional as well as non-conventional uses of this species are reported here. The exploitation of this species through bioprospecting for sustainable development is recommended. Conservation measures to save this rare *Allium* in its natural habitat are highlighted.

Key words: Non-conventional uses, Wild garlic, Sikkim, Bioprospecting, Conservation.

The people of tribal communities are the most underprivileged group in modern day civilization. Since the ancient times they tend to remain isolated from the so-called human races and more or less completely rely upon the forest and forest products for their livelihood (Sinha and Sinha 2001). The poor economic conditions as well as inaccessible terrains of the high Himalayan Mountains lead them to assimilate the use of natural products for their livelihoods. Establishment of modern healthcare system in extreme valleys of Sikkim Himalayan region is a challenging job. So the people residing there have to be dependent upon the folk medicine (Jana and Chauhan 2000, Maity *et al.* 2003, Maity *et al.* 2004). The tradition of health practices by the folk healers in Sikkim is a sign of biocultural knowledge of the ethnic people and thus called Sikkim is a 'biocultural hotspot' (O'Neill *et al.* 2017). In many remote areas of this Himalayan state many folk healers of different ethnic communities' like-Lachenpa, Lachuugpa, Bhutia, Lepcha, Sherpa, Nepali, etc. are used to treat people by the using of herbal medicine which are growing in and around their adjacent areas (Jana and Chauhan 2000, Maity *et al.* 2003, Maity *et al.* 2004, Maity *et al.* 2018).

The genus *Allium* L. of the family Alliaceae is much popular worldwide for its two species *A. cepa* L. (onion) and *A. sativum* L. (garlic) and is used as spice crops. Moreover, the other species as *A. ascalonicum* L. (Shallot), *A. fistulosum* L. (Welsh onion/Stone Leek) and *A. schoenoprasum* L. (Chives/Leek) are also cultivated commercially and are used as spices, vegetables as well as for medicinal purposes. In Sikkim there is the report of nine species of *Allium* (Srivastava 1996; Maity *et al.* 2018) out of 34 species growing in India (Dasgupta 2006). In Asia around 200 species are growing (Keusgen *et al.* 2006), whereas the total of 850 species of *Allium* occur Worldwide (Xu and Kamelin 2000, Mabberley 2017). Of course the high Himalayan mountains are the home of many species of *Allium* like *A. auriculatum* Kunth, *A. caesioides* Wendelbo, *A. gilgiticum* F.T.Wang & Tang, *A. macranthum* Baker, *A. roylei* Stearn, *A. humile* Kunth, *A. sikkimense* Baker, *A. stracheyi* Baker, and *A. wallichii* Kunth (Dhaliwal and Sharma 1999, Maity *et al.* 2018, Mohan *et al.* 2019).

A. sikkimense, one of the rare species, is growing in alpine pastures in some interior valleys of Sikkim Himalaya and the only known habitat of the species in India. It is prominent by its sparkling blue flowers in

¹Taxonomy & Biosystematics Laboratory, Department of Botany, University of Calcutta, 35, Ballygunge Circular Road, Kolkata 700 019, West Bengal, India.

²Quality Control Laboratory/High Altitude Research, Forest and Environment Department, Govt. of Sikkim, Deorali, Gangtok, Sikkim, India.

Correspondence author. e-mail: debmaity@yahoo.com

drooping umbellate racemes and is commonly known as wild garlic (rarely as wild onion) to the local people of Thangu–Lachen Valley and being popular as a substitute of garlic (*Allium sativum*). Of course, it is less known to the people of other regions of this state because of its sporadic occurrence and rarity. During the documentation of Indigenous Traditional Knowledge (ITK) of the inhabitants of North Sikkim, it was possible to the authors come across some unique uses of this species and that are presented here for future reference. Furthermore, a short description, habitat ecology and field photographs are provided for easy recognition and correct identification. The non-conventional uses are highlighted to promote bioprospecting of the species in future for sustainable use.

Plant specimen

The plant specimens were collected from alpine habitat of Lhonak, Gurudongmar and Jhachu valleys of North Sikkim. Photographs were taken for the presentation of habitat information and characteristics of the plant. Identity of the specimens was confirmed through critical examination of the specimens and comprehensive literature search (Hooker 1892, Wu and Raven 2000, Maity *et al.* 2018). The representative specimens are deposited at CUH.

Taxonomy

Allium sikkimense Baker, J. Bot. 12: 292.1874; Hooker. J. D., Fl. Brit. India 6: 341. 1892; Stearn, Fl. Bhutan 3(1):78.1994; Xu and Kamelin, Fl. China 24:178. 2000; Maity *et al.*, Fl. Kanchenjunga Bios. Res., Sikkim. 670.2018. [Fig.1]

Bulbous, annual herb; bulbs narrow-cylindric, densely clumped; leaves linear, flat, base sheathed; scape terete, to 25 cm long; flowers in terminal, dense drooping umbels, bright blue; petals ovate or oblong, obtuse, ±denticulate; filaments shorter than petals, base broad; ovary subglobose, with hood-like projections; styles short; capsules subglobose.

Flowering and fruiting: July–September

Distribution:India: Himalaya, Sikkim; Bhutan; China; Nepal.

Ecology: This species grows in open slopes, grassy fields, in rocky crevices in the alpine region between 4000-5000 m amsl elevations, commonly associated with *Kobresia* spp., *Gentiana* spp., *Rhodiola* spp., etc.

Ethnomedicinal uses in Sikkim

The Lachenpa community of the Thangu and Lachen



Fig. 1. *Allium sikkimense*: A. Inflorescence, B. Open flowers, C. Fruits.

regions of North Sikkim are exploiting *A. sikkimense* as spice, vegetable as well as medicinal herb. Most common practice is the use of fresh plants, both bulbs and leaves along with other vegetables as substitute of garlic. Of course, the scapes with flowers are also used when the plants are collected in flowering condition. Porters and yak herders use this species in the dishes during their prolonged stay at high altitude alpine pasture. It is believed that it helps them to cure body pain and to keep their body warm in severe cold. The plant is prescribed by the local healers in the treatment of common cold and cough, diarrhoea, gastritis and also in breathing problem (high altitude sickness). Even, the decoction of the bulbs is prescribed by the tribal medicine practitioner for the remedy of cold and cough. More importantly, local people used this plant as nutraceutical supplement for health improvement. Flowers have garlic-like smell and used as flavoring agent in curries and foods by the local people.

The ethnomedicinal and non-conventional uses of *Allium wallichii* Kunth, comparatively a common wild species in the Himalaya, have been reported by several

workers (Singh *et al.* 2002, Acharya *et al.* 2011, Borborah *et al.* 2014), as the bulbs of this species are used in curries as flavoring agent (garlic-like), flowers are often served as salads, and juice of the plant is used as moth repellent. Bulbs are chewed to get relief from cold and cough. Bulbs are also taken to treat dysentery and cholera by boiling followed by frying in ghee. It also lowers the blood cholesterol level, helps to improve digestive systems (Tiwari *et al.* 2014). The traditional use of *A. stracheyi* Baker in the Western Himalaya has been reported by Tiwari *et al.* (2014).

Chemical constituents of *Allium* spp.

Species of the genus *Allium* are usually rich in various phenolic acids, flavonoids, thiosulfinates, alkaloids, essential oils, phytosterols, sulfur containing compounds, etc. (Mohan *et al.* 2019) and different bioactive compounds as cysteine, methiin, alliin, isoalliin, propiin, and saponin. The chemical concentrations in different members of *Allium* vary, depending upon which the taste and odor changes from species to species. Elemental investigation of *A. sikkimense* is yet to be done, however, its close relative *A. wallichii* contains Ca (56.489%), K (40.207%), S (0.927%), Si (0.926%), Mn (0.656%), Fe (0.434%), Cu (0.131%), Zn (0.130%), and Rb (0.100%) as reported by Yee (2019). The chemical investigation of this species through bioprospecting is strongly recommended for better and convenient exploitation.

Discussion and conclusion

The Indigenous Traditional Knowledge (ITK) related to the uses of nonconventional medicinal plants are highly recommended to sustain the human life as healthy, longer and stronger. Thus the herbal based treatments steadily climb as top priority in the society. Species of *Allium* are economically important and grown widely in India and elsewhere. Most commonly it is used as vegetable or spice and traditionally as a source of medicine in Asia as well as around the globe (Keusgen *et al.* 2006). It has various household, nutraceutical and ethnomedicinal uses since the ancient times. People in the villages have grown different species of *Allium* in their kitchen garden for ready use. Among the wild species in Sikkim Himalaya, *A. wallichii* and *A. sikkimense* are recorded with many nonconventional uses. However, in case of the later species, this is perhaps the first report with important medicinal information. *A. sikkimense* is a rare species found to grow only in some specific locations in the extreme valleys of North Sikkim and most importantly, Sikkim is the only known habitat of this species in India. Biodiversity of this region is eroding rapidly and thus

sustainable utilization of this bioresources is important. Moreover, the bulbs of different plants are often uprooted and thus there is a possibility of complete eradication of the plant species from its natural habitat. As this is a rare species with high medicinal value, so the domestication and the large scale cultivation in kitchen gardens and in private fields by the local inhabitants, general users and herbal practitioners are perhaps the best possible measures for sustainability.

In the 21st century, the use of herbal medicine for the healthcare is well accepted to get rid of the side effects of general commercial medicine (Xavier *et al.* 2014). Sikkim is the treasure house of many of the non-conventional medicinal plants, but very few are commercialized properly (Rai and Sharma 1994a, b, Panda and Mishra 2010). Moreover, the chemical profiling through bioprospecting of this wild garlic is crucial for its sustainable exploitation.

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