



## Research Article

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# *Mikania Cordata* (Burm.F.) B.L. Rob. – A Bangladesh Folk Medicinal Plant for Gastric Disorders

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## Abstract

*Mikania cordata* (Burm.f.) B.L. Robinson belongs to the Asteraceae family of plants and is a rapidly growing creeping perennial vine found in Bangladesh and other tropical regions. In Bangladesh, the plant is known by a number of names like 'refugee lota', 'libuji lota', 'assam lota', and 'gastric gach', the latter meaning gastric plant. In English, the plant is known as bitter vine, climbing hemp vine, and American rope. The plant is considered an important folk medicinal plant in Bangladesh and is used in the north central districts of Bangladesh (like Jamalpur) for treatment of gastric disorders. Other medicinal uses of the plant in Jamalpur district, Bangladesh include use as poultice for treatment of swelling, itches and wounds. This paper attempts to correlate the folk medicinal uses of the plant in Bangladesh versus ethnic uses reported from other countries along with reported relevant phytochemicals and pharmacological activities.

**Keywords:** Folk medicine; *Mikania cordata*; Ethnic uses; Jamalpur; Bangladesh

## Introduction

Plants produce a bewildering variety of phytochemicals, otherwise known as secondary metabolites. Secondary metabolites are compounds, which are not necessary for a plant cell to live but are necessary for a plant to survive biotic or abiotic stresses [1]. Secondary metabolites can produce pharmacological responses when introduced into humans, which in turn can be toxic or serve therapeutic purposes. A number of such secondary metabolites have been isolated and have found uses in medicine like aconitine, L-hyoscyamine, camptothecin, tetrahydrocannabinol, and tubocurarine, to name only a few [2]. Although the existence of secondary metabolites were possibly not known or understood by ancient hominids, plants have always played a role in the treatment of diseases from the beginning of humankind. Medicinal plant material has been found in a 60,000 year old Neanderthal grave in Iraq [3]. Early Asian and Egyptian texts (since the discovery of writing and writing materials) mention medicinal plants and their uses [4]. Use of plants as medicines since time immemorial gradually led to the establishment of distinct forms of traditional medicinal

practices like the Ayurveda in India, Unani in Greece, Kampo in Japan, and other systems throughout the world [5]. Besides these 'ritualized' forms of traditional medicinal systems, there also exists folk medicine (FM), tribal medicine (TM, same as FM but practiced by tribal people instead of the mainstream population), and home remedies. Allopathic medicine has borrowed heavily from traditional medicinal practices and more than a hundred allopathic drugs are plant-derived [6]. It has been said that approximately 70-80% of primary health care throughout the world is based on plant materials [7].

To discover a new allopathic drug starting from traditional medicinal practices, an excellent place to start is folk medicine or ethnomedicinal reports on any given plant. The more the number of reports and agreement on the plant's medicinal use in those reports, the better probability is that a new drug can be discovered from the plant. So the first thing to do is perform an ethnobotanical survey and compare it with other ethnobotanical surveys. During the past ten years, we had been doing ethnobotanical surveys in

Bangladesh in an extensive manner [8-37], for ethnobotany is still at its infancy in this country. On the other hand, the country has a rich floral diversity with around 5500 floral species. So the probability of new drug discovery is higher in countries like Bangladesh with a rich diversity of flora, which remains to be scientifically studied, but which plants have been medicinally used from time immemorial but the data lies scattered among the folk medicinal practitioners (FMPs) or other types of traditional medicinal practitioners. So the primary objective of any scientist dealing with drug discovery from natural products is to analyze the ethnobotanical data from different angles. *Mikania cordata* (Burm.f.) B.L. Robinson is a vinous perennial plant found in tropical regions like Bangladesh and belongs to the Asteraceae family. In Bangladesh, the plant is known by a number of names like 'refugee lota', 'libuji lota', 'assam lota', and 'gastric gach', the latter meaning gastric plant. In English, the plant is known as bitter vine, climbing hemp vine, and American rope. The plant is considered an important medicinal plant in Bangladesh. It was our objective to compare the ethnic uses of the plant and check out the scientific validation of some uses. The plant was chosen because one of its local names is 'gastric gach', suggesting that the plant may have a long history of folk medicinal use for alleviating gastric disorders.

## Methods

Preliminary information was obtained from a FMP practicing in Ramnagar village in Jamalpur district, Bangladesh. Prior informed consent was initially obtained from the FMP. The FMP was informed the reason for our visit and consent obtained to disseminate any information provided both nationally and internationally. Actual interviews were conducted in the Bengali language, which was spoken fluently by the FMP as well as the interviewers, the language being the mother tongue of FMP, villagers and the interviewers. The FMP mentioned the name 'gastric gach' and described its various uses. He also took the interviewers to show a sample of the plant. The plant was photographed and plant specimen brought to Dhaka for identification by a competent botanist at the University of Development Alternative (UODA). A voucher specimen was deposited at the Medicinal Plant Collection Wing of UODA. Secondary information on the ethnobotany, pharmacological properties and phytochemicals of the plant used by the FMP were obtained from papers in PubMed, SCOPUS and Google Scholar abstracted journals.

## Results and Discussion

The plant shown by the FMP was identified as *Mikania cordata* (Figure 1). The FMP used the leaves of the plant to treat primarily gastric symptoms. Other uses by him were for treatment of swelling, itches and wounds, where the plant was used as a poultice. However, for gastric disorders, aqueous extract of leaves (one spoon) was taken orally in the morning on an empty stomach. This was done till gastric disorder was cured. By gastric disorder the FMP meant acidity, stomach pain, bloating, bleeding with stool and heartburn, all of them being possible symptoms of gastric ulcer. In Barisal district (located in the southern part of Bangladesh), the leaves of

the plant are used to treat wounds and gastric disorders [38]. In Shitol Para village of Jhalokati district, Bangladesh, the leaves are used to stop bleeding [39]. The leaves of the plant are used by the Ilongot-Egongot community of Bayanihan, Maria Aurora, Aurora, Philippines, for treatment of toothache [40]. The Tonchongya tribe of Bandarban district, Bangladesh, uses leaves of the plant to stop bleeding from cuts and wounds [41]. The Sundanese people at the Bodogol area, Gede Pangrango Mountain National Park, West Java, Indonesia, use the plant to treat coughs [42]. Leaves are used as antiseptic on wounds and to stop bleeding by tribal people residing in South and West district of Tripura State, India [43]. Leaves of the plant are used to stop bleeding from cuts and wounds by various communities residing in Garo Hills of Durgapur, Bangladesh [44]. The people residing in Surigao Del Sur Mountain Region, Philippines use the plant for genitor-urinary disorders [45]. A Tonchongya tribal healer in Cox's Bazar district, Bangladesh reportedly used leaves of the plant to treat cuts and wounds to stop bleeding and to treat piles, indigestion, diarrhea, and gonorrhea [46]. The Meetei healers of Manipur, India use leaves of the plant to treat snake bites [47]. The FMPs residing around the Rema-Kalenga Wildlife Sanctuary, Habiganj district, Bangladesh use leaves of the plant to stop bleeding from cuts and wounds [48]. The Chorei tribe of Southern Assam, North Eastern India uses the leaves of the plant to treat cuts and wounds [49]. The leaves of this plant are used by inhabitants of Batak Simalungun, North Sumatra, Indonesia, to cure gastrointestinal disorders. The plant has a bitter taste caused by the presence of tannins in the plant, which compounds can form a thin layer on the lumen thus reducing irritation [50] (Figure 1).



Figure 1: *Mikania cordata*.

From ethnobotanical reports, it appears that the most common ethnic use of the plant is to stop bleeding from cuts and wounds. However, a recent review has pointed out that *Mikania* genus plants such as *M. glomerata*, *M. laevigata* and *M. cordata* are active against disorders of the digestive system including inhibition of gastric ulcers [51]. Sesquiterpene compounds are abundant in *Mikania* genus plants [51] and sesquiterpenes like alpha-cubebene, caryophyllene oxide, alpha-bisabolol, gamma-curcumen, beta-pinene, copaene, alpha-cedrene, and spathulenol are present in

*Mikania cordata* [52]. The anti-ulcer activity of sesquiterpenes has been reported [53].

## Conclusion

Leaves of *Mikania cordata* are used by a FMP of Jamalpur district, Bangladesh for treatment of gastric symptoms. Isolated ethnobotanical reports also demonstrate the use of the leaves of the plant against gastric disorders though most reports indicate ethnic use against cuts and wounds. Perusal of various scientific reports suggests that the plant is rich in tannins and sesquiterpenes, which compounds are beneficial in gastrointestinal tract disorders like diarrhea and gastric ulcer.

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## Conflict of Interest

The authors declare that there are no conflicts of interest.

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