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## MEDICINAL PLANTS USED BY THE MANDAIS - A LITTLE KNOWN TRIBE OF BANGLADESH

Ishita Malek<sup>1</sup>, Tabibul Islam<sup>1</sup>, Ehasanul Hasan<sup>1</sup>, Shakila Akter<sup>1</sup>, Masud Rana<sup>1</sup>, Protiva Rani Das<sup>1</sup>,  
Walied Samarrai<sup>2</sup>, Mohammed Rahmatullah<sup>1\*</sup>

<sup>1</sup>Faculty of Life Sciences, University of Development Alternative,  
Dhanmondi, Dhaka-1205, Bangladesh <sup>2</sup>Biological Sciences Department, NYCCT, CUNY, USA  
\*Email: [rahamatm@hotmail.com](mailto:rahamatm@hotmail.com)

### Abstract

The Mandais are a little known tribe of Bangladesh inhabiting the north central regions, particularly Tangail district of Bangladesh. Their population has been estimated to be less than 10,000 people. Although the tribe has for the most part assimilated with the mainstream Bengali-speaking population, they to some extent still retain their original tribal customs, including their traditional medicinal practices. Since this practice is also on the verge of disappearance, the objective of the present study was to conduct an ethnomedicinal survey among Mandai tribal practitioners to document their use of medicinal plants for treatment of various ailments. Four traditional practitioners were found in the exclusive Mandai-inhabited village of Chokchokia in Tangail district. Information was collected from the practitioners with the help of a semi-structured questionnaire and guided field-walk method. It was observed that the four traditional practitioners used a total of 31 plants distributed into 23 families for treatment. The various ailments treated included diabetes, low semen density, jaundice, gastrointestinal tract disorders (stomach ache, indigestion, dysentery, and diarrhea), leucorrhea, pain (rheumatic pain, joint pain), skin disorders, respiratory tract disorders (coughs, mucus, and allergy), debility, fever, and helminthiasis. From the number of plants used (seven), it appeared that gastrointestinal tract disorders formed the most common ailment among the Mandai community, possibly brought about by the low income status of the people coupled with unhygienic conditions of living.

**Key words:** Medicinal plants, CAM, ethnomedicine, Mandai

### Introduction

Traditional medicine forms an important component of the medicinal system in various countries of the world. Although allopathic medicine is the major form of medicine currently practiced, most people of even the developed world resort to traditional forms of medicine at some time or other. Many indigenous communities or tribes of numerous countries still adhere to their ancient medicinal practices. The formulations usually are simple, being mainly derived from plants and occasionally, animals and minerals. However, complex formulations are also known in several traditional medicinal systems of the Indian sub-continent like Ayurveda and Unani. Traditional medicinal practices exist for a number of reasons. First, modern or allopathic medicine cannot cure a whole gamut of diseases like diabetes, rheumatism or paralysis, but merely treats the symptoms. Second, human beings have suffered from diseases from antiquity and have used medicinal plants and other materials for cure – a tradition that persists till the present period (Sofowora, 1982; Hill, 1989). Third, it is widely believed, at least in countries like Bangladesh with a long history of traditional medicine, that traditional medicines can be effective for a multitude of diseases for which allopathic medicine has no known cure. Fourth, many allopathic drugs have developed resistant vectors or have serious side-effects. Finally, many people of the under-developed world lack access to modern clinics or cannot afford to pay prices of allopathic medicines.

Bangladesh has a number of tribes or indigenous people. In recent years, the total number of tribes has been put at over 100 (Murmu, 2009). Although about a dozen of the larger tribes still maintain their distinct cultural identities, many small tribes have become assimilated or are in the process of assimilation within the mainstream Bengali-speaking population. Anthropological studies on the smaller tribes essentially do not exist. As a result, much knowledge about tribal customs and heritage, which have been practiced over centuries, are getting lost with each passing day. The younger generation of the tribes have taken to adopting the culture, including language of the mainstream population and losing faith in ancient tribal beliefs and rituals. Yet, these tribes because of their residence in forest habitats have over the centuries accumulated a vast amount of knowledge, particularly on the medicinal properties of various plant species. It would be a loss to science if this knowledge is lost through non-documentation or negligence for many effective drugs in allopathic medicine have been discovered through observation of medicinal practices of indigenous peoples (Gilani and Rahman, 2005). To name only a few, aspirin, atropine, ephedrine, digoxin, morphine, quinine, reserpine and tubocurarine are examples of such drugs.

We had been conducting ethnomedicinal surveys among various large and small tribes of Bangladesh for the last few years (Rahmatullah et al., 2009, 2010, 2011a-d; Seraj et al., 2011). The Mandais are a small tribal community residing in Tangail district of Bangladesh with an estimated population of less than 10,000. They claim to have originally come from Coochbehar

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region in India for which reason they add the word Cooch to their names. However, they are different from the Kuch tribe of Bangladesh. Their society is patriarchal. Their language is known as Mandai but they have no alphabet. The word 'Mandai', according to them has originated from the Sanskrit words Mendi or Manda meaning hole. Since this tribe originally used to live in holes dug in forested regions, they referred to themselves as Mandai or "people living in holes". Their main diet consists of rice, pulses and vegetables together with fish and meat when those can be afforded. They are mostly illiterate but have acquired a good fluency in the Bengali language in recent times. They are a much neglected tribe with a poor socio-economic status. Now-a-days, they mostly work as agricultural laborers in farms of more affluent neighboring villages of the Bengali-speaking mainstream population. They profess themselves to be Hindus and conduct worships of multiple gods and goddesses of the Hindu religion. The Mandais are fast losing their separate identities because of the influence of the dominant culture of the mainstream Bengali-speaking population. The younger generations are losing interest and have started to forget their ancient rituals and practices. As a result, the elderly people, who have still maintained their own culture, apprehend that the language and traditional knowledge of the Mandais will soon be forgotten. This knowledge includes knowledge of their traditional medicinal practices. It was, therefore, the objective of the present study to conduct an ethnomedicinal survey among the still existing Mandai tribal medicinal practitioners (TMPs) to document their traditional medicinal practices, including usage of medicinal plants for treatment of various ailments.

## Materials and Methods

The present study was conducted among the Mandai tribal medicinal practitioners (TMPs) of the Mandai community residing in Chokchokia village of Shakhipur sub-district in Tangail district, Bangladesh. Chokchokia village was exclusively inhabited by the Mandai community. Overall, the condition of the community was poor in socio-economic terms, and nearly 100% of families within the community did not possess any agricultural lands of their own. Able bodied men of the community worked as agricultural laborers in adjoining villages inhabited by the mainstream Bengali-speaking population. Since agricultural labor demand peaks only during times of sowing and times of harvesting crops, the Mandai people remained jobless at other times of the year and lived in dire straits for most parts of any given year. The Mandais were in general considered as an inferior class of people by adjoining village populations. The survey was conducted during the first eight months of the year 2011.

The Mandai community had four TMPs, namely, Nipen Chandra Cooch, Nimai Cooch, Nirupam Cooch, and Narendra Chandra Cooch. Informed consent was obtained from all four practitioners to publish their names and any information given by them. At the request of the TMPs, interviews were conducted at any given time with all four TMPs with the help of a semi-structured questionnaire and the guided field-walk method as described by Martin (1995) and Maundu (1995). In this method, the TMPs took the interviewers on field-walks through areas from where they collected their plants and described the uses of those plants. Plant specimens were photographed, collected, dried and brought back to Dhaka for identification done by Mr. Manjur-Ul-Kadir Mia, ex-Principal Scientific Officer and Curator of Bangladesh National Herbarium. Voucher plant specimens were deposited at the Medicinal Plant Collection Wing of the University of Development Alternative. More details as to uses of individual plants were obtained from the TMPs in evening sessions. All interviews were conducted in the Bengali language, it being observed that all four TMPs had excellent command of this language. Bengali language was also the language of the interviewers.

## Results

It was observed that the Mandai TMPs used a total of 31 plants distributed into 23 families for treatment of various ailments. The results are shown in Table 1. The Fabaceae family contributed the largest number of plants with three plants belonging to this family. The Amaranthaceae, Euphorbiaceae, Moraceae, Rutaceae, Solanaceae, and Zingiberaceae families provided two plants per family. Other medicinal plants used by the Mandai TMPs belonged to Amaryllidaceae, Apocynaceae, Araceae, Aristolochiaceae, Convolvulaceae, Costaceae, Iridaceae, Lauraceae, Liliaceae, Lygodiaceae, Menispermaceae, Myrtaceae, Plumbaginaceae, Rubiaceae, Smilacaceae, and Sterculiaceae families. Among the plants used by the TMPs, *Manihot esculenta*, *Tamarindus indica*, *Syzygium cumini*, *Citrus aurantiifolia*, and *Zingiber officinale* were cultivated for various reasons including edible fruits (*T. indica*, *S. cumini*, *C. aurantiifolia*), cereal crop (*M. esculenta*) or for use as spice (*Z. officinale*). However, *T. indica* and *S. cumini* can occasionally be observed growing by roadsides or in forested areas around any typical village of Bangladesh. The rest of the plants were collected from the wild or fallow lands.

Virtually all plants parts were observed to be used in one or other formulation. However, it was noticed that out of the total of 40 uses of various plant parts, roots constituted the major plant part used, forming 40% of total uses. Roots were followed by rhizomes at 17.5% and leaves at 10%. Whole plants constituted only 2.5% of total uses. Other plants parts used and percentage of uses were stems (5%), barks (5%), fruits (5%), flowers (2.5%), seeds (5%), tubers (2.5%), gum (2.5%), and bulbs (2.5%). Plant parts from the same plant were observed to be used both singly and in combination. Roots of *Vigna trilobata* were used singly for treatment of jaundice. Macerated stems of *Colocasia nymphaeifolia* were used for treatment of joint pain. On the other hand, a paste of a combination of leaves and roots of *Physalis minima* was used for treatment of boils.

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**Table 1:** Medicinal plants used by Mandai traditional medicinal practitioners for treatment of various ailments.

Serial Number	Ailment with symptoms	Formulation	Local name of plants/ingredients used
1	Low semen density	Juice obtained from macerated tubers of <i>Manihot esculenta</i> Crantz. (Euphorbiaceae) is taken once daily (2 teaspoonfuls). Alternately, tubers are lightly boiled and then mashed. 2 teaspoonful of the mashed tuber is taken for 5 days.	<i>Manihot esculenta</i> : Shimul
2	Diabetes, debility	Roots of <i>Curculigo orchioides</i> Gaertn. (Amaryllidaceae) are macerated with seeds of <i>Tamarindus indica</i> L. (Fabaceae), seeds of <i>Syzygium cumini</i> (L.) Skeels (Myrtaceae) and roots of <i>Asparagus racemosus</i> Willd. (Liliaceae) and made into pills. One pill is taken twice daily for 21 days.	<i>Curculigo orchioides</i> : Tejbol <i>Tamarindus indica</i> : Tentul <i>Syzygium cumini</i> : Jaam <i>Asparagus racemosus</i> : Shotomul
3	Jaundice	Two teaspoonfuls of paste prepared from roots of <i>Vigna trilobata</i> (L.) Verdc. (Fabaceae) is taken twice daily.	<i>Vigna trilobata</i> : Bon kalai
4	Stomach ache, indigestion	Pills prepared from macerated roots of <i>Smilax zeylanica</i> L. (Smilacaceae) are taken three times daily (one pill each time).	<i>Smilax zeylanica</i> : Kumir kanta
5	Stomach ache, indigestion	Pills prepared from a mixture of macerated mixture of rhizomes of <i>Curcuma aromatica</i> Salisb. (Zingiberaceae) and molasses is taken thrice daily (one pill each time). Alternately, 2 teaspoonfuls of paste prepared from rhizomes and molasses are taken twice daily.	<i>Curcuma aromatica</i> : Bau ada
6	Stomach ache	Two teaspoonfuls of paste prepared from a combination of rhizomes of <i>Costus speciosus</i> (J. König.) Sm. (Costaceae) and <i>Zingiber officinale</i> Roscoe (Zingiberaceae) are taken twice daily.	<i>Costus speciosus</i> : Keu kola <i>Zingiber officinale</i> : Ada
7	Leucorrhea, diarrhea	One teaspoonful of paste prepared from macerated roots of <i>Lygodium flexuosum</i> (L.) Sw. (Lygodiaceae) and a little water is taken once daily.	<i>Lygodium flexuosum</i> : Bhaluk jan
8	Vomiting, indigestion	Two teaspoonfuls of paste prepared from roots of <i>Hemidesmus indicus</i> R. Br. (Apocynaceae) and <i>Solanum violaceum</i> Orteg. (Solanaceae) and rhizomes of <i>Zingiber officinale</i> Roscoe (Zingiberaceae) are taken twice daily.	<i>Hemidesmus indicus</i> : Boishthofa <i>Solanum violaceum</i> : Tek bahor <i>Zingiber officinale</i> : Ada
9	Joint pain	Macerated stems of <i>Colocasia nymphaeifolia</i> Vent. (Araceae) are applied to painful areas twice daily.	<i>Colocasia nymphaeifolia</i> : Bish kochu
10	Boils	Paste of leaves and roots of <i>Physalis minima</i> L. (Solanaceae) is applied twice daily to boils.	<i>Physalis minima</i> : Aigadowa
11	Coughs, mucus, rheumatic pain	Pills or paste is prepared from macerated fruits and barks of <i>Ficus racemosa</i> L. (Moraceae), roots of <i>Aristolochia indica</i> L. (Aristolochiaceae) and roots of <i>Curculigo orchioides</i> (Gaertn.) (Amaryllidaceae). Pills are taken thrice daily for 6-7 days for coughs and mucus. Paste is topically applied to rheumatic pain-affected areas.	<i>Ficus racemosa</i> : Jol dombor <i>Aristolochia indica</i> : Ishwar mul <i>Curculigo orchioides</i> : Tejbol
12	Debility (physical weakness)	Leaves and barks of <i>Litsea monopetala</i> (Roxb.) Pers. (Lauraceae) are soaked in water overnight. The water is taken the following morning like a sherbet.	<i>Litsea monopetala</i> : Khara jor
13	Dysentery, vomiting, nose bleed	Pills prepared from macerated roots of <i>Evolvulus nummularius</i> L. (Convolvulaceae), rhizomes of <i>Zingiber officinale</i> Roscoe (Zingiberaceae) and roots of <i>Alternanthera sessilis</i> (L.) DC. (Amaranthaceae) are taken (one pill each time 3 times daily).	<i>Evolvulus nummularius</i> : Indur kaina <i>Zingiber officinale</i> : Ada <i>Alternanthera sessilis</i> : Henchi

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14	Debility (physical weakness)	One teaspoonful of paste prepared from roots of <i>Ixora parviflora</i> Vahl. (Rubiaceae) and a little water is taken once daily.	<i>Ixora parviflora</i> : Cheton nath
15	Allergy	Paste prepared from leaves of <i>Desmodium pulchellum</i> (L.) Benth. (Fabaceae) is applied twice daily to affected areas.	<i>Desmodium pulchellum</i> : Maichta
16	Fever	Garland made from flowers of <i>Pentapetes phoenicea</i> L. (Sterculiaceae) is worn around the neck for 3 days.	<i>Pentapetes phoenicea</i> : Dupira
17	Stomach ache, diarrhea, toothache, gum infections	Paste or pill prepared from a mixture of gum of <i>Streblus asper</i> Lour. (Moraceae) and root of <i>Hemidesmus indicus</i> R. Br. (Apocynaceae) is taken for 2-3 days.	<i>Streblus asper</i> : Shora gach <i>Hemidesmus indicus</i> : Boisthofa
18	Dysentery	Paste prepared from roots of <i>Achyranthes aspera</i> L. (Amaranthaceae) and a little water is orally taken for 2-3 days.	<i>Achyranthes aspera</i> : Ubuth nangra
19	Joint pain	Paste prepared from bulbs of <i>Eleutherine palmifolia</i> (L.) Merr. (Iridaceae) and a little water is topically applied to painful joints.	<i>Eleutherine palmifolia</i> : Bon peyanj
20	Stool color black in children	One teaspoonful of paste prepared from leaves of <i>Phyllanthus reticulatus</i> Poir. (Euphorbiaceae) and rhizomes of <i>Zingiber officinale</i> Roscoe (Zingiberaceae) is taken twice daily for 2-3 days.	<i>Phyllanthus reticulatus</i> : Jetki <i>Zingiber officinale</i> : Ada
21	To prevent snakes from drinking milk from cows (snakes are believed to drink milk directly from a cow's udder in Bangladesh)	Roots of <i>Glycosmis pentaphylla</i> (Retz.) Corr. (Rutaceae) are tied to the cow's body to repel snakes.	<i>Glycosmis pentaphylla</i> : Modail
22	Leucorrhoea	Two teaspoonfuls of juice from fruits of <i>Citrus aurantiifolia</i> (Christm.) Swingle (Rutaceae) are mixed with 1 teaspoonful sugar and a handful of rice and soaked in water overnight followed by taking the water the following morning.	<i>Citrus aurantiifolia</i> : Jamir lebu
23	Chronic fever, helminthiasis	Stems of <i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thoms. (Menispermaceae) are sliced and soaked in water overnight. The following morning, the water is taken like a sherbet on an empty stomach.	<i>Tinospora cordifolia</i> : Padma berenchi
24	Chronic fever	One teaspoonful of paste obtained from whole plants of <i>Plumbago zeylanica</i> L. (Plumbaginaceae) and rhizomes of <i>Zingiber officinale</i> Roscoe (Zingiberaceae) is taken twice daily for 6-7 days.	<i>Plumbago zeylanica</i> : Kolponath <i>Zingiber officinale</i> : Ada

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Formulations were oral or topical depending on the ailment treated. Oral formulations usually consisted of paste or pills prepared from one or a combination of plant parts; the latter could be a combination of different plants. For instance, a paste prepared from a combination of roots of *Hemidesmus indicus* and *Solanum violaceum* and rhizomes of *Zingiber officinale* was orally administered as treatment for vomiting and indigestion. Sometimes, the juice obtained from a macerated plant part was administered directly, as in the case of *M. esculenta* tubers, which was taken as treatment for low semen density. For topical applications, macerated plant part or a paste of plant part was observed to be directly applied. Macerated stems of *C. nymphaeifolia* were directly applied to affected areas during joint pain; paste prepared from leaves of *Desmodium pulchellum* was applied to affected areas of the skin as treatment of allergy, which can manifest itself as skin rashes or itching. A notable use of topical administration was the wearing of garland made from flowers of *Pentapetes phoenicea* around the neck as treatment for fever.

The rhizomes of *Z. officinale* were used in a number of formulations. In combination with rhizomes of *C. speciosus*, they were used for treatment of stomach ache. They were used in combination with roots of *H. indicus* and *S. violaceum* for treatment of vomiting or indigestion. In combination with roots of *Evolvulus nummularius* and *Alternanthera sessilis*, they were used for treatment of dysentery, vomiting, or nose bleed. In combination with leaves of *Phyllanthus reticulatus*, they were used for treatment of black colored stool in children, the color being an external manifestation of possible internal bleeding in the gastrointestinal tract. Finally, in combination with whole plants of *Plumbago zeylanica*, they were used for treatment of chronic fever.

In a few cases, plant-based formulations were advised by the TMPs to be taken with other substances like molasses, sugar, and rice. Pills prepared from macerated rhizomes of *Curcuma aromatica* contained molasses in addition, possibly to make them more palatable. Juice from fruits of *C. aurantiifolia* was mixed with sugar and rice and soaked in water overnight, followed by partaking of the water the following morning for treatment of leucorrhea.

With one exception, all formulations prescribed by the TMPs were for human ailments. The sole exception was the use of roots of *Glycosmis pentaphylla*, which were tied to a cow's body to repel snakes. It is widely believed by the village people of Bangladesh (the Mandais being no exception) that snakes drink milk from cows by directly sucking the udder, and this is often cited as the possible cause for low milk production from any given cow or cows. Plants (which are considered snake-repellent plants) are usually tied then to the cow's body as close to the udder as possible. Whether this actually works or not remains to be scientifically determined, but there is a vast volume of anecdotal evidence in Bangladesh as to people actually seeing snakes drinking milk from a cow's udder.

## Discussion

The Mandai TMPs did not treat a wide variety of ailments. The various ailments treated included low semen density, diabetes, jaundice, gastrointestinal tract disorders (stomach ache, indigestion, dysentery, and black stool color), leucorrhea, pain (rheumatic pain, joint pain), skin disorders (boils, allergy), respiratory tract disorders (coughs, mucus), debility, fever, and helminthiasis. Among the diseases treated, diabetes was the only disease that cannot be cured by modern allopathic medicine; therefore, the combination of plants used for treatment of this disease, namely, *Curculigo orchoides*, *T. indica*, *S. cumini*, and *Asparagus racemosus* merit further scientific studies for their potential towards discovery of more efficacious anti-diabetic drugs. Interestingly, the seeds of *T. indica* and *S. cumini* were used by the Mandai TMPs in their anti-diabetic formulation. It is noteworthy that scientific research has established the efficacy of seeds of the two above-mentioned plants in various diabetic rodent models (Pandey and Khan, 2002; Maiti et al, 2004, 2005; Shinde et al, 2008; Hamidreza et al, 2010).

From the number of plants used for treatment (seven), it appeared that gastrointestinal tract disorders like stomach ache or dysentery formed the major ailment among the Mandais. This is not surprising. As mentioned earlier, the Mandai community was poor from the economic point of view, which led to a poor standard of living under unhygienic conditions and scarcity of quality drinking water. Gastrointestinal disorders in the form of diarrhea or dysentery are the most frequent ailments encountered by the rural population of Bangladesh. The Mandais formed no exception to this rule. It was observed by the interviewers as well as mentioned by the Mandais about their poor socio-economic conditions and living standards. Infective diseases like gastrointestinal disorders, skin disorders, respiratory tract disorders, helminthiasis, and fever are common manifestations of poor sub-standard living conditions, and these formed the major part of the diseases treated by the Mandai TMPs. Debility in the sense of physical weakness was another condition treated by the Mandai TMPs and which can arise from malnutrition caused through low income leading to inadequate food intake. As such, the diseases treated by the Mandai TMPs are a direct reflection of their general low income status and consequential poor living standards.

It is, however, possible that much of the traditional medicinal knowledge of the Mandais has been forgotten and only knowledge of treatment of a few common diseases remains. Nevertheless, this knowledge is important not only for anthropological purposes, but also because if these treatment formulations can be validated through modern scientific research, it can offer the Mandais a low-cost effective alternative for pricier allopathic medicines, which they are not able to afford currently. It is also an undeniable fact that the vast majority of the world's population and particularly the people of under-developed countries are poor, live under sub-standard conditions, and either lack access to or cannot afford the cost of allopathic medicine. If the Mandai TMP medicinal formulations can be validated through proper research, these formulations can benefit the people of the whole world. *Ficus racemosa* was found to be used by the Mandai TMPs for treatment of coughs and rheumatic pain. An



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anti-inflammatory and anti-oxidant glucoside, racemosic acid, has been isolated from the plant (Li et al, 2004). As such, the plant can prove useful in coughs, which can result from inflammation of the mucous membranes of the bronchi as well as rheumatism, which is also an inflammatory disease. Therefore, at least some plants used by the Mandai TMPs for treatment have been validated through research. The rest of the plants merit further potential for appropriate studies and research to be conducted leading towards discovery of possibly cheaper and more efficacious drugs.

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