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## Ethnomedicinal formulations of a Garo tribal healer in Haluaghat, Mymensingh district, Bangladesh

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### Abstract

Indigenous people or tribes, because of a long history of association with plants, can form a valuable source of information on the therapeutic properties of a given plant or plant part. Most tribal practitioners use simple plant-based formulations for treatment of ailments. However, some are knowledgeable enough to use polyherbal formulations along with other non-plant ingredients. The objective of this study was to document the medicinal practices of a Garo tribal medicinal practitioner (GTMP) practicing in Haluaghat region of Mymensingh district, Bangladesh, who used polyherbal formulations. Interviews of the GTMP were carried out with the help of a semi-structured questionnaire and the guided field-walk method. In his various formulations, the GTMP was found to use a total of 45 plant species distributed into 29 families. The GTMP also used a number of minerals in some formulations. Taken together, these complex formulations of the GTMP, if properly researched upon, may prove beneficial in the preparation of effective herbal therapeutics and so provide people with an affordable and less costly mode of treatment.

**Keywords:** Ethnomedicine, Garo, Mymensingh, Bangladesh, medicinal plants

### 1. Introduction

Human beings have probably been afflicted with diseases since their advent. From long association with plants, indigenous peoples have acquired substantial knowledge on the medicinal properties of various plant species, and have used them for treatment of various diseases. This is a common phenomenon throughout the world where folk medicinal practitioners (FMPs) and tribal medicinal practitioners (TMPs) provide an alternate mode of treatment, mostly involving plants, which is separate from modern allopathic medicine. A few instances are cited to show that various tribes or indigenous peoples of different countries of the world have their own traditional medicinal plants [1-5].

Bangladesh is no exception to traditional medicinal practices. Although it is a small country by size, Bangladesh has a rich traditional medicine heritage, which consists of but is not limited to homeopathy, Ayurveda, Unani, folk, and tribal medicinal practices. The country also has over 5000 floral species and many of these species have traditional medicinal uses. Bangladesh also has over a hundred small to large tribes (like Chakmas, Garos, Marmas, to name a few) and most tribal people still have their own traditional medicinal practices. On the other hand, the vast amount of information, which could and should have been documented about these indigenous practices still remain to be done and is getting lost with every passing day. Such documentation is important in Bangladesh for several reasons. Ethnomedicinal information not only enables a country to form a database on medicinal properties of plants within the country, but also enables researchers from the country and the rest of the world to focus their research on any particular floral species. This is vital in the present era because of the emergence of new diseases like AIDS or Ebola as well as the emergence of drug-resistant vectors.

Towards documenting the medicinal plant resources of the country, we had been conducting ethnomedicinal surveys among the folk and tribal medicinal practitioners of the country for several years [6-23]. The objective of the present study was to document the medicinal practices of a Garo tribal medicinal practitioner (GTMP) practicing in Haluaghat region of Mymensingh district in the north central part of the country.

## 2. Materials and Methods

The survey was conducted between August-October, 2016 at Uttar Narail village, which falls under Haluaghat Police Station in Mymensingh district of Bangladesh. The village is inhabited by Garo tribal people and they had one Garo tribal medicinal practitioner (GTMP) practicing in the village. The GTMP was named Katuram Sangma, and was male. He did not divulge his age, years that he had been practicing, or where he learned of his formulations.

Prior Informed Consent was first obtained from the GTMP. He was thoroughly apprised as to the nature of our visit and consent obtained to disseminate any information both nationally and internationally. However, he mentioned that he will only provide us with a few medicinal formulations and not all the formulations that he knew of. Actual interviews were conducted in the Bengali language, which was spoken fluently by the GTMP as well as the interviewers. The interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method of Martin [24] and Maundu [25]. In this method the GTMP took the interviewers on guided field-walks through areas from where he collected his medicinal plants, pointed out the plants, and described their uses. All plant specimens were photographed and collected on the spot, pressed, dried and brought back to Bangladesh National Herbarium at Dhaka for identification. Voucher specimens were deposited with the Medicinal Plant Collection Wing of the University of Development Alternative.

## 3. Results and Discussion

The GTMP was observed to use a total of 45 plants distributed into 29 families in his formulations. The results are shown in Table 1. The total number of formulations used by the GTMP was eight. Seven formulations were polyherbal complex formulations. Only one formulation had a single ingredient; bark powder of *Saraca asoca* was used by the GTMP to treat dysentery. The various formulations were used to treat various disorders like dysentery, jaundice, passing of semen with urine, leucorrhea, puerperal fever, wasting of body, cancer, pneumonia, fever, tuberculosis, loss of appetite, stomach disorders, indigestion, lower abdominal pain, irregular menstruation, and diarrhea.

The GTMP's most complex formulation (in terms of the number of ingredients involved) was used for treatment of a diverse variety of diseases, which included puerperal fever, wasting of body, cancer, pneumonia, fever, tuberculosis, leucorrhea, passing of semen with urine, loss of appetite, stomach disorders, and indigestion. In this formulation, paste was prepared from leaves of *Mallotus philippensis*, tubers of *Colocasia esculenta*, bark of *Cinnamomum verum*, camphor (terpenoid from *Cinnamomum camphora*), fruit of *Piper*

*cubeba*, leaf of *Scoparia dulcis*, fruit of *Ficus scandens*, clove of *Syzygium aromaticum*, fruit of *Amomum subulatum*, fruit of *Amomum aromaticum*, fruit of *Piper longum*, rhizome of *Curcuma zedoaria*, top of stem with leaf of *Bambusa tulda*, leaf pulp of *Aloe vera*, rhizome of *Alpinia nigra*, and calcined copper, lead, iron, brass, any color and bell metal. Tablets prepared from the paste were dried and advised to be taken orally. The use of metals with plants is interesting but not novel; many Ayurvedic and Unani preparations are herbo-metallic [26]. Another interesting feature about this formulation was that its use included cancer treatment and if this cancer curing efficacy can be scientifically validated, it may provide an excellent alternative to existing chemo- and radiotherapy treatments and their adverse side-effects.

Another formulation used by the GTMP which contained herbo-metallic ingredients was for the treatment of a single disease, namely leucorrhea. In this formulation, floral stalks of *Cardiospermum halicacabum* were mixed with rhizomes of *Cyperus rotundus*, whole young plant of *Tinospora crispa*, camphor (terpenoid obtained from *Cinnamomum camphora*), sea salt, and makardhwaja (an Ayurvedic preparation, see Table 1 for details) and made into a paste. Tablets prepared from the paste are taken orally twice daily for 3 months. The use of a noted Ayurvedic ingredient, makardhwaja, by the GTMP clearly indicates Ayurvedic influences on Garo tribal medicine. This influence seems to be newly acquired or may be confined to this practitioner, for in other ethnomedicinal surveys of the Garos in different areas, we did not find any evidences of use of makardhwaja [27-29].

Use of metals in formulations to be used for therapeutic purposes is an Ayurvedic concept. The safety of preparations containing metals has been argued both ways; some scientists claim such preparations to be toxic, while others claim them to be safe. The safety is said to arise from calcinations of the metals to turn them into 'Bhasmas' or ashes, which process supposedly removes metal toxicity [30]. The concept of polyherbal formulations is also not new for many of the traditional Indian systems like Ayurveda, Unani and Siddha practice it. The rationale is that use of multiple plants can not only give a synergistic effect in treatment but also one plant can negate any toxicity created by another [31].

Polyherbal formulations can offer another advantage. Modern allopathic medicine usually consists of a single active ingredient making it easier for various vectors to develop drug resistance. A polyherbal formulation may contain hundreds if not thousands of phytochemicals, some of which are complementary to each other in pharmacological effects, making it difficult for a vector to develop drug resistance. From that view point, polyherbal formulations like those used by the GTMP offer promise for the future in developing more effective cures.

**Table 1:** Medicinal plants and formulations of the Garo tribal medicinal practitioner

Serial Number	Scientific Name	Family Name	Local Name	Parts used	Ailments and mode of medicinal use
1	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kuira kata	Root	See <i>Kalanchoe pinnata</i> .
2	<i>Celosia argentea</i> L.	Amaranthaceae	Morog phul	Root	See <i>Pterocarpus santalinus</i> .
3	<i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roem. & Schult.	Apocynaceae	Dudh gach (shada)	Leaf	Dysentery. Leaves of <i>Tabernaemontana divaricata</i> and <i>Euphorbia hirta</i> and <i>Piper betle</i> are mixed with slightly burnt papri khoyer (extract of wood of <i>Acacia catechu</i> ) and slightly burnt fruits of <i>Morus indica</i> . The mixture is made into a paste and tablets prepared from the paste are taken orally with cold water twice daily for 3 months.

4	<i>Colocasia esculenta</i> (L.) Schott.	Araceae	Mokaddas	Tuber	See <i>Mallotus philippensis</i> .
5	<i>Asparagus racemosus</i> Willd.	Asparagaceae	Shotomul	Whole plant	See <i>Kalanchoe pinnata</i> . See <i>Ipomoea aquatica</i> .
6	<i>Aloe vera</i> (L.) Burm.f.	Asphodelaceae	Musabbar	Leaf	See <i>Mallotus philippensis</i> .
7	<i>Oroxylum indicum</i> Vent.	Bignoniaceae	Kanai dinga	Bark	See <i>Ipomoea 221quatic</i> .
8	<i>Canna indica</i> L.	Cannaceae	Kolaboti	Root	See <i>Kalanchoe pinnata</i> .
9	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Kolmi shak	Top of stem	Jaundice. Seven tops of stems of <i>Ipomoea aquatica</i> , bark of <i>Oroxylum indicum</i> , leaves of <i>Abelmoschus moschatus</i> , 21 tops of stems with leaves of <i>Cajanus cajan</i> and one whole plant of <i>Asparagus racemosus</i> are mixed together and made into a paste. Pills prepared from the paste are dried under the sun and taken orally twice daily for 3 months.
10	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Crassulaceae	Pathor chira	Leaf	Passing of semen with urine, leucorrhoea. Leaf of <i>Kalanchoe pinnata</i> is mixed with root of <i>Amaranthus spinosus</i> , one whole plant of <i>Asparagus racemosus</i> , leaf of <i>Mimosa pudica</i> , root of <i>Pandanus foetidus</i> , root of <i>Canna indica</i> , and 1-year old root of <i>Raphanus sativus</i> . Tablets are prepared from paste of the above mixture and dried. Tablets are orally taken twice daily in the morning and night for 3 months.
11	<i>Raphanus sativus</i> L.	Cruciferae	Mula	Root	See <i>Kalanchoe pinnata</i> .
12	<i>Cyperus rotundus</i> L.	Cyperaceae	Vadail	Rhizome	See <i>Cardiospermum halicacabum</i> .
13	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Dudh gach (lal)	Leaf	See <i>Tabernaemontana divaricata</i> .
14	<i>Mallotus philippensis</i> (Lam.) Müll. Arg.	Euphorbiaceae	Sindur	Leaf	Puerperal fever, wasting of body, cancer, pneumonia, fever, tuberculosis, leucorrhoea, passing of semen with urine, loss of appetite, stomach disorders, indigestion. Paste is prepared from leaves of <i>Mallotus philippensis</i> , tubers of <i>Colocasia esculenta</i> , bark of <i>Cinnamomum verum</i> , camphor (terpenoid from <i>Cinnamomum camphora</i> ), fruit of <i>Piper cubeba</i> , leaf of <i>Scoparia dulcis</i> , fruit of <i>Ficus scandens</i> , clove of <i>Syzygium aromaticum</i> , fruit of <i>Amomum subulatum</i> , fruit of <i>Amomum aromaticum</i> , fruit of <i>Piper longum</i> , rhizome of <i>Curcuma zedoaria</i> , top of stem with leaf of <i>Bambusa tulda</i> , leaf pulp of <i>Aloe vera</i> , rhizome of <i>Alpinia nigra</i> , and calcined copper, lead, iron, brass, any color and bell metal. Tablets prepared from the paste are dried and taken orally.
15	<i>Acacia catechu</i> (Willd.)	Fabaceae	Khoyer	Wood extract (obtained by boiling wood in water and drying the mixture)	See <i>Tabernaemontana divaricata</i> .
16	<i>Cajanus cajan</i> (L.) Millsp.	Fabaceae	Arhar dal	Leaf with stem	See <i>Ipomoea 221quatic</i> .
17	<i>Mimosa pudica</i> L.	Fabaceae	Lojjaboti	Leaf	See <i>Kalanchoe pinnata</i> .
18	<i>Pterocarpus santalinus</i> L.f.	Fabaceae	Rokto chandan	Flower	Lower abdominal pain, irregular menstruation. Seven flowers of <i>Pterocarpus santalinus</i> are taken with 3 flowers of <i>Nymphaea rubra</i> , 3 flowers of <i>Hibiscus rosa sinensis</i> , inner portions from 7 flowers of <i>Saccharum spontaneum</i> , roots of <i>Celosia argentea</i> and roots of <i>Flacourtia jangomas</i> and made into a paste. Tablets prepared from the paste are taken orally with cold water twice daily for 3 months.
19	<i>Saraca asoca</i> Roxb.	Fabaceae	Ashok	Bark	Dysentery. Tablet prepared from 2g bark powder is taken orally in the morning on an empty stomach.
20	<i>Flacourtia jangomas</i> (Lour.) Raeus.	Flacourtiaceae	Daruchik	Root	See <i>Pterocarpus santalinus</i> .
21	<i>Cinnamomum camphora</i> (L.) J. Presl	Lauraceae	Korpur	Plant extract (terpenoid)	See <i>Cardiospermum halicacabum</i> . See <i>Mallotus philippensis</i> .
22	<i>Cinnamomum verum</i> Presl	Lauraceae	Daruchini	Bark	See <i>Mallotus philippensis</i> .
23	<i>Allium cepa</i> L.	Liliaceae	Peyaj	Bulb	See <i>Abelmoschus moschatus</i> .
24	<i>Abelmoschus moschatus</i> Medik.	Malvaceae	Kal kasturi	Leaf	Diarrhea. Leaves of <i>Abelmoschus moschatus</i> , <i>Solanum surattense</i> and <i>Eryngium foetidum</i> along with bulb

					juice of <i>Allium cepa</i> are made into a paste from which tablets are prepared. The tablets are taken orally with cold water twice daily for 3 months. See <i>Ipomoea aquatica</i> .
25	<i>Hibiscus rosa sinensis</i> L.	Malvaceae	Joba phul	Flower	See <i>Pterocarpus santalinus</i> .
26	<i>Gossypium herbaceum</i> L.	Malvaceae	Karpas	Plant extract	See <i>Cardiospermum halicacabum</i> (constituent of makardhwaja).
27	<i>Tinospora crispa</i> (L.) Hook. F. & Thomson	Menispermaceae	Pith vadail	Whole plant	See <i>Cardiospermum halicacabum</i> .
28	<i>Ficus scandens</i> Lam.	Moraceae	Latar guta	Fruit	See <i>Mallotus philippensis</i> .
29	<i>Morus indica</i> L.	Moraceae	Tunth	Fruit	See <i>Tabernaemontana divaricata</i> .
30	<i>Syzygium aromaticum</i> L.	Myrtaceae	Long	Clove	See <i>Mallotus philippensis</i> .
31	<i>Nymphaea rubra</i> Roxb. ex Andrews	Nymphaeaceae	Rokto shapla	Flower	See <i>Pterocarpus santalinus</i> .
32	<i>Pandanus foetidus</i> Roxb.	Pandanaceae	Keya danga	Root	See <i>Kalanchoe pinnata</i> .
33	<i>Piper betle</i> L.	Piperaceae	Paan	Leaf	See <i>Tabernaemontana divaricata</i> .
34	<i>Piper cubeba</i> L.	Piperaceae	Kapak chini	Fruit	See <i>Mallotus philippensis</i> .
35	<i>Piper longum</i> L.	Piperaceae	Pipul	Fruit	See <i>Mallotus philippensis</i> .
36	<i>Bambusa tulda</i> Roxb.	Poaceae	Mitha	Leaf with top stem	See <i>Mallotus philippensis</i> .
37	<i>Saccharum spontaneum</i> L.	Poaceae	Kaisha	Flower	See <i>Pterocarpus santalinus</i> .
38	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Sita gach	Flower stalk	Leucorrhoea. Floral stalks of <i>Cardiospermum halicacabum</i> are mixed with rhizomes of <i>Cyperus rotundus</i> , whole young plant of <i>Tinospora crispa</i> , camphor (terpenoid obtained from <i>Cinnamomum camphora</i> ), sea salt, and makardhwaja (for ingredients and preparation, see below)* and made into a paste. Tablets prepared from the paste are taken orally twice daily for 3 months.
39	<i>Scoparia dulcis</i> L.	Scrophulariaceae	Josti modhu	Leaf	See <i>Mallotus philippensis</i> .
40	<i>Solanum surattense</i> Burm.f.	Solanaceae	Dula baegun	Leaf	See <i>Abelmoschus moschatus</i> .
41	<i>Eryngium foetidum</i> L.	Umbelliferae	Dhonia (boro pata)	Leaf	See <i>Abelmoschus moschatus</i> .
42	<i>Alpinia nigra</i> (Gaertn.) Burt.	Zingiberaceae	Tara	Rhizome	See <i>Mallotus philippensis</i> .
43	<i>Amomum aromaticum</i> Roxb.	Zingiberaceae	Kalo elach	Fruit	See <i>Mallotus philippensis</i> .
44	<i>Amomum subulatum</i> Roxb.	Zingiberaceae	Shada elach	Fruit	See <i>Mallotus philippensis</i> .
45	<i>Curcuma zedoaria</i> (Christm.) Roscoe	Zingiberaceae	Shunti	Rhizome	See <i>Mallotus philippensis</i> .

**\*Makaradhwaja ingredients**

Shuddha Swarna – Purified gold leaves – 12 g

Shuddha Parada – Herbal purified Mercury – 96 g

Shuddha Gandhaka – Herbal purified Sulfur – 288 g

Karpasa – Cotton – *Gossypium herbaceum* – juice extract – Quantity Sufficient.

Kumari – *Aloe vera* – juice extract – Quantity Sufficient.

First purified Mercury and gold leaves are triturated together. Then purified sulfur is added to it, and grounded carefully. Later the juice extracts are added and triturated till dryness. This is further processed in Kupipakwa method (an Ayurvedic preparation method) to obtain Makaradhwaja.

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