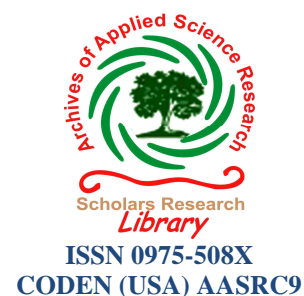




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Wild Edible Vegetables Consumed by *Bodo* Tribe of Kokrajhar District (Assam), North-East India

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ABSTRACT

The present study deals with the identification, documentation and exploration of wild edible vegetables consumed by Bodo tribes of Kokrajhar District, Assam (North-East India). A total of 52 wild edible plants were surveyed. Plants are the nature's gift to mankind and consumed wholly or in parts either cooked or raw. These are delicious, refreshing and chief sources of vitamins, minerals and protein. Vegetables constitute a major part of daily food intakes and play an important role in well-balanced diet and maintain healthy living. Utilization of wild plant resources in day-to-day life of Bodo tribes has been an old-age practice and recently popularity of the same has declined. Hence, prime importance should be given to them in order to maintain and popularize this important source of non-conventional food supply. In this paper, the scientific names along with family, local names in Bodo, time of availability, edible parts used and method of use of the wild edible plants are presented.

Key words: Wild edible vegetables, Kokrajhar district, *Bodo* tribe, Assam.

INTRODUCTION

Plants are the nature's gift to mankind and have been used as an important source of food and medicine from the very beginning of time. Plants have a great socio-economic significance because of their food and medicinal values [1-4]. Vegetables are the edible parts of plants that are consumed wholly or in parts either cooked or raw as part of main dish or salad. Vegetables are good and chief sources of vitamins, oil, carbohydrates and minerals which may not be available in other food sources [5-7]. Vegetables constitute a major part of daily food intakes and play an important role in well-balanced diet and maintain healthy living [8, 9]. Adequate intake of essential mineral is necessary to remain healthy as they are involved in numerous biochemical processes and diets rich in vegetables and fruits are link to reduce the risk of diseases like diabetes, cancer, coronary heart disease, neurodegenerative ailment [10-12].

Wild edible vegetables are obtained from forests or wild areas and play a very important role in the livelihoods of tribal communities. Wild edible vegetables not only serve as alternatives to staple food during periods of food deficit but they play as a valuable supplement for a nutritionally balanced diet [13-15]. These are also a good source of income for many poor communities in rural areas. A scientific investigation of wild edible vegetables is urgently needed to assess the potentiality which would be utilized at the time of food deficit or cultivated as a source of food material for an ever increasing population.

North Eastern (NE) region of India is known for its high ethnic and biological biodiversity. NE region embraces two biogeographic zones *viz.* Eastern Himalayas comprising Arunachal Pradesh and North East India comprising the states of Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. The Eastern Himalayas

biogeographic zone is accorded as mega diversity in plant wealth. Assam ($89^{\circ}50'$ E to $96^{\circ}10'$ E and $24^{\circ}30'$ N to $28^{\circ}10'$ N) is one of the richest biodiversity zones in NE region of India. The total area of Assam is 78,438 sq. km out of which 26,781.91 sq. km is delineated as forest area [16]. The state is enriched with extensive forest areas and famous for floras and faunas.

Kokrajhar, one of the 27 districts of Assam, is the gateway to Assam and other NE states of India by road as well as railways. Kokrajhar district is located on the north bank of the river Brahmaputra and shares the international boundary with Bhutan in the north and interstate boundary with West Bengal in the west. The district is bounded by Dhubri district on the south, Chirang and Bongaigaon district on the east. The district lies roughly between $89^{\circ}46'$ E to $90^{\circ}38'$ E longitudes and $26^{\circ}19'$ N to $26^{\circ}54'$ N latitudes. The district has a total area of 3,169.22 sq. km. and a total population of 8,86,999 according to the Census-2011. The main inhabitants of the district are *Bodo*, *Rava*, *Garo*, *Bengali*, *Nepali*, *Santhal*, *Rajbongshi*, *Orao* etc. Among them, *Bodo* is a prominent inhabitant of Kokrajhar district of Assam belonging to scheduled tribe (plain) [17].

The Kokrajhar district is situated in a humid sub-tropical climate which is the characteristic of the lower Brahmaputra Valley of Assam. There is high rainfall and humidity. Forest is one of the most prominent features of Kokrajhar district. The district has the largest concentration of forest in the state. The present estimated area under reserved forests is 1,636.26 sq. km. which shows that 51.63% of the total geographical area of the district is under reserved forest. The soil in the district is fertile and suitable for paddy cultivation. The district is rich in forest resources. In the forests of Kokrajhar district, a large variety of wild edible vegetables grow well in their natural habitats which are mostly consumed by *Bodo* people and other tribal communities of this region in their daily diet since the time unknown [17].

During festival of *Bwisagu* (a New Year festival of *Bodo* tribe), the *Bodo* tribes use to collect various types of wild edible vegetables from the forest and then vegetables are eaten cooked with meat or as mixed vegetables. Many of the indigenous tree and shrub species of this locality are still unknown, underutilized and hence, there is an urgent need to be explored as a source of food for human consumption. The present study is an attempt to identify, document and to protect the traditional knowledge of plant species mainly the wild edible vegetables consumed by *Bodo* tribes of Kokrajhar district.

MATERIALS AND METHODS

Several rounds of field study were carried out in Kokrajhar District of Assam (North-East India) at different seasons of the year during 2012-2013. Local markets (*viz.* *Kharigao*, *Khangklabada*, *Tiniali*, *Maldang*, Daily bazar) of selected localities and various parts of the study area were surveyed. Live specimens along with photographs were taken and interacted with local vegetable vendors and villagers for local identification and to assess the traditional knowledge on wild edible plants. Questionnaire was prepared for the collection of data such as local name, edible parts used, time of availability and mode of preparation and uses as food. Wild edible vegetables were collected and preserved in the Department of Botany, Science College, Kokrajhar. The plant species were identified by interacting and discussing with the local vegetable vendors and villagers, and by referring relevant scientific literatures [17-23].



Spilanthes paniculata (Usumwi)



Plectranthus ternifolius (Jwглаori)



Dillenia indica (Taigir)



Oxalis corniculata (Singri)



Stellaria media (Nabiki)



Drymaria cordata (Jabsri)



Lippia geminata (Ontaibajab)



Paederia foetida (Kipibendwng)



Murraya koenigii (Nwrsing)



Amaranthus viridis (Kuduna)



Centella asiatica (Manimuni gidir)



Hydrocotyle sibthorpioides (Manimuni pisa)



Premna herbacea (Keradapini)



Fagopyrum cymosum (Mwisungka)



Bambusa tulda (Meoai)



Oroxylum indicum (Karokandai)



Pteris ensiformis (Dingkia)



Enhydra fluctuans (Alangshi)



Lasia spinosa (Sibru)



Amorphophallus sylvaticus (Olodor)



Antidesma acidum (Lapasaiko)



Portulaca oleracea (Hangswgarma)

*Leucas aspera* (Kansingsa)*Solanum indicum* (Kuntainara)*Casearia glomerata* (Daopenda)*Vitis rependa* (Dausrem)

RESULTS AND DISCUSSION

Bodo tribe constitutes the majority in Kokrajhar district which is the present study area. Forest is one of the most prominent features of Kokrajhar district and is rich in biological biodiversity. The district has the largest concentration of forest in the state (Assam). The traditional knowledge about the various uses of plant species *i.e.* food, medicine etc. is preserved from generation to generation and they depend mainly on the forest resources for their survival. Identification, documentation and conservation of indigenous traditional knowledge about the plants are very essential to be used in near future for ever increasing population.

The present study in the district of Kokrajhar revealed that a total of 52 wild plant species mainly used for human consumption belonging to 35 families have been reported. Majority of these plants are eaten cooked as vegetable, some of them are eaten fried and as raw or chutney by *Bodo* tribe. Out of the documented plant species, the edible parts used are leaves or young shoot, tubers, petiole, stem, flower, fruit, rhizome and root. Among these, the most commonly used edible part is leaves or young shoot. While the whole plant parts of only 3 species are used as vegetable. The wild edible vegetables used by *Bodo* tribe of the study area are arranged in alphabetically with their scientific names, family, *Bodo* name, time of availability, part used and mode of use are shown in **Table 1** and a total of 26 photographs of 26 plant species are also shown in this paper.

Table 1. List of wild edible vegetables of Kokrajhar district (Assam)

Sl. No.	Scientific name	Family	Bodo Name	Time of availability	Edible part used	Uses
1	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kuduna (su gwnang)	September - January	Young shoot/ Leaves	Tender shoots and young leaves used as vegetable and eaten cooked.
2	<i>Amaranthus viridis</i> L.	Amaranthaceae	Kuduna (pisa)	September - January	Young shoot/ Leaves	Tender shoots & leaves are eaten cooked.
3	<i>Amorphophallus sylvaticus</i>	Araceae	Olodor	March-June	Young leaves/petiole	Young leaves and petioles are eaten cooked.
4	<i>Antidesma acidum</i> Retz.	Phyllanthaceae	Lapasaiko	March-October	Leaves	Leaves are eaten as vegetable, slightly acidic and also leaves can be preserved for later use.
5	<i>Alocasia acuminata</i> Schott.	Araceae	Thaso	January-March	Young shoot/ tuber	Young shoots, tender leaves and tubers are eaten cooked mostly with acidic fruit.
6	<i>Alocasia indica</i> (Lour.) Koch.	Araceae	Mana thaso	September-February	Young shoot/ tuber	Tubers, rhizome and shoots are eaten cooked with acidic fruits.
7	<i>Alpinia nigra</i> (Gaertn) Burt.	Zingiberaceae	Tharai	March-September	Young shoot/ leaves, rhizome	Young shoots and rhizomes are eaten either raw or cooked. Leaves have distinctive aromatic smell, used as wrappers in roasting or boiling of various food items.
8	<i>Argyreia speciosa</i> Sweet	Convolvulaceae	Kaoasang	February-April	Young leaves	Leaves are used as vegetable.
9	<i>Basella alba</i> L. var. <i>rubra</i> (L.) Stewart.	Basellaceae	Mwifrai	May-July	Young shoot/ Leaves, Fruits	Leaves, stem and fruits are largely used as vegetable and considered good for anaemia patient.
10	<i>Bambusa balcooa</i> Roxb.	Poaceae	Auwa burka	April-July	Young shoot	Young shoots are eaten after slicing as vegetables cooked with grinded rice and /or fish/meat. Young shoots are also eaten after drying and grinding.
11	<i>Bambusa tulda</i> Roxb.	Poaceae	Auwa gubwi	April-July	Young shoot	Young shoots are eaten after slicing as vegetables cooked with grinded rice and /or fish/meat. Young shoots are also eaten after drying and grinding.
12	<i>Bidens pilosa</i> Hook.	Asteraceae	Daomeoi	April-July	Leaves/shoot	Young leaves & shoots are used as vegetable.
13	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Thaso gwswm	Throughout the year	Young leaves/ tuber/flower	Tender leaves, tubers and flowers are eaten as vegetable.
14	<i>Costus speciosus</i> (Koen. Ex Retz.) Smith	Costaceae	Buritokon	April-May	Young shoot	Young shoots are eaten as vegetable.
15	<i>Casearia glomerata</i> Roxb ex DC.	Balsaminaceae	Daopenda	April-October	Young shoots/leaves	Young shoots & leaves are eaten as vegetables generally cooked with rice or chicken by Bodos.
16	<i>Calamus tenuis</i> Roxb.	Arecaceae	Garlabata	April-May	Young shoot/Seeds	Young shoots are eaten as vegetable. Ripe fruits and seeds are also eaten.
17	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Manimuni (gidir)	November-April	Leaves/stem	Leaves, young shoots are eaten as vegetable. It is considered medicinal in stomach complains and usually used locally as liver tonic making curry with small fishes.
18	<i>Chenopodium album</i> L.	Chenopodiaceae	Butua	November-March	Tender shoots	Tender shoots eaten fried.
19	<i>Dillenia indica</i> L.	Dellineaceae	Taigir	September-November	Fruit (fleshy calyx)	Fleshy calyx eaten raw and cooked as vegetable.
20	<i>Drymaria cordata</i>	Caryophyllaceae	Jabsri	September-January	Leaves	Young leaves are used as vegetable.
21	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Nasraikoro	Through the year	Leaves	Leaves are used as vegetable.
22	<i>Enhydra fluctuans</i> Lour.	Asteraceae	Alangshi	April-June	Leaves/Shoot	Leaves and young shoots are eaten cooked as vegetable.
23	<i>Fagopyrum cymosum</i> Meissn.	Polygonaceae	Mwisungka	September-January	Young shoot/ leaves	The tender leaves and young shoots are eaten cooked as vegetable.
24	<i>Gmelina arborea</i> Roxb.	Lamiaceae	Gambari	January-April	Flower	Flowers are eaten fried.
25	<i>Hedyotis diffusa</i> (Willd.) Roxb.	Rubiaceae	Daosriateng	December-February	Leaves	Leaves are cooked as vegetables. Leaves are considered medicinal for stomach trouble.
26	<i>Houttuynia cordata</i> T hunb.	Saururaceae	Maisundri	April-October	Leaves	Leaves are eaten either raw or cooked as vegetable. Roots are also edible and eaten as chutney.
27	<i>Hydrocotyle sibthorpioides</i> Lamk.	Araliaceae	Manimuni (pisa)	November-March	Whole plant	Young leaves and shoots are cooked as vegetable. Leaves are used in healing wounds of man and animals.

28	<i>Hemidesmus indicus</i> L.	Apocynaceae	Parukia	Throughout the year	Young tender leaves	Young tender leaves are cooked as vegetable.
29	<i>Hypericum japonicum</i> Thunb. ex Murr.	Guttiferae or Hypericaceae	Sonapuli		Leaves/Stem	It is used as a mixed vegetable and also used as medicine by Bodos.
30	<i>Ipomoea aquatica</i> Forsk.	Convolvulaceae	Mande	March-October	Young shoot	The leaves and undershoots are eaten cooked as vegetable. Fruit are also eaten fried.
31	<i>Justicia adhatoda</i> L.	Acanthaceae	Barsika	April-June	Flowers	Flowers are eaten fried. The plant has medicinal value viz. in cough, cold, allergy etc.
32	<i>Lippia geminate</i> H. B. & K.	Verbenaceae	Ontaibajab	April-October	Leaves	Leaves are eaten cooked as vegetable.
33	<i>Lasia spinosa</i> (L.) Thaw.	Araceae	Sibru	April-August	Leaf petioles	Leaf petioles are eaten cooked as vegetable and flower spadix can also be eaten cooked as vegetable.
34	<i>Leucas aspera</i>	Lamiaceae	Kansingsa	November-March	Leaves	Leaves are eaten cooked as vegetable
35	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Nwrsing	April-November	Leaves	Leaves are eaten cooked as vegetable
36	<i>Monochoria hastata</i> L.	Pontederiaceae	Ajinai	April-July	Flower bud	Flower bud is eaten cooked as vegetable or fried.
37	<i>Nymphaea nouchali</i> Burm. f.	Nymphaeaceae	Toblo	May-October	Fruit, leaf petiole, seed and root	Fruit, leaf petiole and roots are eaten cooked as vegetable. Seeds are eaten raw or roasted.
38	<i>Oroxylum indicum</i> (L.) Vent.	Bignoniaceae	Karokandai	March-July	Young shoot/Leaves/Flowers	Young shoots and leaves are used as vegetable. Fresh flowers are eaten fried.
39	<i>Oxalis corniculata</i> L.	Oxalidaceae	Singri	October-February	Leaves/ Stem	Young shoots and leaves are used as vegetable. It is mildly acidic. The plant is also highly considered medicinal in dysentery and blood pressure.
40	<i>Oldenlandia corymbosa</i> Roxb.	Rubiaceae	Tuntini	November-March	Whole plant	Whole plant is eaten cooked.
41	<i>Premna herbacea</i> Roxb.	Verbenaceae	Kerapapini	March-June	Leaves/young shoots	Leaves and young shoots are used as vegetable. Ripe fruits are also eaten. It is considered as a high quality vegetable. It is also considered as medicinal in fever, sleeping sickness and jaundice.
42	<i>Plectranthus ternifolius</i> D. Don	Lamiaceae	Jwglaoiri	June-November	Young Shoots	Pungent young shoots are eaten as vegetable. It is a popular vegetable among Bodos.
43	<i>Paederia foetida</i> L.	Rubiaceae	Kipibendwng	May-October	Leaves/ tender twigs	Leaves, tender twigs are used as vegetable. It is also considered medicinal for stomach ache, gastric problem etc.
44	<i>Portulaca oleracea</i>	Portulacaceae	Hangswgarma	September-May	Leaves/stem	Leaves and stem are eaten as vegetable.
45	<i>Pteris ensiformis</i> Burm.f.	Pteridaceae	Dingkia	April-October	Leaves	Young fronds are eaten fried and as vegetable mixing with others.
46	<i>Spilanthes paniculata</i> Wall. ex D.C.	Asteraceae	Usumwi	Throughout the year	Leaves	Young shoots and leaves are eaten cooked as vegetable and also used as medicine in sore mouth, tooth ache, wounds etc.
47	<i>Solanum nigrum</i> L.	Solanaceae	Mwisung	November-February	Young leaves	Young leaves are used as mixed vegetable with others. Ripe fruits are eaten. It is also considered highly medicinal for burns
48	<i>Sesbania grandiflora</i> (L.) Poir.	Fabaceae	Bogbibar	March-May	Flower	Flowers are eaten as vegetable either fried or with grinded rice or gram.
49	<i>Solanum indicum</i> L.	Solanaceae	Kuntainara	May-November	Fruit	Fruits are eaten as vegetable and also considered medicinal for worm infection and skin diseases.
50	<i>Stellaria media</i> L.	Caryophyllaceae	Nabiki	September-march	Whole plant	Whole plant is used as vegetable. The plant has medicinal value.
51	<i>Vitex negundo</i> L.	Lamiaceae	Nisinda	Throughout the year	Leaves	Tender leaves are used as vegetable. The plant is considered highly medicinal.
52	<i>Vitis rependa</i> W & A	Vitaceae	Dausrem	March-June	Leaves	Leaves are used as vegetable.

CONCLUSION

In Kokrajhar district, a large variety of wild edible plants grow well in their natural habitats which are mostly consumed by *Bodo* people and other tribal communities of this region in their daily diet since the time unknown. Wild food plants are inexpensive, locally available and have a great socio-economic significance because of their food and medicinal values. The *Bodo* tribes of Assam have enough knowledge for using almost all the plants of the forests as the source of food or medicine and they have been using since several generations. With the change in present socio-economic conditions, some of the information has been lost and the population of this wild plant

species is also decreasing. Therefore, immediate attention is needed to protect and popularize them among the people and further research is needed for analysis of nutritional and medicinal values of these wild edible plants.

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