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## Conservation and management of ethno medicinal herbs in homeland gardens (Bari) of Assam

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### ABSTRACT

The present paper highlighted 57 anti-hepatitis ethno-medicinal herbs recorded from 18 such sample homeland gardens of Sivasagar District, Assam during 2008-2009 from 42 reliable practitioners and 245 users. During hepatitis rural communities and tribes confidently used 46(80.8%) reported species as medicinal supplements. Out of the total reported species 14(22.8%) are effective, 31(54.4%) are frequent, 26(45.6%) are occasional, 24(42.15%) are threatened, 13 (22.8%) are cultivated and 40 (71.7%) are naturally grown. 14 species are seasonally found in local markets. Homeland gardens are the chief source of the reported herbs and have agro-economic and pharmaceutical potentiality. Such traditional land used model has significant value in intreatgrated local and regional level climate and environmental management.

**Key words :** Conservation, Management, Ethno-medicinal herbs, Homeland garden, Assam

### INTRODUCTION

Homeland gardens (Bari) of Assam has played a significant role in biodiversity conservation and management. Over 500 species of native and endemic ethno-medicinal flora are found in any ideal homeland garden of communities and tribes. It may be considered as *living gene banks* of native and endemic species, managed by communities and tribes with their inherent knowledge based idea and techniques. Conservation and management of medicinal herbs has become a global concern. It's played a vital role in socio-cultural and economic life of rural masses of the region. Extension and development of Bari is an integral part of Assamese culture. Ethno-medicinal herbs have directly fulfilled the basic health care needs of the local inhabitance with providing necessary vitamins, minerals and other important phytomolecules. The scientific management of land resource is essential for sustainable agricultural development and environment preservation (Singh, 1996).

Ethno-medicines are those traditional raw therapeutic drugs and supplements, practices and uses by communities and tribes with their inherent knowledge based ideas and experiences for control and prevention of various diseases and illness of human, pet animals, cultured crops and other purposes. Such traditional medicine practices are closely associated with biotic and a-biotic components of nature

and culture. It is one of the many service systems that have emerged to facilitate fulfillment of individual as well as social goals (Fulop, 1986). It is observed that over 100 species of edible herbs are commonly found in any such ideal homeland gardens (Bari) of Sivasagar District. Other than health care an ideal homeland garden provides numbers of services such as food and drink, biological resources, eco-system services, socio-cultural and economic services to the rural people. Other than these activities, it protects the wild life, maintain soil health, balancing the carbon di-oxide ratio in atmosphere, checking soil erosions, balancing ground water table, maintain local and regional climate.

Hepatitis is an inflammatory liver disease, caused by bacteria, virus and other factors. Out of different forms of hepatitis, HB+V are serious and lead to chronic liver diseases and cancer. It is observed that 99% raw therapeutic drugs and medicinal supplements formulated by ethno-medicine practitioners for hepatitis treatment are from plant sources. As per World Health Organization report-2003, 5000 people die each year in U.S.A, due to HB+V. As per Center for Disease Control and Prevention (CDC) report-2003 that 1.25 million people in U.S.A have chronic HB+V. Indian Journal of Medical Research reported that, over 184000 people died from HBV in India in 2008. Many thousands of people died each year in the

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world for hepatitis infection. With the advancement of science and technology, the global environment is degrading in such a way that our liver is seriously threatened. Liver inflammatory diseases are common in all areas of the world, especially in the industrial areas. A vast knowledge of ethno medicinal herbs exists as vocal among the rural communities and tribes in India has been silently eroding with time for several anthropogenic causes, having significant therapeutic values. Hepatitis is confidently treating with few effective plants in India. In Indian Ayurvedic systems of medicine more than 100 native plant species are used for control and prevention of liver inflammatory diseases. Pharmaceutical industries mainly used black radish, dandelion, goldenseal, red cloves, milk thistle etc. Few herb species are confidently uses by communities and tribes for hepatitis treatment in Sivasagar District. Anti-hepatitis raw drugs have strong social reliability for its effectiveness and less adverse effect on health. Realizing the ongoing developmental trends in traditional medicines, a need based investigation is urgently necessary for revitalization of the system. In different parts of the globe, communities and tribes have eco-friendly conserved and managed the local bio-resources with their own traditional methods and techniques are directly and indirectly related to the studies. Many of the effective herbs are still unexplored, having its significant therapeutic value and pharmaceutical prospect.

The study has an interdisciplinary relevance. It will be helpful to the Developing countries for quality base nutritional supplements and anti-hepatitis herbal drugs production at low cost. Such study has great utility to the geographer, botanist, and planners of government in the realistic formulation of strategy and plan for sustainable utilization and management of ethno-medicinal plants. It can also contribute new concept in pharmacological and clinical research. An organized study of it would be certainly of great significances in the field of ethno-medicinal health care sectors of the district, in context of present medicinal plan scenario of the country.

The study area, Sivasagar District of Assam is a unique part of Upper Brahmaputra Valley Agro-Climatic Sub-Region of East Himalayan Zone (Zone-2), extends from 26°45' North to 27°15' North latitude and 94°25' East to 95°20' East Longitude (Survey of India, 2004). Temperature ranges from 8°C-38°C, average rain fall is above 260 cm and relative humidity is above 86%. Humid-monsoon climate with wet-summer and dry-winter, vast alluvial plain topography with occasionally hills, hillocks and wetlands; tropical deciduous with semi-evergreen and evergreen forest; seven reserved forest with one bird sanctuary, three major tributaries *viz.*, Dehing, Desang

and Dikhow, with eleven sub-tributaries are the significant physiographic character of the District. Rich diversity of plant species at eco-system level is another significant character. As per 2001 census, urban population of the District was 10.85% and rural population was 89.15% of total population. Density of population was 394 persons per sq. km. and literacy rate was 75.33%. Schedule cast and schedule tribe population of the district was around 7% of total population, while schedule tribe population of the district was only 3.58%. Near about 40% of the total population of the district is Tai-Ahom, followed by Kuch-Kalita, Tea-garden community, indigenous Muslim, Moran-Motak, Chutia, Nath-Yogi, Mishing, Mech-Kachari, Snowal-Kachari, Koybotra, Bengali, Barhman-Ganak, Borahi, Deowuri, Tai-Khamiyang, Kanyak-Naga, Aaow-Naga Monipuri, Nepali, Hindusthani, Garu and Arunachali. With long historical background and diverse folk culture of ethnic communities and tribes, Sivasagar District is a unique part of Assam. The present investigation was undertaken to study the anti-hepatitis ethno-medicinal herbs used by ethno-medicine practitioners and local users in the Sivasagar District of Assam and their agro-economic and pharmaceutical prospects.

A perusal of available literature reveals that ethno-medicinal knowledge on plants used and their conservation measures have been reported by Bhuyan (1932), Kanjilal, *et al.* (1934-1940), Gait (1967), Jain (1968), Sharma (1978), Fulop (1986), Myers (1991), Islam (1996), Singh (1996), Mirchandani (2002), Sarma (2006-07), Nath *et al.* (2008), Phukan *et al.* (2008), Nath and Konwar (2009) are directly and indirectly related to the study.

## MATERIALS AND METHODS

The entire study has been done on the basis of primary data, collected from 18 ideal homeland gardens of Nazira, Charaideo and Sivasagar Sub-Divisions during 2008-2009 with specially designed questionnaires cum schedule. 42 reputed practitioners (family level, village level and district level) and 245 users were interviewed directly, considering their intellectual property rights. The sample bari were selected in such a way that it represents the tribal and non-tribal. Socially reliable practitioners and experienced persons were specially considered for data/information collection. Photographs as well voucher specimens were collected along with the field tour and compared with ethno-botanical literature of (Kanjilal *et al.*, 1934-1940, Sharma, 1978 and Islam, 1996). During field work carefully observed the basic ethno-medicinal norms followed by practitioners for raw drugs formulation, side by side eco-climacteric characteristics the selected

villages along with the folk-culture and socio-economic behaviors of communities and tribes were noted down for the study. The present paper deals with the 57 ethno-medicinal herbs used, knowledge of practitioners and users with their habits, relative abundance and parts used.

## RESULTS AND DISCUSSION

Land used for biodiversity conservation and management has become a global concern. Demand of medicinal herbs has been increasing day by day in corners of the globe for its effectiveness and less adverse effect on health. Considering the ethno-medicinal herbs potentiality in the homeland gardens of Assam and their eco-friendly conservation and management techniques and ideas, it is necessary to collect the information/data for human welfare. It will be helpful for pharmaceutical industries of the country to extraction of new plant drugs for hepatitis. From the studies based on investigation in the district, 14 species has been identified as effective, the species are *viz.*, *Achyranthus aspera* L., *Alternanthera sessiles* L., *Argemone mexicana* L., *Boerhavia diffusa* L., *Drymaria cordata* Nees., *Eclipta alba* (L.) Hassk., *Euphorbia Pilulfera* L., *Hedyotis diffusa* Roxb., *Hydrocotyle asiatica* L., *Hydrocotyle sibthorpioides* Lamk, *Impatiens glandulifera* Royle., *Lindernia crustacea* (L.)F.Muell, *Oxalis corriculata* L. and *Sida rhombifolia* L. The reported species has played and important role on raw therapeutic drug doses, formulated with certain methods and techniques. It protects our liver in many ways with like boosting immune system, cleaning the blood bacteria and wash product, maintaining hormone balance, producing quick energy on demand, helping in production of bile etc. It is observed that, other than active bio-chemical components of plants some unidentified phytomolecules and factors are responsible for hepatitis remedy.

All the reliable practitioners belong to different communities and tribes of the district have well knowledge on 30-40 herbs. Every one practitioner has their own formulation methods and techniques. All the practitioners have advised to their patents for certain herbs used as medicinal recipes forms during infection and after remedy. Experienced and knowledgeable persons of communities and tribes cared their family patent with their traditional food supplement knowledge based experience. The species are collected from home land garden (Bari) and near by village forest. Such homeland garden of Assamese is the store house of quality base herbs. In case of medicinal herbs collection and medicinal recipe preparation rural women are expert. During hepatitis no one has taken

any advices from allopathic and other doctors for supplements. Urban people belongs to Assamese and non-Assamese have purchased 14 of such reported wild edible herbs from market (Table 2), having its high price per kg. From the investigation it is found that 46(80.8%) species were specially used by communities and tribes as recipe. during hepatitis. From practice experiences on HBV+ positive cases, clinical tests have done periodically and got result that it is curable within 30-90 days without any adverse effect on health. The reported edible herbs played a significant role in all forms of hepatitis.

It observed that most of the medicinal herbs are already known to the rural masses of the district, but the methods and techniques of raw drugs formulation with biotic and a-biotic components of nature is not known to all. In case of effective raw drugs practices reputed ethno-medicines have followed certain basic norms of ethno-medicine like toxic free sites selection, hormonal balance situation of plants during collection, maturity of the plant and its parts, disease free and healthy plants, knowledge and experiences on inter-mixing of plant parts and products, knowledge and experiences on disease diagnosis, standardization of raw drug doses etc. Amongst the ethno-medicinal raw drugs, anti-hepatitis drugs have strong social reliability in the District for its effectiveness.

It is found that 31(54.4%) reported herbs are frequently and 26(45.6%) are occasionally obtainable in the district. 13(22.8%) herbs are found in cultivated form and 40 (71.7%) herbs are naturally grown. 24 (42.15%) anti-hepatitis herbs are threatened in the district. The responsible anthropogenic causes for which rapid loosing of herbs in the homeland gardens of Sivasagar District are *viz.*, population pressure on land for several economic activities, changing patterns of agricultural and extension of residential land used, changing traditional food-habits and life style, less awareness on economic potentiality of medicinal herb resources, extension and development of small scale tea cultivation, pesticide and herbicidal pollution from Tea-Estates and lack of research on herbs bio-resources in the District. Considering the ethno-medicinal herbs diversity and potentiality, a need base plans is necessary for sustainable economic utilization of medicinal herbs resources in the District, through community level campaign, focusing through mass media and small scale cultivation at family level for quality best production with proper training to the rural cultivators. Moreover. state government of Assam and central government of India should take proper steps for revitalization of ethno-medicinal health care sector for human welfare. Considering different components like IPR of practitioners, traditional eco-friendly methods of cultivation, formulation

**Table 1: Enumeration of recorded anti-hepatitis ethno-medicinal herbs**

Sr. No.	Botanical name of the plant species with family	Assamese Name	Relative abundance and habitats	Parts used for traditional recipes during hepatitis	Parts used for ethno-medicinal therapeutic drug
1.	<i>Achyranthus aspera</i> L. Amaranthaceae	Ubhotkata	O,N	Not used	Whole herb with roots
2.	<i>Alternanthera sessiles</i> L. Amaranthaceae	Matikaduri	F, N	Twigs of plant	Roots, Leaves
3.	<i>Amaranthus philoxeroides</i> (Mars.) Grsep Amaranthaceae	Panikhutara	F, N	Twigs of plant	Twigs of plant
4.	<i>Amaranthus spinosus</i> L Amaranthaceae	Hatikhutara	F, N , Th	Young plant	Roots
5.	<i>Aloevera tournex</i> L. Liliaceae	Salkuwari	O ,Cu, Th	Not used	Whole Plant
6.	<i>Alpinia nigra</i> (Gaertn.) Burt. (=A.allughas. (Retz.) Rosec.) Zingiberaceae	Tora	F, N	Young plant	Young plant
7.	<i>Amaranthus viridis</i> L. Amaranthaceae	Jatikhutara	F, N and Cu	Twigs, young plant	Leaves
8.	<i>Andrographis paniculata</i> Ness. Acntheaceae	Kalmegh	O, Cu, Th	Not used	Leaves,
9.	<i>Argemone mexicana</i> L. Papaveraceae	Sial-kata	O, N , Th	Not used	Leaves
10.	<i>Bassica nigra</i> Koch. (=B.campestris L.) Brassicaceae	Kola- sorioh	F, Cu	Young plant	Not used
11.	<i>Boerhavia diffusa</i> L Nyctaginaceae	Punonowa	O, N , Th	Not used	Whole plant
12.	<i>Bromelia comosa</i> L. Bromiliaceae	Matikothal	F, Cu	Ripen fruits	Young Leaves
13.	<i>Cassia tora</i> L. Caesalpiaceae	Horu-Medelua	F, N	Leaves	Leaves
14.	<i>Chenopodium album</i> L. Chenopdiaceae	Jilmil Sag	F,N and Cu	Twigs of young plant	Not used
15.	<i>Colocasia esculenta</i> Schoot. Arceae	Kolakosu	F, N	Young Leaves	Not used
16.	<i>Commelina benghalensis</i> L. Rubiaceae	Konasimalu	F, N	Twigs	Leaves
17.	<i>Curcuma amada</i> Roxb. Zingiberaceae	Amada	O ,Th,Cu	Modified Roots	Modified Roots
18.	<i>Desmodium. latifolium</i> DC. (=D. lasiocarpum DC.) Papilionaceae	Byonisabota	F, N ,Th	Leaves	Roots, Leaves
19.	<i>Drymaria cordata</i> Nees. Convolvulaceae	Laijabori	F, N,	Whole plant	Whole plant
20.	<i>Eclipta alba</i> L .Hassk. Asteraceae	Keharaj	F, N , Th	* One or two Twigs	Roots,twigs
21.	<i>Eleusine indica</i> Gaerin Poaceae	Bobosabon	F, N	Not used	Whole plant
22.	<i>Endydra fluctuans</i> Lour Asteraceae	Helosi Sag	F, N , Th	Twigs	Not used
23.	<i>Euphorbia Pilulfera</i> L. (=E. hitra) Euphorbiaceae	Gakhiroti Bon	F, N , Th	*One or Two Twigs	Whole plant
24.	<i>Fragaria indica</i> Andr. Rosa Rosaceae	Gorukhis	F, N	Leaves	Leaves
25.	<i>Hedyotis corymbosa</i> (L.) Lamk (=Oldenlandia corymbosa L.) Rubiaceae	Bonjaluk	O , N ,Th	Whole plant	Whole plant
26.	<i>Hedyotis diffusa</i> Roxb. Rubiaceae	Bonjaluk	F , N	Whole plant	Whole plant
27.	<i>Heliotropium indicum</i> L. Heliotropiaceae	Hatisur	O , N , Th	Not used	Leaves
28.	<i>Hydrocotyle asiatica</i> L. Apiaceae	Bormanimuni	F, N	Whole plant	Whole plant
29.	<i>Hydrocotyle sibthorpioides</i> Lamk (H. roundifolia DC.) Apiaceae	Sorumanimuni	F, N	Whole plant	Whole plant
30.	<i>Houttynia cordata</i> Thunb. Saururaceae	Mosondo	O, Cu,Th	Leaves	Not used
31.	<i>Impatiens glandulifera</i> Royle. Balsaminaceae	Damdeuka	O , N , Th	* One or two Leaves	Roots
32.	<i>Leucas aspera</i> (Willd.) Spreng. Lamiaceae	Dorunbon	F, N	Young plant	Whole plant
33.	<i>Lindernia crustacea</i> (L.)F.Muell Scrophulariaceae	Kasidoria bon	O,N,Th	Leaves	Whole plant

Table 1 contd...

Contd... Table 1

34.	<i>Mimosa pudica</i> L. Mimosaceae	Lajuki Bon	F,N	Not used	Whole plant
35.	<i>Musa balbisiana</i> Colla. (= <i>M. sapientum</i> var. Pruinosa King. Ex Cowan) Musaceae	Bhim kol	F, Cu	Ripen fruits and Young plant	Youn plant
36.	<i>Musa velutina</i> Wendl. and Drude. Musaceae	Malbhug kol	O, Cu	Ripen fruits and Young plant	Youn plant
37.	<i>Neptunia oleraceae</i> Lour Mimosaceae	Pani-jaluki	O, N ,Th	Leaves	Leaves
38.	<i>Ocimum sanctum</i> L. Lamiaceae	Kola-Tulshi	F, Cu	Not used	leaves
39.	<i>Oxalis corriculata</i> L. Oxalidaceae	Sorutengashi	O, Th	Whole plant	Whole plant
40.	<i>Oxalis corymbosa</i> L. Oxalidaceae	Bortengashi	O, N ,Th	Whole plant	Whole plant
41.	<i>Physalia minima</i> L Solanaceae	Kapalphuta	O, N ,Th	Leaves	Leaves
42.	<i>Phyllanthus fraternus</i> Webster. (= <i>P. niruri</i> L.) Euphorbiaceae	Bon-amlakhi	O,N, Th	Whole plant	Whole plant
43.	<i>Plantago erosa</i> Wall Plantaginaceae	Singabon	O, N,Th	Leaves	Leaves, Roots
44.	<i>Polygonum caespitosum</i> Bl. Polygonaceae	Modhusulang sag	O, Cu,Th	Twigs	Not used
45.	<i>Portulaca oleracea</i> L. Portulacaceae	Mallbhug Sag	O,N,Th	Whole Plant	Not used
46.	<i>Pouzolzia indica</i> Gand. Urticaeaceae	Boralibokua	O, N	* one or two Twigs	Leaves
47.	<i>Raphanus sativus</i> L. Brassicaceae	Mula	F,Cu	Young Leaves	Not used
48.	<i>Rumex vesicarius</i> L (= <i>R. acetosa</i> L.) Plyonaceae	Suka-sag	O , Cu,Th	Young plant	Not used
49.	<i>Sida rhombifolia</i> L Malvaceae	Saru-sunborial	F, N	Not used	Leaves, Roots
50.	<i>Stellaria media</i> (L.) Vill. Caryophyllaceae	Morolia Sag	F, N	Whole Plant	Not used
51.	<i>Solanum nigrum</i> L. Solanaceae	Laskosi	O,N	Leaves	Not used
52.	<i>Solanum ferox</i> L. (= <i>T. Indicum</i> L.) Solanaceae	Kotahibengana	O,N	Not used	Roots,seed,
53.	<i>Sphenoclea zeylainca</i> Gaertn. W. Sphenocleaceae	Pani-leheti Sag	F, N	Leaves	Leaves
54.	<i>Spinaciaolerace</i> L. Chenopodiaceae	Mitha paleng	O, N and Cu	Whole Plant	Not used
55.	<i>Spermacoce ocymoides</i> Burn. Rubiaceae	Soru Gahori Bon	F, N , Th	Leaves	Leaves
56.	<i>Xenthium strumarium</i> L. Compositae	Agora	F, N	Young Plant	Leaves
57.	<i>Zigiber officinal</i> Rose. Zingiberaceae	Moranada	O, Cu,Th	Modified Roots	Modified Roots

(F= Frequent, O=Occasional, Th-Threatened, N and Cu- Naturally grown and cultivated -N -Naturally grown, Cu-Cultivated)

Source: Based on primary data.

**Table 2 : Market prices of few reported herbs in the District**

Sr. No.	Botanical name of the herbs	Assamese name	Approx. price/ kg. of herbs in Rs.		Seasonal availability in markets
			Sub-urban markets	Urban Markets	
1.	<i>Alpinia nigra</i> (Gaertn.) Burtt	Tora	15/-	20/-	Summer
2.	<i>Alternanthera sessiles</i> L.	Matikaduri	15/-	25/-	All season
3.	<i>Amaranthus spinosus</i> L.	Hatikhutara	25/-	40/-	Not available
4.	<i>A. viridis</i> L.	Jatikhutara	15/-	25/-	All season
5.	<i>Chenopodium album</i> L.	Jilmil Sag	15/-	25/-	Winter
6.	<i>Colocasia esculenta</i> (L)	Kolakosu	10/-	25/-	Available
7.	<i>Endydra fluctuans</i> Lour	Helosi Sag	20/-	30/-	Summer Season
8.	<i>Hedyotis corymbosa</i> (L.) Lamk	Bonjaluk	30/-	40/-	Winter
9.	<i>Hydocotyle. asiatica</i> L.	Bormanimuni	40/-	80/-	Not available,
10.	<i>H. roundifolia</i> L.	Sorumanimuni	30/-	60/-	Not available,
11.	<i>Ipomea aquitica</i> Forsk.	Kolmou	15/-	30/-	Available
12.	<i>Leucas aspera</i> (Willd.) Spreng.	Dorunbon	20/-	40/-	Available in all
13.	<i>Oxalis corriculata</i> L.	Sorutengashi	40/-	70/-	Not available,
14.	<i>O. corymbosa</i> L.	Bortengashi	40/-	70/-	Not available,

Source: Based on primary data

and administration of raw therapeutic drugs, methods of nutritional supplement used as recipes, preservation techniques and related other works, young researchers of the country should take interest on such the integrated studies for sustainable bio-resources utilization and management.

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