



## Indigenous Knowledge and Bioresource Utilization among the Tai-Khamyangs of Assam, North East India

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### Abstract

A deep-rooted indigenous bio-cultural heritage surrounding plant resource utilization forms an inseparable part in the life of the Tai-Khamyang tribe of Assam. The present paper is an effort made to explore and document some vital aspects of the plant based traditional skills and technologies related to ethnomedicine, food preparations, consumption of wild edible plants, food storage items, etc. The study was conducted through extensive personal interviews, in-depth discussions and participant observations with the traditional medical practitioners and select knowledge holders of two very old Khamyang villages viz. Cholapather and Disangpani in Sivasagar district, Assam. Further scientific research on the plant based IK can provide ample scope for further pharmaceutical studies as well as in the development of eco-friendly technologies for better livelihood.

**Keywords:** Indigenous knowledge, bioresource, ethnomedicine, *livistona jenkinsiana* griff., tai-khamyang, Assam.

### Introduction

Exploration and systematic documentation of Indigenous Knowledge (IK) of the tribal communities is regarded globally as a high priority research area. IK refers to the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area<sup>1</sup>. Such knowledge is cumulative, representing generations of experience, and trial and error experiments. IK and resource use practice has been defined as a cumulative body of knowledge and beliefs handed down through generations by cultural transmission about the relationship of living beings (including human) with one another and with their environment<sup>2</sup>. Tribal people are the ecosystem people who live in harmony with the nature and maintain a close link between man and environment<sup>3</sup>. Living a synchronized life and maintaining a constant interaction with nature has enabled them to meticulously observe, scrutinize and exploit the rich plant resources around them. As a result, they have developed culturally important indigenous technologies of utilizing the vast available plant resources and the related bio-cultural knowledge. The socio-cultural and religious activities of the tribal people are closely related to their surrounding plant resources. They depend to a great extent on the plant diversity as the main source of raw material being used traditionally as food, fodder, fuel, ethno-medicine, house construction, agricultural and household implements, utensils, handicrafts, coloring agents (dyes) and in many other areas of their material culture.

North East (NE) India comprises 8 vibrant states viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland,

Sikkim and Tripura. The region shares 4500 Kms of international border with Myanmar, Bangladesh, Bhutan, South Tibet and China. With strong ethnic and cultural ties with Southeast Asia the region forms an important physical and cultural bridge that connects the Indian subcontinent to the entire Southeast Asia. NE India represents an important part of the Indo-Myanmar biodiversity hotspot, one of the 25 global biodiversity hotspots recognized currently<sup>4</sup>. Besides its rich floristic diversity NE India is also a *living anthropological museum* as it is the abode of a large number of tribes with varied social-cultural traditions and they lead an intricate life totally dependent on the surrounding plant resources. All the tribes are a store house of a range of Indigenous Knowledge System (IKS) which are yet to be fully documented. In Assam a host of tribal people live in the plains of the Brahmaputra valley (the mighty river flowing east to west of the state) of the state. They have close association with and good knowledge about plant resources of their surroundings which form an integral part of their material and spiritual cultures.

So far a number of studies on the topic have been carried out among different tribes of NE India<sup>5-12</sup> as well as in several other parts of India<sup>13-16</sup>. The Tai-Khamyangs possess enormous ethno-botanical knowledge hand in hand with a rich cultural heritage. However, exploratory research and scientific documentation of the same among the Khamyangs has not yet been taken up. The on-going cultural and economic changes brought in by the process of globalization and modernization is slowly eroding the IKS of the people. Hence, in this backdrop, an attempt has been made in the present paper to document some aspects of IK of the Tai-Khamyangs with reference to the use of surrounding plant resources.

**The Tai-Khamyangs:** The Tai-Khamyangs or Khamjangs popularly known as Shyams are a section of the great Tai stock. 'Tai' is a generic term meaning 'the Free' or 'Free Men' that represents a great branch of the Mongoloid population of mainland Southeast Asia. It includes the Thai or Siamese (in central and southern Thailand); the Lao (in Laos and northern Thailand); the Shan (in northeast Myanmar); the Dai (in Yunnan province of China) and the Tai in Northeast India, Myanmar, Laos, northern Thailand and Vietnam. They are probably the most numerous and widely diffused indigenous population of the entire Indo-Chinese peninsula. Its members are to be found from Assam to far into the Chinese province of Kwangsi and from Bangkok to the interior of Yunnan<sup>17</sup>. Wherever they have spread, the Tai people have acquired local appellation. There are many instances of the same groups and sub-groups being named differently by different people at different places. In spite of this variation the members of this great branch, to whatever local groups they may belong, call themselves as Tai and they all share a common cultural background.

The different Tai groups of people who migrated to Assam from Southwest China and North Myanmar in the historical past are the Khamyangs, the Khamtis, the Phakes, the Turungs, the Aitons and the Ahoms. The Khamyangs migrated to Assam from North Myanmar after crossing the Patkai hills in the early 18<sup>th</sup> century AD. Today, they are a distinct scheduled tribe of Assam having their own unique culture and tradition. They are small in number with a total population of around 5000 individuals. The Khamyangs are mainly concentrated in the district of Sivasagar and scatteredly distributed in the districts of Golaghat, Jorhat and Tinsukia in upper Assam. At present, Tai language is not in use among the people. They speak Assamese and use Assamese script. But, many Tai terms are still retained in their vocabulary. Their society is divided into 9 exogamous clans (*Phan*) viz. *Thaomung*, *Chaohai*, *Chaolun*, *Chaolek*, *Tungkhang*, *Wailong*, *Pannyok*, *Phaalik*, and *Chaosong*. The Khamyangs are patrilineal, patriarchal and patrilocal. The rules of tribal endogamy and clan exogamy are followed by the Khamyangs with regard to marital alliances. However, marriage with other immigrant Tai groups' settled in Assam and with other Assamese communities is permitted and accepted by the society. The people by and large live in nuclear families. The women enjoy relatively a high position in the society. Agriculture is the main occupation of the Khamyangs. They are traditionally pile dwellers. By religion they are Buddhist of the Theravada form. *Mai-Ko-Chun-Fai*, *Poi-Sang-Ken*, *Poi-Kathin*, *Poi-Chang-Kham*, etc. are some of the important religious ceremonies of the tribe.

## Material and Methods

Two very old Tai-Khamyang villages viz. Chalapather and Disangpani in Sivasagar district (21°45'-27°15' N Latitude and 94°25'-95°25' E Longitude) of Assam were selected to carry out the study. Extensive fieldwork was carried out during 2010-2011. Several field visits were made to the study villages including overnight stay on some occasions. Standard

anthropological methods (extensive personal interview, in-depth discussion and participant observation) were used in the field to generate the required mass of data. Traditional medical practitioners and select knowledge holders (both male and female) were the key informants. Information about indigenous uses of different plant species, their vernacular names, different part/parts used, the associated cultural importance, etc. were recorded. All the enumerated plant species were identified with the help of relevant and standard literatures<sup>18-20</sup>. For each plant species their scientific name, family and local names (in Assamese) are given. The local names of some of the plant species are also provided in Tai language (denoted as T). It was the ethical duty of the authors to ensure the protection of IK of the people. Hence, the knowledge holders were informed in advance about the purpose of the present study and the safety of disclosure. Only after taking their due permission the data pertaining to this study has been processed for publication.

## Results and Discussion

The collected information's are compiled into an orderly fashion to suite the scientific requirement of the study and are presented under the following sub-headings:

**Ethnomedicine: Asthma:** Juice extracts of *Ocimum americanum* Linn. (Labiatae; *Kola Tulokhi*) and *Piper bettle* Linn. (Piperaceae; *Pan*) leaves; *Zingiber perpureum* [Zingiberaceae; *Moran ada*; *Khing-Keing* (T)] rhizome and *Syzygium aromaticum* (L.) (Leguminosae; *Laung*) clove is taken twice daily.

**Boils and Abscess:** Paste of *Solanum indicum* Linn. (Solanaceae; *Titavekuri*) and *Jatropha curcas* Linn. (Euphorbiaceae; *Bongali era*) fruit and *Clerodendrum colebrookianum* Walp. (Verbenaceae; *Nefafu*) leaves is applied over the affected area. *Zanthoxylum hamiltonianum* Wall. (Rutaceae; *Teezmoi*) root, tree bark of *Alstonia scholaris* (L) R Br. (Apocynaceae; *Chotiana*) and *Prunus domestica* Linn. (Rosaceae; *Ahom bogori*) leaves are crushed to make a paste which is applied over the affected area.

**Cough:** Crushed root bulb of *Eleusine indica* (L) Gaertn. (Gramineae; *Bobosa bon*) and tender leaves of *Ocimum sanctum* Linn. (Labiatae; *Tulokhi*) mixed with little amount of *Piper nigrum* Linn. [Piperaceae; *Jaluk*; *Me-fit-loum* (T)] seed powder and common salt are wrapped in a banana leaf and roasted in the fire and eaten. Decoction of 5-6 young leaves of *Piper chaba* Hunter. (Piperaceae; *Choi pan*), rhizome of *Zingiber officinale* [Zingiberaceae; *Ada*; *Khing* (T)] and fruits of *Piper longum* Linn. (Piperaceae; *Pipoli*) are administered till relief.

**Dysentery:** Three teaspoonful extract of tender leaves and leaves buds of *Tamarindus indica* Linn. (Leguminosae; *Teteli*) is administered for 3-4 days. Tree bark of *Punica granatum* Linn. (Lythaceae; *Dalim*), 1 dry fruit of *Aegle marmelos* Correa. (Rutaceae; *Bel*), root of *Cyperus rotundus* Linn. (Cyperaceae; *Mutha*) and small amount of dried stem of

*Polygonum strigosum* Br. (Polygonaceae; *Mowasorali*) are crushed properly and dipped in water for few minutes, filtered and taken once daily.

**Eczema:** A paste prepared from the whole plant of *Centella asiatica* (L) Urban. (Umbelliferae; *Bor manimooni*) and a few seeds of *Kyllingia brevifolia* Rottb. (Cyperaceae; *Keya bon*) is applied over the infected area.

**Fever:** Resin and crushed leaf paste of *Aloe vera* Linn. (Liliaceae; *Chalkuwari*) is applied on the forehead. Juice extract of *Exacum tetragonum* Roxb. (Gentianaceae; *Chirota*) leaves and powdered stock of *Piper longum* Linn. fruits mixed with honey or sugar is taken.

**Jaundice:** Root juice extracts of *Dracaena angustifolia* Roxb. (Liliaceae; *Jomlakhuti*) and *Adhatoda vasica* Nees. (Acanthaceae; *Tita bahak*) are mixed with a mixture of *Cajanus cajan* (Leguminosae; *Rohor dal*) and date-palm cubes that were dipped in 1 L of water overnight. The infusion is then filtered and taken orally in empty stomach for 3 times a day for 2 days.

**Piles:** A small amount of root oleo gum resin of *Ferula assafoetida* L. (Umbelliferae; *Hing*) and stem juice of *Commiphora mukul* (Hook) Engl. (Burseraceae; *Gugul*) mixed with ghee is applied in the diseased area for 6-7 days.

**Rheumatism:** Leaves of *Crataeva religiosa* (Forst) Hook. F. (Capparidaceae; *Barun goch*), *Zanthoxylum hamiltonianum* Wall. and *Croton tiglium* Linn. (Euphorbiaceae; *Konibih*) are ground to a paste, taken in a banana leaf and tied over the pain area for 2-3 hours for at least 1 week.

**Stomach ache:** Juice extract of *Oxalis corniculata* Linn. (Oxalidaceae; *Tengeshi tenga*) leaves, peel of *Mangifera indica* Linn. [Anacardiaceae; *Am*; *Mak-mong* (T)] and rhizome of *Curcuma caesia* Roxb. (Zingiberaceae; *Kola halodhi*) mixed with small amount of sugar is taken once daily. Half cup fruit extract of *Citrus aurantium* Linn. (Rutaceae; *Soleng tenga*) and rhizome of *Zingiber perpureum* mixed with one cup water is taken.

**Toothache:** Bark of *Coffea bengalensis* Roxb. (Rubiaceae; *Kothona phool*), root of *Bambusa arundinaceae* (Retz.) Willd. (Bambuseae; *Kotoha bah*) and leaves of *Cynodon dactylon* (L.) Pers. (Gramineae; *Dubori bon*) are ground to make a paste which is applied over the teeth.

**Tuberculosis:** Leaves of *Leucas aspera* (Lamiaceae; *Duron bon*), *Solanum indicum* Linn. (Solanaceae; *Tita bhekuri*) and *Ocimum americanum* Linn.; *Oldenlandia corymbosa* Linn. (Rubiaceae; *Bon jaluk*) whole plant and *Zingiber perpureum* rhizome are mixed together and ground to make a paste. From it small tablets are made and allowed to dry over the fireplace. The patient is given 1 tablet thrice a day before meal till relief. The present study documented a total of 41 medicinal plant species distributed across 25 families. These medicinal plant

species play a vital role in the primary healthcare of the Khamyangs. Leaves, roots and rhizomes, fruits, tree bark, seeds, stems, some times the whole plant, followed by leaf and root resin, and fruit peel are suitably used for different ethnomedicinal preparations. It was observed that most of the preparations include the combination of two or more plant species. It was also observed that different parts of a single species are used to cure different diseases. The different plant parts, and sometimes the whole plant is either ground or crushed to make a paste and to extract the juice as medicine. In most of the times fresh plant parts are used for the preparation of medicine. The plant products are administered raw in the form of tablets and juice when consumed internally, and as ointments or raw paste when applied externally. The methods of medicine administration are not standardized in general, but depend on the age and physical appearance of the patient, illness and diagnosis of the diseases<sup>21</sup>. Children are given small doses of medicine in comparison to adult patients, which further depend on the type of illness and treatment realized appropriate by the local medicine man. Dose regimen is determined by the type of disease and its severity.

The Tai-Khamyangs are considered as one of the most knowledgeable tribe in the field of ethnomedicine in upper Assam. Their renowned traditional herbal medicines are very much effective and both Khamyang and non-Khamyang people from far and near come to avail the services of the traditional practitioners. Their accumulated wealth of plant based ethnomedicinal knowledge along with various magico-religious beliefs and practices are mostly passed through oral tradition and some through Tai literatures from one generation to another. Some of these texts containing ethnomedicinal formula are more than 100 years old and have traveled with them at the time of their migration to Assam from Myanmar. The cultivation and sustainable extraction of the medicinal plants from their traditional homestead plantations and surrounding plant resources is an indicative of their dependence on wild plants from the experience of their age old interaction with nature.

**Use of plants in traditional food preparation:** Culturally and nutritionally rich biodiversity based traditional foods were some of the significant observations made during the field investigation. The traditional glutinous rice (*Oryza glutinosa* Lour.; Poaceae) belonging to the *Oryza sativa japonica* variety, called as *Bora* in Assamese and *Khao-Niao* in Tai language has a special preference among the Khamyangs. In Tai language *Khao* means rice and *Niao* means sticky. In English it is known as the sticky rice, waxy rice, sweet rice or pearl rice. A variety of traditional food items prepared from *Khao-Niao* rice like - *Khao-Nong* or *Tupula bhat* (steamed rice balls) nicely warped in freshly collected broad plantain leaves (*Pyrrnium pubinerve* Bl.; Marantaceae) called as *Tong-Sing* and *Kou pat* in Tai and Assamese respectively; *Khao-lam* or *Sunga chaul* (rice cooked in immature bamboo tube); *Ton-Tep-Pitha* / *Peng-Sot* (rice cake) steamed in triangular shaped packets made from banana leaves (*Tong-Kui-T*) or from *Tora* (*Alpinia nigra* Gaerth. Burt.);

Zingiberaceae) leaves; etc. are very popular among the Tai-Khamyangs. The *Kou* leaf used to wrap the steam rice balls retains some of its heat besides making it convenient for the farmer to carry it to the agricultural fields.

A good number of wild edible plants are consumed daily which play a major role in meeting the nutritional requirements of the people. A list of some of the traditional wild plants taken by the Khamyangs in their daily diet is presented in table-1. In addition, the wild edible plants possess important medicinal properties which the people are well aware of. Some of the wild edible plants which are used frequently and can easily propagate are found to be grown in the homestead plantations and kitchen gardens by the Khamyangs. This has evidently led to the domestication of some of these important plant species and has been a significant indigenous technical knowledge of preserving the plant genetic resource. Such essential practice reflects the wisdom of the traditional culture and the ecological knowledge that have evolved over the years.

Fermented bamboo shoot called as *Nou-Heib* in Tai is an esteemed and indispensable traditional food item of the Khamyangs. The fermentation process is carried out in the months of June-August when tender bamboo shoots sprouts. Succulent bamboo shoots of local species - *Bambusa balcooa* Roxb. (*Bhaluka Bah*), *Dendrocalamus hamiltonii* Ness. & Arn. (*Kako Bah*), *Bambusa jaintiana* (*Bijuli Bah*) and *Bambusa tulda* Roxb. (*Jati Bah*) are mostly used to produce fermented bamboo shoot. These species of bamboos are widely available in the homestead plantations of the people of the study villages. *Nou-Heib* is mainly consumed as a side dish to enhance taste and provide flavour to the meal. It is eaten as a pickle; also dried and eaten as cooked vegetable. Bamboo shoot mixed with pork meat or dry fish is a favorite delicacy of the people.

The fermentation process begins by removing the outer leaf sheaths of the young shoots, washed thoroughly with water and cleaned. The shoots are then sliced into small pieces and pressed into a bamboo tube. The mouth of the tube is closed by stuffing banana leaves and sealed by tying up the rim of the tube with thin bamboo strips. The mouth is sealed to prevent any accidental seepage of water into the tube, which would turn the shoots black, making the final product unfit for eating. The bamboo tube is then stored for a period of about 1-2 weeks under natural anaerobic conditions i.e. fermentation. Completion of fermentation is indicated by the typical aroma and acidic taste. Consumption of bamboo shoots has profound health benefits. The shoots are free from residual toxicity and grow without the application of fertilizers. The juvenile shoots are not only delicious but are rich in nutrient components, mainly proteins, carbohydrates, minerals and fiber and are low in fat and sugars. In addition, they contain phytosterols and a high amount of fiber that can be labeled as nutraceuticals or natural medicines<sup>22</sup>.

**Indigenous food storage technology:** Apart from food, bamboo is also used as an indigenous eco-friendly storage container of

food items. For example, the rice grains after threshing are stored in big bamboo baskets called as *Duli*, which are 4-5 feet high, tightly plastered inside and outside with clay to thwart off insects, fungus and rats. The traditionally prepared *Pa-Soum* (fermented sour fish), *Noe-Soum* (fermented sour meat), *Pa-Nou / Hukoti* (dry crushed fish powder), etc. are stored in bamboo tubes (normally in *Dendrocalamus hamiltonii* Ness. & Arn.) and kept on the bamboo made hanging platforms called as *Dhuwa Chang / Khing* over the traditional hearth. Likewise, *Payang* (smoked fish) and *Noe-Hen* (smoked meat) are kept on bamboo trays (*Nung*) over the fireplace for dehydration. Traditionally, *Nou-Heib* (fermented bamboo shoot) is stored in bamboo tubes and kept in bamboo made baskets called as *Hura / Chok*. Easy availability and the intrinsic relationship of ecosystem and food habits are the prime reasons for using plant based storage technology.

**Multiple uses of *Livistona jenkinsiana* Griff:** *Livistona jenkinsiana* Griff (Arecaceae; *Tokou*) grow naturally in the forest and also cultivated in the homestead plantations of the people. After proper sun drying the leaves are widely used as an eco-friendly roofing material for the traditional houses. Such roofs last for at least 4-5 years. In addition, *Tokou* leaves are also used for constructing the roofs of the cow shed, and sheds for housing other domestic animals and birds like pigs, goats, chicken, ducks, etc. The traditional headgear (*Kup*) made from *Tokou* leaves and bamboo strips is the most indispensable item of the cultivators and open air workers. To make it, first of all, split bamboo strips of required sizes are woven in open hexagonal design into a circular disc with a dome in the centre for the head to fit in. Then, previously dried *Tokou* leaves cut into required sizes and number are put in between two such discs and finally sewed securely with yarn and fine strands of cane. A *Kup* is more advantageous because the cultivator after putting it on can tie the strings around his chin leaving his hands free to work in any position-standing, squatting or stooping. Broad sized *Tokou* leaves serves as a mat upon which meat and fish are placed and cut. The dried seeds are hard and sweet in taste, and sometimes eaten like areca nut.

## Conclusion

It is evident from the foregoing discussion that a deep-rooted indigenous bio-cultural heritage surrounding plant resource utilization forms an inseparable part in the life of the Tai-Khamyangs. The indigenous knowledge holders and the people of the micro-field collect the different medicinal, edible and economic plant species from the surrounding plant resources viz. the *Chola* Reserve forest, patches of small forested lands located in the periphery of the village and some species that are grown in their large traditional homestead plantations. The Khamyangs have high esteem for their surrounding plant resources. The exploitation and extraction of the plants from the natural environment is solely based on ethnomedical and other day-to-day needs. This selective and limited use of natural resource provides enough breathing space to the plant species to

grow and propagate. This nature based IK has been responsible for maintaining the man-nature equilibrium and has permitted its holders to use the resources sustainably. Moreover, this is an important example of the people's IK of sustainable natural resource management and biodiversity conservation.

Nevertheless, over the past few years there has been some erosion in the IK base of the people due to reasons such as rapid socio-economic and cultural changes; pressure of modernization and urbanization; unwillingness of the younger generation to learn the IK from the elders; depleting forest and other surrounding natural plant resources; etc. If the present trend prevails, there is every possibility that several important components of the valuable ethno-botanical knowledge of the Khamyangs would be lost forever. Hence, there is an urgent need for in-depth scientific studies and proper documentation of the IKS. At the same time it is very much essential to educate and spread awareness among the people about the medicinal and economic values of the important plant species and encourage the cultivation of the same at a large scale. Further research on the medicinal plants mentioned in this study might provide some potential leads to the discovery of new drugs to fight diseases. In addition, scientific evaluation of the wild edible plants consumed as vegetables with high nutritional and medicinal values may also bring out very promising results to the ongoing food security programmes. Here, similar studies carried out on *Ocimum sanctum*, *Punica granatum* and on a few wild edible plant species are worth mentioning<sup>23-25</sup>.

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## References

1. Grenier L., Working with Indigenous Knowledge - A Guide for Researchers, IDRC, Ottawa (1998)
2. Gadgil M., Berkes F. and Folke C., Indigenous knowledge for Biodiversity Conservation, *AMBIO*, **22(2-3)**, 151-156 (1993)
3. Sharma J., Gairola S., Gaur R.D. and Painuli R.M., Medicinal plants used for primary healthcare by Tharu tribe of Udham Singh Nagar, Uttarakhand, India, *Int. J. Medic. Arom. Plants*, **1(3)**, 228-233 (2011)
4. Myers N., Mittermeier R.A., Mittermeier C.G., da Fonseca G.A.B. and Kent J., Biodiversity hotspots for conservation priorities, *Nature*, **403**, 853-858 (2001)
5. Kalita D. and Beb B., Some folk medicines used by the Sonowal Kachari tribe of the Brahmaputra valley, Assam, India, *Nat. Prod. Radiance*, **3(4)**, 244-245 (2004)
6. Bhardwaj S. and Gakhar S.K., Ethnomedicinal plants used by the tribals of Mizoram to cure cuts and wounds, *Ind. J. Trad. Knowl.*, **4(1)**, 75 (2005)
7. Singh R.K., Singh A., Tag H. and Adi community, Traditional skill among the Adi tribes of Arunachal Pradesh, *Ind. J. Trad. Knowl.*, **7(1)**, 27-36 (2008)
8. Barua I., Conservation and Management of Community and Natural Resources: A Case Study from North East India, *Stud. Tribes and Tribals*, **7(1)**, 39-46 (2009)
9. Jaiswal V., Culture and ethnobotany of Jaintia tribal community of Meghalaya, Northeast India – A mini review, *Ind. J. Trad. Knowl.*, **9(1)**, 38-44 (2010)
10. Jamir N.S., Takatemjen and Limasemba, Traditional knowledge of the Lotha-Naga tribes in Wokha district, Nagaland, *Ind. J. Trad. Knowl.*, **9(1)**, 45-48 (2010)
11. Saikia B., Borthakur S.K. and Saikia N., Medico-ethnobotany of Bodo tribals in Gohpur of Sonitpur district, Assam, *Ind. J. Trad. Knowl.*, **9(1)**, 52-54 (2010)
12. Pal S. and Palit D., Traditional Knowledge and Bioresource utilization among Lepcha in North Sikkim, *NeBIO*, **2(1)**, 13-17 (2011)
13. Sainkhediya J. and Aske D.K., Ethnomedicinal plants used by tribal communities for the treatment of Snake bite in west Nimar, M.P, India, *ISCA J. Biological Sci.*, **1(2)**, 77-79 (2012)
14. Sharma A., Dangwal L.R. and Dangwal M., Dye Yielding Plants of the Garhwal Himalaya, India: A Case Study, *ISCA J. Biological Sci.*, **1(4)**, 69-72 (2012)
15. Patil H.M., Ethno botanical Notes on Satpura Hills of Nandurbar District, Maharashtra, India, *Res. J. Recent. Sci.*, **1(ISC-2011)**, 326-328 (2012)
16. Patil S.J. and Patil H.M., Ethno medicinal Herbal Recipes from Satpura Hill Ranges of Shirpur Tahsil, Dhule, Maharashtra, India, *Res. J. Recent. Sci.*, **1(ISC- 2011)**, 333-336 (2012)
17. Grierson G.A., Linguistic Survey of India, Motilal Banarsidas, Delhi, **Vol. II**, 95 (1966)
18. Dutta A.C., Dictionary of Economic and Medicinal plants, Khelmati, Jorhat, Assam, (1985)
19. Gupta A.K. and Sharma, M. (eds.), Reviews on Indian Medicinal Plants, Medicinal Plant Unit, ICMR, New Delhi, **Vol. V** (2007)
20. Gupta A.K. and Sharma, M. (eds.), Reviews on Indian Medicinal Plants, Medicinal Plant Unit, ICMR, New Delhi, **Vol. VI** (2008)
21. Addis G., Abebe D. and Urga K., A survey of traditional medicine in Shirka District, Arsi Zone, Ethiopia, *Ethiopian Pharma. J.*, **19**, 30-47 (2001)

22. Chongtham N., Bisht M.S. and Haorongbam S., Nutritional Properties of Bamboo Shoots: Potential and Prospects for Utilization as a Health Food, *Comprehensive Rev. in Food Sci. and Food Safety*, **10**, 159-169 (2011)
23. Hegde C.R., Madhuri M., Swaroop T., Nishitha D.A., Bhattacharya S. and Rohit K.C., Evaluation of Antimicrobial properties, phytochemical contents and antioxidant capacities of leaf extracts of *Punica grantum* L., *ISCA J. Biological Sci.*, **1(2)**, 32–37 (2012)
24. Shukla K., Comparative study of *Withania somnifera* and *Ocimum sanctum* for Anthelmintic Activity, *ISCA J. Biological Sci.*, **1(1)**, 74-76 (2012)
25. Pepsi A., Ben C.P. and Jeeva S., Phytochemical Analysis of Four Traditionally Important Aquatic Species, *ISCA J. Biological Sci.*, **1(5)**, 66-69 (2012)

**Table-1**  
**Some traditionally consumed wild edible plants by the Tai-Khamyangs**

Sl. No.	Botanical Name and Family	Local Name (A-Assamese; T-Tai)	Parts Used
1	<i>Amaranthus viridis</i> Linn. [Amaranthaceae]	Khutura (A) Pa-lum (T)	Young leaves are cooked by steaming and taken as vegetable
2	<i>Bischofia javanica</i> Blume. [Euphorbiaceae]	Urium / Khumpatt (A)	Juice extract from young leaves and shoots is added in <i>Pa-Sa</i> , a characteristic fish and vegetable soup preparation of the Khamyangs. The juice extract gives a tint of greenish color to the soup
3	<i>Calamus tenuis</i> Roxb. [Palmae]	Jati Bet (A)	Soft inner flesh of the young stems are cooked or fire roasted and eaten
4	<i>Cassia sophera</i> Linn. [Leguminosae]	Medeluwa pat (A) Palammoun (T)	Young leaves taken as vegetable
5	<i>Centella asiatica</i> (L.) Urban [Apiaceae]	Mani-muni (A) Panang (T)	Leaves and young shoots are eaten as vegetable
6	<i>Clerodendrum colebrookianum</i> Walp. [Verbenaceae]	Nephafu (A) Pa-ta-khai (T)	Tender leaves cooked and taken after boiling or steaming
7	<i>Colocasia esculenta</i> (L.) Schott [Araceae]	Kosu sak (A) Phak-mon (T)	Tender leaves and tubers are eaten as vegetable
8	<i>Diplazium asperum</i> Bl. [Woodsiaceae]	Dhekia (A) Pa-kut (T)	Tender fronds are eaten as cooked vegetable
9	<i>Eryngium foetidum</i> Linn. [Apiaceae]	Mann dhonia (A)	A aromatic herb, the leaves have attractive flavour and taste and are used as condiments in various curries
10	<i>Gnetum gnemon</i> Linn. [Gnetaceae]	Bhoja pat (A)	Tender leaves are cooked and taken as vegetable. Also, its fatty edible seeds are roasted and taken
11	<i>Lasia spinosa</i> (L.) Thaw. [Araceae]	Chengmora (A)	Flower spadix, peeled leaf stalk and young leaves are taken as vegetable
12	<i>Momordica charantia</i> Linn. [Cucurbitaceae]	Tita Kerala (A) Ma-khai-khum (T)	Fruits are boiled and taken as vegetable
13	<i>Polygonum chinense</i> Linn. [Polygonaceae]	Modhusoleng (A) Khunpeinsun (T)	Young leaves are taken as vegetable
14	<i>Solanum indicum</i> Linn. [Solanaceae]	Tita bekuri (A) Ma-heng-khum (T)	Young fruits are boiled and taken as vegetable
15	<i>Solanum torvum</i> Sw. [Solanaceae]	Hati bhekuri (A)	Young fruits are boiled and taken as vegetable
16	<i>Zanthoxylum nitidum</i> (Roxb.) DC. [Rutaceae]	Teezmoi (A)	Young leaves are cooked and taken as vegetable
17	<i>Zanthoxylum oxyphyllum</i> Edgw. [Rutaceae]	Mezenga (A)	Tender leaves and shoots are cooked and taken as vegetable
18	–	Po-phoihom (T)	A type of indigenous aromatic herb. Leaves are widely used as condiments in various curries