

Indigenous Fermented Food Habits of Manipur and Nagaland

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Abstract—One of the oldest and most economical methods of food production and preservation is the method of fermentation. Fermented food items are associated with a unique group of micro-organisms which play a role in increasing the levels of proteins, vitamins and dietary fibers. Fermentation of food is done in order to ensure food safety & ultimately enhancing its nutritional quality, flavor and aroma which helps in good digestion. Traditional knowledge of preparing nutritionally rich fermented food items and beverages exist among the different communities of Manipur and Nagaland which has been passed on from one generation to the next generation. Few of the common fermented food delicacy treats of the Nagas are fermented til (sesame) seed and crab, fermented bamboo shoot, aakhone, dried fermented mustard leaf (Ngüghü), fermented fish, fermented animal fats. The most prominent fermented food items of Manipur are fermented soybean (Hawaijar), fermented bamboo-shoot (Soibum/Sojjim/Soidon), fermented fish products like Ngari and Hentak, mustard leaf extracts (Ziang Sang and Ziang Dui), fermented beverages like Atingba and wine from fermentation of natural fruits.

A survey was carried out taking into account North East based food junctions in North and South Delhi, to document the major North Eastern dishes preferred and also ingredients used in those dishes. According to the information collected, Pork with fermented bamboo shoot happens to be the most sought after dish among the northeastern customers at the different joints. Pork with fermented Soybean (Axone) was also one of the most preferred dishes. Iromba is another dish very popular amongst the customers. It is a chutney preparation consisting of mashed potatoes, vegetables, fermented fish (Ngari), king chili and very often fermented bamboo shoot is added. The survey also suggested that most of the customers

(80-85%) are people from North East India residing in Delhi while people from other states are seen in less numbers. The main reason quoted by the owners is, lack of awareness about the dishes, the ingredients used in the dishes and health benefits of the dishes. All these fermented food items are economical and at the same time packed with a plethora of nutrients. Therefore, this paper aims to uplift awareness about the benefits of native fermented food items of Manipur and Nagaland and increase their consumption in other parts of the country and the world.

Keywords: North East India, Nagaland, Manipur, Fermentation, Food junctions.

1. FERMENTATION

One of the oldest and most economical methods of food production and preservation is the method of fermentation. Fermented food not only enhances flavor, but also increases digestibility, improves the nutritional and pharmacological values of the food items. One of the major problems of the third world countries is deficiency of protein [7] and vitamin. Fermented food items are associated with a unique group of micro-organisms which play a role in increasing the levels of proteins and vitamins. Therefore there is an increase in the importance of fermented food as a basic diet around the world.

2. THE STATE OF NAGALAND

The State of Nagaland was formally granted statehood on 1st of December, 1963, as the sixteenth State of the Indian Union. It shares international boundary with Myanmar (Burma) on the east, and it is bounded by

Assam in the West, Arunachal Pradesh and part of Assam on the North and Manipur in the South. The State comprises of seven Administrative Districts, 16 major tribes along with other sub-tribes inhabit the state of Nagaland. Every tribe is different from the other in terms of traditions, dialect and dress. The people of this state belong to one of the Mongolian racial groups whose ancestors lived off nature's bounteous endowments and the general population here is pleasant and greatly friendly.

Agriculture has generally been and keeps on being the pillar of Naga life. The various celebrations are fixated on farming and have their underlying foundations in cultivation practices. Seventy-three percent of the general population in Nagaland is occupied with farming. Rice is the staple food.

The Nagas have no prejudice against any sort of sustenance and they are essentially rice and meat eaters. One mainstream drink that is normal among all the Naga tribes is the indigenous rice beer considered as nutritious. It was customarily served amid celebrations and festivals. Other than this, bamboo shoot and fermented soybeans are additionally common delicacy treats of the Nagas.

2.1 Few of the most common fermented food items of Nagaland

2.1.1 Fermented Til (sesame) seed and crab: This indigenous food item is predominantly used among the Rengma community of Nagaland. As describe by Mao & Odyuo (2007), this food item is prepared by cleaning the til seeds (*Sesamum orientale* L.) and pounding the seeds into paste. Then, crabs are added to the paste in a proportionate quantity and pound again. After the food item is crushed properly it is kept in a container for 2 days in summer for fermentation and it takes more than 2 days in winter. Once the paste is properly fermented it is wrapped properly in banana, *Macaranga indica* or *Phrynium pubinerve* leaves and placed over the fire to dry or it is buried in the furnace under ash for some time. It can be used in the preparation of chutni/pickle.

2.1.2 Fermented bamboo shoot: The fermented bamboo shoot is an indigenously prepared food item, popular mainly among the people of Nagaland, Manipur, Arunachal Pradesh and Meghalaya. It is utilize as a taste-maker in the preparation of various food recipes. It is also believed among the indigenous community that

when fermented bamboo shoot is cook with other food items it neutralizes toxin present in any food item. The fermented bamboo shoot is usually prepared in the months of May and June when new shoots are formed [12]. Tender young shoots of bamboo are harvested and sliced/crushed to smaller pieces and kept for 30-35 days in airtight containers. The fermented bamboo shoot doesn't require any preservative and it can be stored for a very long period of time. This practice is followed by all the people of Nagaland and Meghalaya for about 100 years.

2.1.3 Aakhone: Aakhone also known as axone, is an indigenously prepared fermented sticky soybean food. It is popular among the Sema tribe of Nagaland. Akhone is used while cooking pork and other food items or it could be served as a side dish with rice.

For the preparation of Akhone, soybean seeds are soaked in water and cooked. After which it is wrapped with banana leaves, *Macaranga indica* Wight (Euphorbiaceae) or *Phrynium pubinerve* Blume (Marantaceae) and placed above the fireplace for 5-7 days [13][12]. The fermented aakhone can last for atleast 1 week. The fresh Aakhone can be molded and made into cakes and dried above the fireplace.

2.1.4 Dried fermented mustard leaf (Ngüghü): Ngüghü is used as a taste maker in the preparation of many delicacies. It is usually prepared during summer season. It is prepared by digging a pit of about 2-3 feet deep and 2-3 feet wide. Then the dug pit is covered with either athama or amejan leaves (local names) or plastic at the bottom and on the sides. The washed mustard leaves are dried under the sun for some time to reduce the moisture and then, placed the mustard leaves in the pit. The pit is covered at the top with either of the two leaves or plastic. Then, it is covered with earth making it airtight and raised from the surroundings to avoid water lodging. It takes about 3 weeks for the mustard leaves to get fermented, after which they are removed from the pit and dried under the sun.

2.1.5 Fermented Fish: It is prominent among the Lotha tribe. For the preparation of fermented fish, small fishes are washed and stuff inside a bamboo and plugged tightly with leaves and kept over the fireplace for fermentation. It takes just few days to get fermented. Ones fermented it can be used for at least a month.

2.1.6 Fermented animal fats: Fermented animal fat is prepared in a similar way like the preparation of fermented fish. It is used in the preparation of vegetables to soften and add flavor.

3. THE STATE OF MANIPUR

Manipur nestle within a rich green corner of North East India. Manipur covers an area of 22,327 km² and a population of 27, 21,756. Lying at an altitude of 790m above sea level, between 23.83° and 25.68 ° north latitudes and 93.03° and 94.78° east longitudes it appears to be much similar to a perfect masterpiece executed by eminent hands of Nature. The magnificence of which once inspired Mrs. St. Clair Grimwood to portray it as "A Pretty Place more excellent than numerous show spots of the world" Late Pandit Jawaharlal Nehru paid a fitting tribute by depicting it as "jewel of India".

3.1 Fermented food items of Manipur

Similar to Nagaland, in the state of Manipur, there are different types of traditionally fermented food items. Few of the most prominent fermented food items of Manipur are fermented soybean (Hawaijar), fermented bamboo-shoot (Soibum/Soijim/Soidon), fermented fish products like Ngari and Hentak, fermented mustard leaf extracts (Ziang Sang and Ziang Dui), fermented beverages like atingba and wine from fermented natural fruit [7].

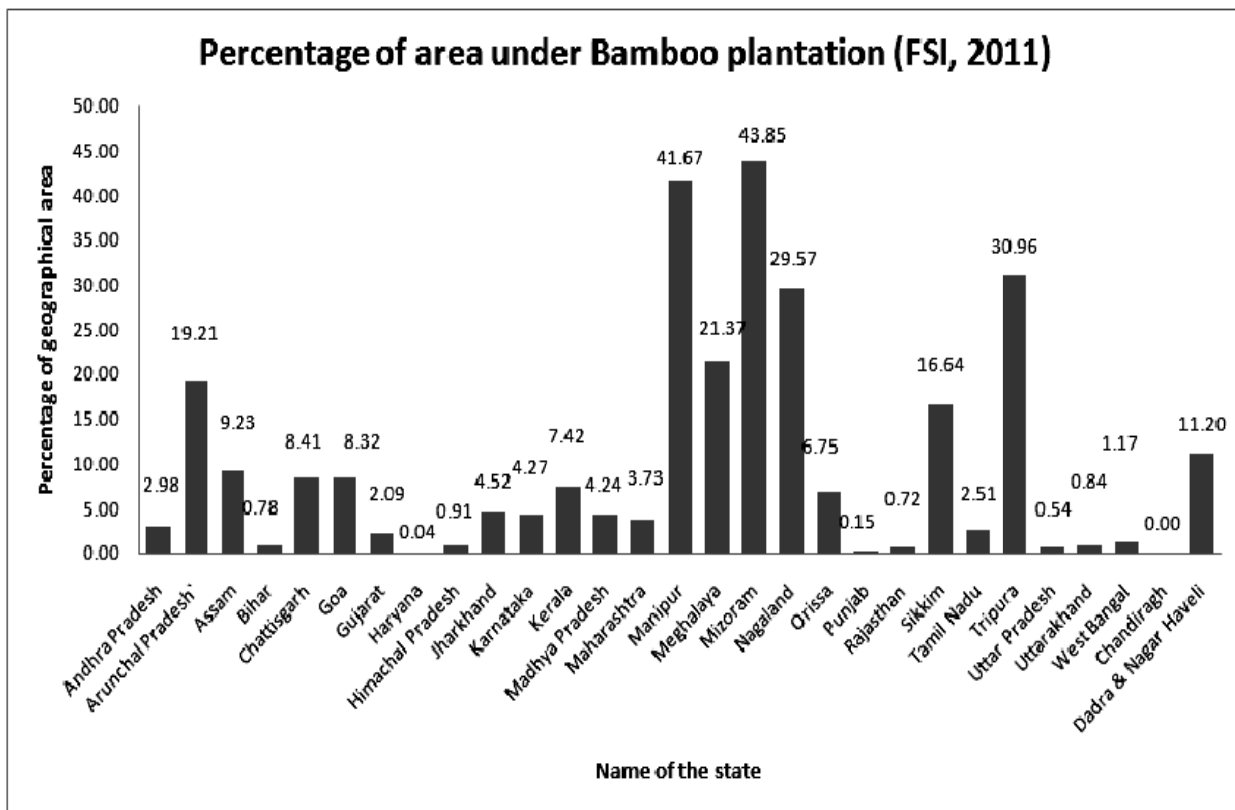
3.1.1 Fermented Soyabean or Hawaijar: Hawaijar is an indigenously prepared traditional fermented soyabean. It is consumed commonly in the local diet as a low cost source of high protein food and plays an economical, social and cultural role in Manipur. For commercial purposes there is an effort to promote hawaijar. The cooked soybean is placed in a bamboo basket after draining off the water portion. The greasy portion is washed with lukewarm water till it becomes non-greasy. The drained water is believed to help in curing tuberculosis [2]. The beans are then packed tightly in a small bamboo basket and covered with a thick layer of *Ficus hispida* leaves, locally known as Assee heibong or we can also use banana leaves [2]. The fermented soyabean, i.e. hawaijar is ready in 3 days during summer and during winter it takes 5 days or more. Hawaijar can be eaten as it is with salt and chilli or cooked with other food ingredients. The traditional hawaijar is characterised by Amonia odour and mucilage fiber production, which is an indication of good quality of hawaijar [7].

3.1.2 Fermented fish or Ngari: Ngari is used as an ingredient in different cuisines regularly, in the daily meal of manipuries - in Singju, iromba, morok metpa. It is not only used in Manipur but also popular in other north eastern states and even Myanmar. In the preparation of ngari, a typical sun dried small type of fish locally called as **phabou** (*Puntius sophore*) is used [3][7]. The *phabou* is washed and the head and bones are crushed with hammer. The *phabou* is then press with leg and packed tightly in an earthen pot (internally layered with mustard oil). The container is sealed air tight and fish scales, oily slurry mud, cow dung or sand is placed on the top to put pressure and left to ferment for about 3 to 6 months.

3.1.3 Hentak: The Manipuries had used *hentak* before the existence of *ngari* [3]. According to Jeyaram et al. (2009) equal weights of the sun dried crushed *Esomus danricus* fish powder and small cut pieces of *Alocasia* petiole are crushed together to form a paste. They are prepared into small balls and stuff into earthen pots. Then it is left to incubate for 7 days with lose lits at room temperature.

3.1.4 Bamboo based products: Around ten per cent (spread over 27,598 sq km) of the total geographic area of the eight North Eastern Indian states is covered with bamboo, which accounts for 24.29 per cent of the total bamboo coverage of the country.

The percentile clearly depicts that States like Manipur, Meghalaya, Nagaland and Tripura have maximum geographic cover of Bamboo because of the favorable conditions for growth. North eastern states are also rich in diversity of Bamboo. Out of 125 species of Bamboo 60 Species belong to North Eastern states. Being available in large quantities in the region, they are quite affordable.



Source: Kumar, R.S., & Kamalobhavan, B. (2014).

Figur 1: Distribution of Bamboo resources in different states of India

In Manipur, bamboo forest covers an area of around 3218Km² [3]. Abundance availability of bamboo has benefitted the local people in many ways. Young and tender bamboo shoots are fermented for consumption namely: **Soibum**, **Soijim** and **Soidon**.

3.1.4.1 Soibum: Tender bamboo shoots are collected from succulent bamboo shoot sprout (*Dendrocalamus hamiltonii*, *Melocana bambusoide*, *Bambusa balcoa*) and cleaned by removing the outer sheaths [5]. There are mainly 2 ways for the preparation of fermented bamboo shoot namely **Noney/Kwatha** type and **Andro** type. In **Noney/Kwatha** type the thin slices of succulent shoots are stuff tightly inside a bamboo (with an inner lining of forest leaves or polythene sheet). For draining the acidic fermented juice the bottom of the bamboo chamber is perforated. It is then covered air tight with polythene sheets and left for 6-12 months. It is also prepared inside a pit wherein a basket made of bamboo is placed in a pit and *Colocasia* leaves are place around the inside of the pit [7] and the pit is covered airtight. In the **Andro** type, sliced bamboo shoots are put in an

earthen pot and allowed to ferment. When the fermentation takes place the volume of the bamboo slices decrease, so new bamboo shoot slices are added. This continues till the pot is filled and left for 6-12 months. In this case the juice of the fermented shoots is not allowed to escape. The immature stage of soibum is known as **Soijim**.

3.1.4.2 Soidon: In the preparation of soidon unwanted portions of succulent tender *Teinostachyun wightii* (Nath) apical meristem are removed and cut into pieces. Then they are put in earthen pots or plastic containers. Milky fermented liquid of the previous batch is used as starter for the process of fermentation for a new batch. In an open plastic submerge fermentation it is prolonged up to 5 days with intermittent stirring. Addition of *Garcinia pendunculata* (local name: Heibung) improves the quality and the addition of rice water (Chenghi) improves the colour [7].

3.1.5 Fermented leafy vegetables (Ziang Dui and Ziang Sang): This fermented leafy vegetable can be stored for a long period of time as reserved food. Using

a wooden chamber, *Brassica* leaves (Hangam) are crushed and left for semisolid fermentation for 2-3 days. The juice of the fermented leaves is extracted by squeezing with hand and concentrated by boiling. The juice extract is known as Ziang Dui and the concentrated paste is known as Ziang Sang.

3.1.6 Atingba (rice beer beverage): In the preparation of **Atingba**, rice is cooked and spread on a tray. **Hamei/yeast** (Chamri in tangkhul tribe) is mixed with the cooked rice properly and transferred in a vessel. Then just to dip it, a little amount of water is poured and cover with a muslin cloth. The submerge fermentation is left for 2-3 days [7]. The fermented beverage is known as **Atingba** and the distilled liquor using traditional methods is known as **Yu**. Other kinds of alcoholic beverage are prepared from fruits and it is commonly consumed by the Naga tribes of Manipur. These fruit wines are prepared by fermenting the fruits in closed containers with little amount of sugar and water. It is ready to be consumed in 2-3 days.

4. HEALTH BENEFITS OF SOME OF THE FERMENTED FOOD PRODUCTS MENTION ABOVE

4.1 Health benefits of fermented bamboo shoot

Fermentation is one of the healthiest ways to increase the shelf life of bamboo shoots with the help of beneficial microflora, decreases the level of toxin, making it more palatable and easy to store and handle. Bamboo shoots have high content of amino acids, proteins, carbohydrates, minerals, fibres, and low fat. It is believed to be beneficial in hormonal balance, reducing cholesterol and fat levels, increasing bowel movement, anti-cancerous, etc., [12].

4.2 Health benefits of fermented soybean products

Fermented soybeans besides being a good source of proteins are rich in isoflavonoids, peptides, etc. Consumption of fermented soybean helps in reducing cholesterol, it slows down the progression in atherosclerosis, enhances overall intestinal and digestive tract health. Helps to reduce inflammation and lubricates joints associated to arthritis due to production of *hyaluronic* acid on fermentation. Intake of fermented soybeans increases bone strength, improves the functioning of the heart. Fermented soybeans are easier to digest as compare to unfermented soybeans. It is also reported to be anti-cancerous, anti-osteoporosis and hypocholesterolemic [7].

4.3 Health benefits of fermented rice beer:

Fermented rice beer has high content of bioactive compounds such as *maltotetrose*, *maltotriose*, and *maltose*, and this bioactive compounds have low calorie content, and inhibit the growth of microorganisms pathogenic to the intestine [4].

4.4. Health benefits of fermented fish

Ngari has high nutritional value which is rich in protein, vitamins, and essential amino acids [16]. In a study by Majumdar et al. (2012) it was found that Ngari and Hentak have high nutritional value with respect to necessary fatty acids and antioxidative potential. Ngari contains many beneficial microorganisms of *Bacillus* sp., *Micrococcus* sp., and *Staphylococcus* sp. with antimicrobial properties against harmful or food borne pathogens [10] [14].

Table 1: Survey conducted in Delhi

Name of the food outlet	Location	Cuisines	Preferred Dishes	Customers
Bamboo Hut	Outram Lines, Kingsway Camp	Casual Dining - Naga	<ul style="list-style-type: none"> Pork Thali Pork with Fermented Bamboo shoot Pork with Axone 	90% North East 10% From other states
Naga Sports Meet	Kirori Mal College, Delhi University	Stalls with Pork Sausages, Shingju, Bora	<ul style="list-style-type: none"> Pork Sausage Shingju (Ngairi an integral component) 	100% North East
Kaziranga Pakghar	Kingsway Camp Road	Assamese Food	<ul style="list-style-type: none"> Bamboo Shoot and Pork, Fish (Rohu) 	80% from North East 20% Other from states
One- Organic North East	Delhi Haat, INA	Ingredient shop and restaurant	<ul style="list-style-type: none"> Pork Thali Fish (Rohu, Basa) Pickles 	60% from other states 40% from north east
Manipur Tourism	Delhi Haat, INA	Manipuri	<ul style="list-style-type: none"> Pork Thali Eromba (with bamboo shoot) - Ngairi an integral component of Eromba 	50% from other states, 50% from north east
Nagaland Tourism	Delhi Haat, INA	Naga food	<ul style="list-style-type: none"> Pork Fermented Soyabean & Bamboo shoots are added in pork curry 	80% from north east and 20% from other states
Hornbill	Safdarjung	Naga food	<ul style="list-style-type: none"> Pork, chicken and fish Smoked pork with bamboo shoot 	50% from other states, 50% from north east
The Categorical Eat Pham	Safdarjung	Manipuri food	<ul style="list-style-type: none"> Smoked Pork curry with fermented soyabean Yam curry with fermented soya bean Eromba (Ngairi an integral component) Rice beer (zutho) 	90% from north east and 10% from other states
Nagaland Tourism branch 2	Delhi Haat, INA	Naga food	<ul style="list-style-type: none"> Pork Thali Pork with added bamboo shoots or king chilli 	60% from other states, 40% from north east

Bamboo Shoot Preparation



Bamboo Shoot Used in a Dish
Source: Bamboo Hut, Outram Lines, Kingsway Camp



Vegetable Preparation with Ngairi (Singju)
Source: Naga Sports Meet, Kirori Mal College

5. CONCLUSION

Food fermentation enhances the nutritional value of the products, improves flavor and texture, preserve the perishable foods and extend the self-life, fortify the products with health-promoting bio-active compounds, vitamins and minerals. Even though traditional practices are affected by the advent of modern civilization, traditional fermented foods of Nagaland and Manipur still hold importance in the daily dietary of the people of Nagaland and Manipur. The nutritional value of the traditional fermented food items and the preservation of food items by the process of fermentation are well known.

A survey was carried out taking into account North East based food junctions in North and South Delhi. The idea here was to document the major North Eastern dishes preferred and also ingredients used and methods of preparation for these dishes. According to the information collected, Pork with fermented bamboo shoot happens to be most sought after dish amongst the northeastern customers at the different joints. Pork with fermented Soybean (Axone) was also one of the most preferred dishes. Iromba is a very popular chutney amongst the customers, prepared with mashed potatoes, vegetables, fermented fish (Ngari), king chili and very often fermented bamboo shoots are added.

The survey also suggested that most of the customers (80-85%) are people from North East India residing in Delhi while people from other states are seen in less numbers. The main reason quoted by the owners is, lack of awareness about the dishes, the ingredients used in the dishes and health benefits of the dishes, as many customers from other states who are aware of the flavor and nutritional benefits are frequenters at their joints. It is therefore high time to promote the consumption of traditional fermented foods of Manipur and Nagaland. Commercially it will profit the indigenous people of the two states and in return the nutritive values of the fermented food items would benefit the health of the consumers.

REFERENCES

- [1] Chongtham, N., Bisht, M. S., & Haorongbam, S. (2011). Nutritional properties of bamboo shoots: potential and prospects for utilization as a health food. *Comprehensive Reviews in Food Science and Food Safety*, 10(3), 153-168.
- [2] Devi, P., & Suresh Kumar, P. (2012). Traditional, ethnic and fermented foods of different tribes of Manipur. *Indian Journal of Traditional Knowledge*, 11(1), 70-77.
- [3] Ghosh, K., Ray, M., Adak, A., Dey, P., Halder, S. K., Das, A., Jana, A., Parua Mondal, S., Das Mohapatra, P.K., Pati, P.R., & Mondal, K. C. (2015). Microbial, saccharifying and antioxidant properties of an Indian rice based fermented beverage. *Food chemistry*, 168, 196-202.
- [4] Jeyaram, K., Singh, W. M., Premarani, T., Devi, A. R., Chanu, K. S., Talukdar, N. C., & Singh, M. R. (2008). Molecular identification of dominant microflora associated with 'Hawaijar'—a traditional fermented soybean (*Glycine max* (L.) food of Manipur, India. *International journal of food microbiology*, 122(3), 259-268.
- [5] Jeyaram, K., Singh, Th. A., Romi, W., Ranjita Devi, A. R., Singh, W. M., Dayanidhi, H., Singh N. R., & Tamang, J. P. (2009). Traditional fermented foods of Manipur. *Ind J Trad Know*, 8, 115-121.
- [6] Keishing, S., and Banu, T. (2013). Hawaijar –A Fermented Soya of Manipur, India: Review. *Journal Of Environmental Science, Toxicology And Food Technology*, 4(2), 29-33.
- [7] Kumar, R.S., Binu, N.K., Nishant, N., Buxy, S., & Sinha, G.N. (2014). Bamboo Productivity in Forest and Non – Forest Areas A review of bamboo based agroforestry models developed in different parts of India, productivity and marketing aspects. *ResearchGate, Conference Paper*, January 2014.
- [8] Majumdar, R. K., Bejjanki, S. K., Roy, D., Shitole, S., Saha, A., & Narayan, B. (2015). Biochemical and microbial characterization of *Ngari* and *Hentaak* - traditional fermented fish products of India. *Journal of Food Science and Technology*, 52(12), 8284-8291. <http://doi.org/10.1007/s13197-015-1978-x>
- [9] Mao, A.A., and Odyuo, N. (2007). Traditional fermented foods of the Naga tribes of Northeastern, India. *Indian Journal for Traditional Knowledge*, 6,37-41.
- [10] Muzaddadi AU and Basu S. (2012). Shidalda traditional fermented fishery product of North East India. *Indian J Tradit Know* 11,323-8.
- [11] Nongdam, P., and Leimapokpam, T. (2014). The Nutritional Facts of Bamboo Shoots and Their Usage as Important Traditional Foods of Northeast India. *International Scholarly Research Notices*, 2014, <http://dx.doi.org/10.1155/2014/679073>
- [12] Tamang, J. P. (2015). Naturally fermented ethnic soybean foods of India. *J. Ethnic Foods*, 2, 8-17.
- [13] Tamang, J. P., Tamang, N., Thapa, S., Dewan, S., Tamang, B., Yonzan, H., Rai, A.K., Chettri, R., Chakrabarty, J., & Kharel, N. (2012). Microorganisms and nutritional value of ethnic fermented foods and alcoholic beverages of North East India. *NISCAIR-CSIR, India*, <http://nopr.niscair.res.in/handle/123456789/13415>
- [14] Roy, D., Majumdar, R.K., Maurya, S.K., Tripathi, H.H., Dhar, B., and Priyadarshini, B.M. (2014). Understanding of traditional knowledge and characterization of telesechda fermented fish product of Tripura state. *Indian J Nat Prod Res*. 5, 351-8.
- [15] Singh, A. S., Singh, A. A., & Devi, M. S. (2012). Ngari - a traditional fish product of Manipur, India. <https://www.researchgate.net>
- [16] <http://www.kiran.nic.in/nagaland.html>
- [17] <https://www.nagaland.gov.in/portal/portal/StatePortal/AboutNagaland/NagalandInfo>
- [18] <https://www.nagaland.gov.in/portal/portal/StatePortal/AboutNagaland/NaturalResources>.