

16. NORTH EAST REGION FISHERY PRODUCTS - OVERVIEW

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Introduction

The Himalayan arc extends between latitudes 26°20' and 35°40' North and between longitudes 74°50' and 95°40' East (Tamang, 2010). The North-Eastern region of India is known for its vast natural resources and a cauldron of different people and cultures lie deep in the lap of easternmost Himalayan hills in the North-eastern part of India (Majumdar *et. al.*, 2016). Based on the population and vegetation the eastern Himalayas includes eastern Nepal, Bhutan, Tibet autonomous region in China, Darjeeling hills, Sikkim, Arunachal Pradesh and the hills of North East India Manipur, Mizoram, Nagaland, Tripura and Assam. The river system along with their tributaries in the Himalayas exhibits a wide range of gradients from subtropical to alpine zones. The Brahmaputra and its tributaries rivers in Assam and Arunachal Pradesh in India contain more than 126 species of fish belonging to 26 families (Jhingran, 1977). About 44 species of fish have been reported from the rivers of Sikkim (Tamang, 2002). Many indigenous species of fish are found in the rivers of Sikkim and Darjeeling hills (Thapa, 2002). Loktak Lake in Manipur has varieties of Ichthyofauna mostly dominated by species of *Puntius*, *Channa*, *Labeo* etc. (Chaudhari and Banerjee, 1965).

North East India (NEI) shares over 2,000km of border with Bhutan, China, Myanmar and Bangladesh. It is home to a varied number of tribal groups (almost 166). Each tribe has either their own distinct culture, which gives them a unique cultural identity. Numerous art forms and festivals of the region are an intrinsic part of its rich culture and tradition. Although NEI is very rich in its food culture, it differs vastly from the rest of the country in its taste as well as flavours. Majority of the population are non-vegetarian and fond of spices. NEI tribes are largely associated with the ethnic groups of Indo Mongoloids, Tibeto-Burmese and proto-Austrioloids who represent the Asio-Austriac culture on Indian hilly regions. The trends of these ethnic groups are visible in the looks as well as the traditions which are followed by these communities. They provide a cultural bridge between India on one side and South-East Asia, China and Inner Asia and Burma on the other side by ethnic and linguistic angles.

NEI is not only rich in plant diversity but also has a great treasure of cultural, social and linguistic variability conserved by tribal people. The region is a treasure of indigenous knowledge system pertaining to agriculture, medicine, food and natural resources management. Indigenous people are habituated to live and survive with the forest and “*Jhum*” cultivation culture which ensures a range of ethnic foods rich in nutrition and compatible to culture and ethnicity of tribes. Different fermented and non-fermented foods are used in various combinations with traditional vegetables to meet food and nutritional security. The new generation in the same community has undergone a rapid change in their diets over period of time due to intervention of modern crop varieties, materialistic life and current trends towards increasing the use of commercial processed foods.

The fish fermentation technology in NEI states evolved by the compulsion of people. NEI having the highest rainfall in the world does not provide a congenial environment for simple sun drying of fish. People used to preserve fish for use in lean periods by drying under the sun. Hence such drying used to be prolonged due to the high humid atmosphere and frequent rainfall, particularly during the peak fishing seasons (i.e., from May to September). NEI, abundant in low lying areas where accumulation of water during rainy season, offers an ideal habitat for the breeding of weed fishes such as *Puntius spp.*, *Esomusdanricus* and *Amblypharyngodonmola*. The fishermen, therefore, were in search of a method through which they could preserve the heavy catches of such less valued weed fishes for consumption and sale in the dry seasons (from November to April) when there was scarcity of raw fresh fish in the market. It is fact that the tastes and food habits of rice eater prefers to eat his rather tasteless rice mixed with little morsels of products bearing strong flavours. In this situation, the fermented fish could become ideal to cater their needs.

Traditionally cured fish is a major source of dietary protein in many developing countries (Poulter, 1988). In addition to preservation, fermented food can also have the added benefits of enhancing flavour, increasing digestibility and improving therapeutic values (Jeyaramet al. 2009). NEI is bestowed with many fermented fish products such as *gnuchi* and *suka ko maacha* (smoked and sun dried fish products), *sidra* and *sukuti* (sun dried/salted fish products) of Darjeeling hills and Sikkim; *Ngari* and *hentak* (fermented fish products) of Manipur, *tungtap* (fermented fish product) of Meghalaya; *shidal*, of Tripura and *karati*, *bordia* and *lashim* (sun-dried and salted fish products) of Assam.

Ngari

Ngari is a fermented fish product of Manipur consumed by the *Meiteis*. During its production, fish (*Puntius sophore*, Hamilton) are rubbed with salt, dried in the sun for 3-4 days, washed and spread on bamboo mats. A layer of mustard oil is applied to the inner wall of an earthen pot, which is filled with dried fish and traditionally pressed tightly by foot (worth to be mentioned is, it is not pressed with bare foot, they covered foot with properly washed gunny bag in order to avoid injury due to fish bones) (Fig. 1). The pot is sealed airtight and then stored at room temperature for 4-6 months (Fig 2). It is kept for more than a year at room temperature. *Ngari* is eaten daily as a side dish with cooked rice. It is sold in local markets in earthen pots.



Fig. 1 Dried fish in an earthen pot is pressed tightly by gunny bag covered foot



Fig. 2 Four month old *Ngari* in an earthen pot ready for sale

Hentak

Hentak is an ethnic fermented fish paste of Manipur prepared from a mixture of sun-dried fish powder and petioles of sun-dried fish powder and petioles of ariod plants. *Esomus danricus* are washed thoroughly, sun dried and crushed to powder and petioles of *Alocasia macrorhiza* are cut into pieces washed and then exposed to sunlight for 1 day. An equal amount of the cut pieces of the petioles of *A. macrorhiza* is mixed with powdered fish and a ball like thick paste is made, kept in an earthen pot, tightly sealed and is fermented for 7-9 days (Fig 3). It is consumed as curry and is also used as condiment. It is given to women in third trimester pregnancy and also after delivery. It can also be given to patient recovering from sickness or injury.



Fig.3 Ball shaped freshly prepared *hentak*

Shidal

Shidal is nonsalted and semifermented ethnic fish product of Tripura prepared using minor carps (*Puntius spp.*) in specially designed earthen pots. It has several local names such as *seedal*, *seepa*, *hidal* and *shidol* in Assam, Tripura, Arunachal Pradesh and Nagaland (Kakati and Goswami, 2013). *Puntius spp.* are sun dried, placed in vats/earthen pots and fermented naturally for 4-6 months under anaerobic condition until the product gains a characteristic odour, texture and appearance (Fig 4). It is a delicacy for most of the tribal, Bengali and other people of Tripura for its characteristics taste and flavour.



Fig.4 Ready for sale Shidal

Karati, bordia and lashin

Karati, *bordia* and *lashin* are ethnic sun dried and salted fish products of Assam (Fig 5). Fish is washed and rubbed with salt and dried in the sun for 4-7 days. They are stored at room temperature for 3-4 months for consumption. *Karati* is prepared from *Gudusiachapra*, *Bordia* from *Pseudeutropiusatherinoides* and *Lashin* from *Cirrhinusreba*. These fish products are eaten as side dish.



Fig.5 Fish products for sale in a local market in Assam, India

Tungtap

It is an ethnic fermented fish pate of the *Khasi* in Meghalaya (Fig 6). Sun dried fish (*Danio spp.*) are washed and mixed with salt; sun dried fish are kept in the earthen pot made airtight and fermented for 4-7 days. It is consumed as pickle and curry.



Fig. 6 *Tungtap* ready for sale

Sidra and sukuti

Sidra and *Sukuti* are ethnic sun dried fish product commonly consumed in Darjeeling hills and Sikkim. *Sidra* is made of *Puntius sarana* washed dried in the sun for 4-7 days and stored at room temperature for 3-4 months (Fig 7). *Sidra* pickle is a popular dish (Fig 8). *Sukuti* is made from *Harpodonnehereus*, washed, rubbed with salt and dried in the sun for 4-7 days and stored for 3-4 months (Fig 9). *Sukuti* is consumed as pickle, soup and curry (Fig 10).



Fig 7. *Sidra* ready for sale



Fig 8. *Sidra* pickle grinded and mixed with dry chillies, salt and ginger



Fig 9. *Sukuti* ready for sale



Fig 10. *Sukuti* pickle-fried and mixed with dry red chillies, salt and ginger

Gnuchi

Gnuchi is an ethnic smoked fish product of the *Lepcha* people of Sikkim in India. *Schizothorax richardsonii*, *Labeo dero*, *Acrossocheilus spp.* *Channa spp.* which are collected from the river are kept on a big bamboo tray to drain off water degutted then mixed with salt and turmeric powder (Fig 11). Fish are separated according to their size. The bigger sized fish are selected and spread in an upside down manner on *sarhang* and kept above the earthen oven in the kitchen. The small sized fish are hung one after the other on a bamboo strip above the earthen oven and kept for 10-14 days (Fig 12). *Gnuchi* is kept at room temperature for 2-3 months and is eaten as curry.



Fig 11. Sieving washed, degutted and turmeric mixed fish in a bamboo tray for smoking



Fig 12. Smoking of fish above the kitchen oven for *Gnuchi* preparation

Suka ko maacha

It is a traditionally smoked fish product of Sikkim. The hill river fish locally called *dothayasala* (*Schizothoraxrichardsoni*) and *chuchayasala* (*Schizothoraxprogastus*) are collected in a bamboo basket from the river or streams and degutted washed and mixed with salt and turmeric powder. Degutted fish are hooked in a bamboo made string and hung above the earthen oven in the kitchen for 7-10 days. It can be preserved for 4-6 months and is eaten as curry (Fig 13).



Fig 13. *Suka ko maacha* is kept inside the bamboo made closed basket

World biggest dry fish market

World biggest dry fish market is at Jagiroad, it is a place located in Mayong Sub-Dvision, in Morigaon district of Assam state, India. This is the only market where the maximum transaction of dry fish takes place in Asia. Fishes from all over India comes to the market. Apart from Assam, different varieties of dry fish from Uttar Pradesh, Andhra Pradesh, Maharashtra, Porbandar in Gujarat, Gorakhpur and Lucknow in Uttar Pradesh, Teliamura in Tripura and Siliguri in West Bengal are supplied. The market also conducts international business by exporting to countries like Bhutan, Malaysia, Singapore and some other South Asian countries. The trading is controlled by the Jagiroad dry fish merchants association. The association also pays a substantial amount of money as taxes and also donates part of its profit to school, colleges, organizations and various sports activities.

Importance of fish and fish products in Manipur

Manipur is state where floating lake known as Loktak Lake is situated. It is a state where *meitei/ manipuris* dominates the population. Different tribal communities also resides in hilly

regions and the valley region mainly occupied by *meiteis*. People here prefer to consume fresh fish which are caught every day from lakes, ponds, streams etc. In the local markets majority of the fishes are sold in live condition. The fresh fishes are purchased and process specially smoked fish in individual house for preparation of different Manipuri cuisines. Fermented fish contributes to regular menus. These products are traditionally prepared in household and the process are normally handed down from generation to generation. People consume these ethnic fermented fish products along with their daily dishes with some ethnic beliefs and these products are intimately connected to virtually all aspects of their socio-cultural, spiritual life and health. Fish and fishery products plays an important role in Manipur.

Livelihood of fishermen/fisherwomen

Fishermen/fisherwomen catches fishes from lakes, streams, rivers, wetlands, ponds etc. and earn their livelihood. The activities involves catching of fishes from wild or from culture system either sell off fresh, process into smoked products or fermented and sell atlocal markets. The market of Manipur is women dominant and men involvement is very minimal. Women fish mongers sell fish/ fish products either in market or door to door delivery. In earlier days wild collection could feed whole Manipur population but nowadays many of the agricultural land, fallow land and inundated areas are converted into fish culture units to meet the increasing demands.

Fish/ fish products as main ingredient in traditional Manipuri cuisines

Meiteis are fond of boil vegetables called as *Kangsoi* and *Eromba* (chutney) which are zero oil main course curry. Side dishes like *ametpa/morokmetpa* and smoked fish are taken by majority of the population. Smoked fishes are costly products at present (2021), 1 kg of *Amblyphyrngodonmola* cost Rs. 2000/-. *A. mola* is one of the fish which is most commonly used in boil vegetable recipe. Fermented fish price range between Rs. 400/- to Rs. 550/- per kg. Depending on the brand of fermented fish like *SingjameiNgari*, *SekmaiNgari* etc. prices differs. Despite of its rising price there is always demand in market. Manipuri dishes which are prepared using fermented fishes/smoked fishes taken almost on daily basis are: 1) Boil vegetable curry called as *Kangsoi*(Fig 14) which is prepared using fermented fish and also smoked fishes 2) *Eromba*(Fig 15) which is prepared using fermented fish and for better flavour smoked/shallow fry fish are used 3) *Morokmetpa/ ametpa*(Fig 16) which is a form of chutney prepared using chilli and fermented fish, garnish with cilantro and onion 4)

Singju(Fig 17) which is traditional Manipuri vegetable salad prepared using fermented fish with varieties of vegetable like cabbage, lotus roots, peas leaves, spring onions etc.

People of Manipur prefer to eat fresh fish on regular basis and in every feast/gathering/party/occasions different varieties of fishes are prepared specially Indian Major Carps, Exotic Carps, *Wallago attu*, *Clarius spp.* *Anabas* etc. (Fig 18). It will be new to many of the readers who do not belong to Manipuri community knowing that, for suppressing the fishy odour in fish curry varieties of traditional spices are use but when if smell of some of the fish are too strong a small portion of fermented fish (*ngari*) are added in small quantity in the fish curry which reduce fishy smell.



Fig 14 *Kangsoi*



Fig 15 *Eromba*



Fig 16 *Morokmetpa/ametpa*



Fig 17 *Singju*



Fig 18 Fish curry

Role of fish/ fish products in socio-culture of Manipur

Marriage ceremony

Marriage ceremony starts with released of paired *Channa spp.* (*Ngamu*) in water bodies. The ritual is performed together by groom and bride family member to foreseethe new couple journey. Paired fishes when released in water swim together they stay together life long and if

one jumped off or moved to other direction it is consider as bad omen so and so accordingly. Thereafter, on the marriage day bride is gifted with a bamboo woven basket called as *Ngarubak/Lubak* in which at least 7 (seven) different varieties of smoked fishes are put in it. It is one of the most important gift to bride to start her new journey. Some of the fishes which are mainly put in *Ngarubak* are *Channa spp.* (Ngamu), *Acanthopthalmuspandia* (Nganap), *Cirhinusreba*(Ngaton),*Danio acquirinnatus*(Ngasang), *Lepidocephalusguntea* (Nganap), *Eutropichthysvacha*(Ngahei), *Puntius sarana*(Nganoi), *Amblypharyngodonmola*(Mukanga) (Plate 1). There is reason for choosing these fishes and the reason lies in their local name which is symbolic. *Acanthopthalmuspandia* (Nganap) gives lifelong togetherness, *Danio acquirinnatus*(Ngasang) gives progress, *Eutropichthysvacha*(Ngahei) gives excellence, *Puntius sarana*(Nganoi) gives wealth and prosperity. The local name like Nganap, Ngasang, Ngahei, Nganoi are all positive symbolic words which brings prosperity to the newly married couple.

At the marriage night *Acanthopthalmuspandia* (Nganap) or *Lepidocephalusguntea*(Nganap)fish curry or fry are prepared and allow the couple to eat these fish which is believe to bring lifelong togetherness.



Wedding procession carrying “athenpot”



Ngarubak



Channa, Ngamu



Acanthopthalmuspandia, Nganap



C. reba, Ngaton



Danio acquirinnatus, Ngasang



Lepidocephalus guntea, Nganap



Eutropichthys vacha, Ngahei



Puntius sarana, Nganoi



Amblypharyngodon mola, Muka nga

Plate 1. Wedding procession, *Ngarubak* and fishes which are important during Manipuri marriage ceremony

Creation of new life

When a woman is pregnant and in the third trimester generally starting of 9th month of pregnancy, mother to be is invited for grand feast at her parent house feeding her with *Wallago attu* (fresh water catfish). *Wallago attu* is local name as *Sareng*. And the ceremony related is called as “*thamapunsarengpijaba*” which means “feeding *Wallago attu* in 9th month of pregnancy”. It is believed that this is for wellbeing of mother and baby. The fish is cooked only for the mother to be and after having it the remaining bones or left over are dug in ground. It is not to be thrown out in garbage.

Welcoming a new life/ first ceremony after birth

After a baby is born on 6th day first ceremony after birth is performed it is called as “EPPAN THABA” or “Swasti puja” is "a must" observed by the people of Manipur (Fig 19). It has a reference to the cleaning and sanctifying the child and the mother. In the morning when the sun's rays reflect on the floor of the house, say of about 9 a.m. a place will be cleaned near the main door of the house and over a basketful of paddy, a garland of *Puntius ticto*, *ngakha* and *Puntius chola*, *phabou* (dryfish), *meitei-thum* (original Manipuri salt-cake), *sing* (ginger) are put to offer to Koirouhanba, the sun God. Then near the fire place of the house over a *yangkok* (winnow) some raw rice, meitei salt, chilly, *heibi mana*, *yendem* (kind of vegetables) and *Channa spp.* meitei *ngamuakangba* (dry fish) offered to EmoinuLairembi. Then all these things are mixed up by the *Maibi* (trained lady who perform the ritual) and put little by little quantity of the mixture (*Singju*) a form of salad on small pieces of plantain leaves and then the *Maibi* takes up one by one saying ku-ku-ku (sound produce while feeding a baby) to the child as if the child is being fed. This practice is for long healthy life of the child.

The child is given bath nicely and put it on the *yangkok* and the *Maibi* will ask three times to the mother whether she likes *yangkok* or the child. The mother says "I don't like *yangkok* I will take my child and the *Maibi* asks whether she likes gold and silver or money and again the mother says no, I don't like gold, silver and money, I like my child". After this the mother will give a coin to the *Maibi* and takes back her child and embraces the child nicely. Those things from the *yangkok* will be taken away by the *Maibi* beyond the gate of the house and

offer them again to the spirits of the locality praying them for the welfare of the child and to guard the child from the evil influences.

When a mother give birth in *Meitei* tradition oil cooked foods are not given to the mother. She can take smoked or dry fish with salt and steam rice till 12th day or even a month. Fermented product like *Ngari* cannot be consume during this period but *Hentak* can be taken.



Fig 19. Eepanthaba ceremony

Manipuri Death Ceremony, End of life

According to *Meitei* tradition when a family member expired from the day till Shradha ceremony on 12th or 14th day family members and close relatives takes only vegetarian food. After shradha is performed on the same day evening or next daya ceremony is performed called as “*Nga tungba*” which means all the family members and relatives can have non vegetarian food from that day. The ceremony is perform offering different fish dishes.

Fish for healthy living

In *Meitei* tradition if someone had undergone for surgery or having injury, a simple diet, zero oil food are given. Which mean when curry are to be prepared with zero oil only dry/smoked fishes are used. Sometimes fishes namely *Channaspp*, *Clarius spp.* and *Anabas testudineus* are either cooked with very less oil or smoked are given for fast recovery.

Conclusion

The present chapter documented traditionally preserved and fermented fish products of North East India. Different fermented fish products have beneficial role in human nutrition. Fermented products have undoubtedly contribute to the survival and good health of entire

generation. Fermentation is not only a method of preservation, in addition the fermented foods also have the added benefits of enhancing flavor, increased digestibility, improving nutritional value and provide pharmaceuticals. Fermented foods are associated with a unique group of microflora which increases the level of proteins, vitamins, essential amino acids and fatty acids. Fish and fishery products of North east has ethnic beliefs and these products are intimately connected to virtually all aspects of their socio-cultural, spiritual life and health. Fish and fishery products has an important role in North East India.

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