

## Traditional Fish Fermentation of Meiteis Of Manipur: An Overview

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**Abstract**

Food is one of the most important fundamental needs besides shelter and clothing for living. Since time immemorial there is relationship between plant and human being. In a harvesting season when there is plentiful harvest some quantity are used up and some quantity are stored for future use. Fermentation is a process which serves a means of preservation without changing its food value but increases more nutritional value. Manipur is one of the small hilly state of North-East India and has a history of 2 thousand years. Different forms of fermented foods are traditionally available in Manipur like fermented bamboo shoot (soibum), fermented fish (Utonga or ngari and hentak), fermented soybean (hawaijar), brewing of local alcohol (yungou), curd (sangom afamba), fermented meat product of the Vaiphei tribe etc. Fish is consumed everyday in every family of Meitei, the dominant community of Manipur as fish curry, roast on fire or sun dried fish (in making kangsoi), fermented fish (Utonga or ngari and hentak) which is very much essential for iromba (a kind of chutney). There is a saying in Meitei family that "no fish no meal". Fish are rich in proteins, lipids, minerals and vitamins. Due to this nutritional properties, fish is preferred as very important for every day consumption by Meiteis.

**Keywords:** Traditional fish fermentation, no fish no meal, Utonga or Ngari, hentak.

**Introduction**

Manipur is one of the most beautiful states of our country, India. In the west it is bounded by Cachar district of Assam, on the east by Myanmar, on the north by Nagaland state and on the south by Mizoram state Chin hills of Myanmar. The total geographical area of Manipur is 22327 Km<sup>2</sup> and located 23°83' N-25°68' N latitude and 93°03' E -94°78' E. The history of fermentation has early records in South East Asia. China is considered as the cradle of mold- fermented foods while Egyptians developed the combined brewery-bakery fermentation (Nout 1992) (Kordylas, 1992). In advanced countries, the techniques of baking brewing, wine making and dairying have emerged into large scale industries producing fermented goods like cheese, pickles, wines, beer, spirits, fermented meat products, soy sauces etc. Fermentation occurs in nature in any sugar containing mash from fruit, honey or sap from palms. If left exposed in a warm atmosphere, air born yeast act on the sugar converting it into alcohol and releasing carbon dioxide (Kordylas, 1992). Animal or plant tissues subjected to the action of microorganisms and/ or enzymes to give desirable biochemical changes and significant modification of food quality are referred to as fermented foods (Campbell-Pratt, 1994). The current century is the era of custom- made foods

satisfying personal and health benefit demands (Steinkraus, 1995). The history of fermentation has early records in South East Asia. Asian countries, people of North-East India catch fishes from the rivers and lakes. Some of the captured fishes are traditionally fermented, (Tamang, 2001). Shidal is a traditional fermented fishery product of North East India, Assam and Tripura. It has several names sepaa and hidal in Mizoram, Arunachal Pradesh and Nagaland (Muzzadadi & Basu, 2012). Ngari & Shidal have the same pasty and solid product in which the shape of the fish (*Puntius spp.*) remains almost intact. Fish fermented products have different names in East and South East Asia. Mention may be made of Katsoubushi of Japan, Trassi of Indonesia, Nampla of Thailand, etc.

China is considered as cradle of mold-fermented foods while Egyptians developed the combined brewery-bakery fermentation (Nout, 1992). Though fermentation has been known in every human civilization but there is a difference in the technique of fish fermentation. With this changing social demands, fermentation technology has a meaning of unlimited supply of food. From the new perspective, traditional fermented foods are receiving new attention to their health

promoting aspects as well as their nutritional supplements. Moreover, increasing population, drought, natural calamities and inadequate food production compel us to seek better options for food production. Consequently, Fermented foods begin to have a new role for stabilizing the global food supply, (Singh et al., 2007). Meitei community of Manipur has many traditional fermented foods like fermented soybean (hawaijar) which have multifarious health benefits, fermented bamboo shoot (soibum), fermented fish (utonga or ngari and hentak) and locale alcoholic beverages -yungou (an alcoholic product of rice fermentation). Traditional fermented foods increases many fold like flavour, preservation of substantial amount of food through lactic acid, alcoholic and alkaline fermentation, enrichment of foods substances biologically with protein, essential amino acids, essential fatty acids and vitamins, detoxification during food fermenting processing, decrease in cooking times and fuel requirement (Steincraus,1995). Fermentation is a low energy preservation process. It increases shelf and decreases the need for refrigeration or other preservation technology (Singh et al., 2007).

### Material and Method

Fish fermentation is one of the oldest practice done by Meiteis for preservation of fishes and this is also reported by Hesselstine and Wang Hwa (1967). There are many forms of fish fermentation in East and South East Asia. Mention may be made of Katsoubushi of Japan, Trassi of Indonesia, Nampla of Thailand, etc. Manipur people, particularly the Meitei community uses indigenous fish fermentation of Ngari and Hentak. Unlike fermentation carried out in other countries, fermentation of Ngari and Hentak are carried out without microbial starters (Singh et al., 2007) but fish fermentation is a spontaneous process. By fermentation process the product develops a different taste. In addition, fermentation of foods also enhance flavor, digestibility and therapeutic value of food (Kumaraswamy et al. 2009).The shidal is believe to have anti-malarial effect and even today people consume it during fever, despite its unpleasant smell, for its therapeutic properties (Muzzadadi & Basu, 2012).

By fermentation the food have extension of shelf life as their objective either through moisture or pH reduction thereby ensuring retardation of microbial activity, (Majumdar et al., 2009). There are two different products of fermented fish-Nagari or Utonga and Hentak, which are salt free fish products of Meiteis. The methods of fermentation for the two products are different.

### Ngari or Utonga

Nagari or Utonga is a traditional fermented fish consumed by every Meitei household everyday in preparing a special dish called iromba, kangsoi (simple boiled vegetable) and morokmetpa (chilly chutney). Nagari is prepared from sun dried fishes of *Puntius sophore* and *Puntius ticto ticto* locally known as Phabou nga and Ngakha respectively (Vishwanath, 2000). These fishes are locally available in rivers of Manipur and Loktak lake, the largest fresh water lake in North-East India and for large scale ngari fermentation it is imported mainly

from Karimgang district of Assam (India) and Bangladesh. For preparation of Ngari the fishes are sun dried (Fig.A) in the bright sunlight for 3-4 days. The next step is brief washing with water and water is drained off. Fishes are pressed with clean cloth to absorb water completely and to break the fish bones. The fishes are put inside big earthen pot, called kharung (Fig.B) which is coated with mustard oil till saturation and pressed tightly. The application of oil is to fill the pores to make the kharung airtight. The filling of sun dried fish is up to neck of the pot. The mouth of the earthen pot is sealed airtight with thick consistent mud (Fig.C) along with ngari phumai (rejected top layer of previous pot) and stored in room temperature for 4-6 months for incubation. Traditional fermentation of ngari is performed without application of salt. In this regard, it is different from other types of fish fermentation found in many parts of South East Asia (Chungkham, 1988). However, there may be some exceptions to this method of preparation of Ngari as Thapa et al. (2004) reported application of salt during stage of Ngari preparation, Thapa & Tamang (2004). (Tamang, 2001).

### Hentaak

Another type of fermented fish widely used by Meitei community is hentaak. It is blackish in colour, soft paste, ball shaped and have a peculiar taste. Hentaak is used in iromba and in making vegetable curry after roasted. Hentaak is more preferred than ngari to the post partum mothers as it contains high calcium, which is required for lactation. It is shaped as ball like in the form of paste. Sun dried fishes are made into powder by grinding in wooden mortar and pastel and mixed with equal amounts of petioles of *Alocasia macrorrhiza*, an aroid plant locally known as hongoo. The mixture is made into small ball like thick paste and kept in an airtight earthen pot or glass bottle for about a week at room temperature. The earthen pot for hentak is smaller than ngari. Hentaak is usually prepared from small fish *Esomus danricus*, and *Esomus altus* locally known as ngasang (*Esomus danricus*, Dhanapati, 1995) (Majumdar et al., 2009). In addition to this, other fishes like ngakha, *Colisa fasciatus* (Dhanapati, 1995) (Majumdar et al., 2009) and *Colisa sota*, Vishwanath, (2000) etc locally known as ngapemma (*Trichogaster fasciatus*) and tommemma are also used. Another small fish *Amblypharyngodon mola* (mukanga) can be added but it gives a bitter taste to the fermented product Singh et al. (2007).

### Result and Discussion

In Manipur, the Meitei community has many fermented foods like fermented bamboo shoot (soibum), fermented soybean (hawaijar), fermented fish (Ngari and hentaak), curd (Sangom afamba), yungou (local alcoholic product produced by rice fermentation) etc. Other fermented food products like bread, beer, wine and cheese have been developed with scientific and technological knowledge. But the traditional methods of fermentation practiced by the Meiteis in which fermented foods are produced by spontaneous or natural fermentation and have not developed scientific and technological practices. Both ngari and hentaak have different mineral composition (Majumdar et al., 2015) Table1.

**Table 1:** Elemental composition (mg per100gm dry weight) of ngari and hentak

Element	Ngari	Hentaak
Calcium	362.79 + 26.89	472.11 + 62.7
Potassium	58.20 + 7.36	75.74 + 6.62
Iron	0.020 + 0.0062	0.017 + 0.004
Sodium	199.66 + 24.92	94.0 + 12.78
Manganese	0.51 + 0.016	0.36 + 0.043
Copper	0.021 + 0.003	0.02 + 0.0064
Zinc	0.86 + 0.092	1.03 + 0.16
Magnesium	16.056 + 3.89	21.125 + 3.78

From the above Table 1 it is found that calcium is more in hentak than in ngari. This may be the reason that ngari is given to the lactating mother after post partum. Potassium, zinc and magnesium content are also more in hentaak. Usually peptides in fermented fish products have been reported to act as antioxidants Faithong et al. (2010) and Giri et al. (2011).

According to Majumdar et al., (2009) analysis of amino acid composition (% dry weight) of the fermented fish products revealed that ngari was rich in glycine, proline, aspartic acid and essential amino acids phsnylalanine, leucine, lycine (4.95,3,15, 3.64,3.23, 2.46, and 3.00% dry weight respectively) while hentaak was found to be rich source of glycine, alanine, proline, aspartic acids, glutamic acid and essential amino acids phenyl alanine, leucine, lycine (5.72, 4.09, 4.45, 3.84, 3.35, 4.91, 3.81 and 4.79 % dry weight respectively). The total amount of essential amino acids was 39.6 and 44.1% of total amino acids in respect of ngari and hentaak. Higher amount of some non essential amino acids like aspartic acids, glutamic acid and glycine were reported to contribute to the taste attributes of fermented fish and shellfish products (Jung et al., 2004). Above all the good quality of ngari and hentak the negative aspect of both is the unpleasant smell for the non eaters but it an appetizer to ngari eaters because they feel hungry when the ngari smell comes. Hentaak fermentation is associated with changes in fungal flora before and after incubation. The changes in fungal flora can be represented in the following Table: 2 & 3, (Chungkham, 1988).

**Table 2:** Incubation during October

Fungal flora before incubation	Fungal flora after incubation
Aspergillus candida	Aspergillus fumigatus
Aspergillus janus	Aspergillus niger
Aspergillus niger	Cladosporium spp.
Chaetomium Spp.	Geotrichium spp.
Cladosporium herbarium	Myrothecium striatisporum
Geotrichium candidum	Penicillium rubrum
Helminthosporium nodulosum	Penicillium rugolusum
Nigrospora sphaerica	Rhizopus nigricans
Penicillium lanosum	White sterile mycelium
Rhozotetonia lanosum	Black sterile mycelium

Torula lucifega	
White sterile mycelium	
Yellow sterile mycelium	

**Table 3:** Incubation during March

Fungal flora before incubation	Fungal flora after incubation
Cladosporium cladosporides	Cladosporium spp
Penicillium spp.(1)	Cladosporium cladosporides
Penicillium spp. (2)	



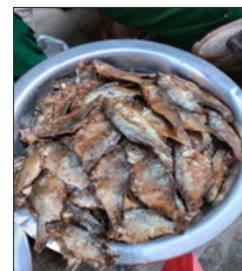
A: Sun dried Puntius sophore (phaboumga)



B: Kharung with fermented fish



C: Mouth sealed with mud and ngari phumai



D: High quality ngari



E: Selling Ngari



F: Mixed fishes



G: Mixed sundried fishes



H: Trichogaster fasciata (ngapemma)



I: Ambliopharyngodon mola (Mukanga)



J: Varieties of Sun dried fishes in the market



K: Esomus dauricus (ngasang)



L: Hentak balls (Home made)

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