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An overview of some ethnic fermented fish products of the Eastern Himalayan region of India

Ranendra K. Majumdar ^{a,*}, Deepayan Roy ^a, Sandeep Bejjanki ^b, Narayan Bhaskar ^b

^a College of Fisheries (Central Agricultural University), Lembucherra, Tripura, India

^b Central Food Technological Research Institute (CFTRI), Council of Scientific and Industrial Research, Mysore, Karnataka, India

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ABSTRACT

Background: Like southeast Asian countries fermented fish is a well known strategy of food preservation in the northeast region of India. The northeastern 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 northeastern part of India. Here the fermentation technology evolved by compulsion of people. Popular fermented fish products of this region of India include Shidal and lonailish. Fermented fish contributes a regular menu in the diets of people of almost all categories.

Methods: The traditional technology was explored by thorough interrogation with the local producer in their place. The origin of the technology as well as the compulsion for diversification of the traditional fish drying process to fermentation was known from the very old people in the community.

Results: The technology was observed while in operation and attempted to justify the science behind each step in the fermentation process. The Shidal technology was found to be evolved even before the use of salt by the people.

Conclusion: It was revealed that as the northeastern states of India, being the highest rainfall area of the world, did not provide a congenial environment for simple sun drying of fish and fermentation was the only option to preserve fish.

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1. Introduction

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, connected to the rest of India by just 20 km of wide land. The region comprises of states like Arunachal Pradesh, Nagaland, Manipur, Tripura, Mizoram, Meghalaya, Assam, and Sikkim. North-East India (NEI) shares over 2,000 km of border with Bhutan, China, Myanmar, and Bangladesh. Its total is 2,55,168 km² with a population of 40 million (as per the 2010 census), of which the Brahmaputra valley in Assam alone houses almost half of its population. People of all religions like Hinduism, Islam, Buddhism, and Christianity all live here. NEI is home to a varied number of tribal groups (almost 166). Each tribe has 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 flavors. Normally, inhabitants of the region are nonvegetarian, and fond of spices. NEI tribes can be largely associated with the ethnic groups of Indo Mongoloids, Tibeto-Burmese, and proto-Austrioloids who represent the Asio–Austic 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. Their existence can be traced back to the prehistoric times.

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 systems 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. Since time immemorial, rural women of this

* Corresponding author. College of Fisheries (Central Agricultural University), Lembucherra, West Tripura District, Tripura-799210, India.

E-mail address: drkmc@gmail.com (R.K. Majumdar).

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region have selected many wild plants and nonvegetarian foods through trial and error. Different fermented and nonfermented foods are used in various combinations with traditional vegetables to meet food and nutritional security. The traditional foods consumed by tribes of NEI are intimately connected to virtually all aspects of their socio-cultural, spiritual life, and health. The new generation in the same community has undergone a rapid change in their diets over the past 30 years due to the 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, being 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., “darkina” (*Esomus danricus*), and “mola” (*Amblypharyngodon mola*). 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. Moreover, due to the nonavailability of ice and good road communications, this perishable produce could not have been transported to the distant markets where they could get a higher price which they never used to earn in the village markets. It is fact that the tastes and food habits of the rice-eater prefers to eat his rather tasteless rice mixed with little morsels of products bearing strong flavors. In this situation, the fermented fish could become ideal to cater their needs.

Fermentation involves the breakdown of proteins in the raw fish to simpler substances which are stable at the normal temperature of storage. Cleavage of proteins by microbial or indigenous proteases yields the bioactive peptides, leading to substantial increases in the biological properties of the food [1]. Traditionally cured fish is a major source of dietary protein in many developing countries [2]. In addition to preservation, fermented foods can also have the added benefits of enhancing flavor, increasing digestibility, and improving therapeutic values [3]. NEI is bestowed with many fermented fish products such as *shidal*, *lonailish*, *ngari*, *hentaak*, *tungtap*, and *numsing* etc. Fermented fish contributes to regular menus, especially in the diets of tribal people. These products are traditionally prepared by different tribes of NEI in their household

and the processes are normally handed down from generation to generation. The traditional people of NEI used to 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. Besides fermented fish products, different dried and smoked fish products are also available in NEI which includes “*gnuchi*” and “*suka ko maacha*” (smoked and sun-dried fish products), “*sidra*” and “*sukuti*” (sun-dried/salted fish products) of eastern Nepal and Sikkim, “*karati*”, “*bordia*”, and “*lashim*” (sun-dried/salted fish products) of Assam, etc. [4].

Unlike salt fermented fish products of Southeast Asia, the salt-free fermented fish products of NEI indicates the fact that the technology of salt-free fermentation originated long before the men started using salt (sodium chloride). Later on, salt was used for fermentation as was observed with *lonailish*. Preparation of such fermented fish products is simple but most of the critical steps are optimized by experiences for getting a yield of different qualities. To date, traditional methods are in practice due to lack of adequate scientific intervention and standardization of methods. Details of the traditional technology of the two most popular fermented fish products of India are discussed here.

2. Shidal

Shidal is a salt-free fermented fish product indigenous to the Northeast sector of India. *Shidal* is exclusively prepared either from *Puntius* sp. (generally *Puntius sophore*) which is popularly known as *Punti shidal* or from estuarine fish *Setipinna phasa*, known as *Phasa Shidal* (Figs. 1A and 1B). The product is very much popular due to its strong flavor. It is popularly called “*seedal*”, “*sepaal*”, “*hidial*”, “*verma*”, and “*shidal*” in Tripura, Assam, Mizoram, Arunachal Pradesh, and Nagaland. In particular, Assam and Tripura are the major producers of *shidal* amongst the Northeast states [5]. The typical strong flavor of *shidal* is due to the breakdown of fish proteins and lipids, which produce some peptides, amino acids, fatty acids, indole, skatole, etc., producing the strong characteristic odor of *shidal* [6]. The appearance of the product is solid, bilaterally compressed, and pasty and the shape of the fish remains almost unchanged except a little disintegration near the belly and caudal portion. The color of the best quality product is a dull white that gradually becomes slight brownish to deep brownish on continuous exposure to air.

2.1. Origin

The technology is very old and originated in the former undivided India (now Bangladesh) and believed to have come into existence at least before the British era in NEI, i.e., before 1824. Revealed through Indian history, the people of this region did not know the use of salt before its introduction by the British Government. Even after the British era, the salt used to be treated as a highly valued and scarce commodity and as an alternative to salt people used to use a substance known as “*khar*,” made from banana or papaya plant. Thus, people could not afford to buy salt for fish preservation and this may be one of the reasons why they preserved fish in a unique way without using salt. The plains of Bangladesh and adjoining NEI are famous for their “*beel* fisheries,” which is a kind of weed-infested shallow water body and gets dried up fully or partially during winter. The “*beel* fisheries” is an excellent habitat for weed fish such as *Puntius* sp. which propagate naturally at the beginning of the rainy season and form a good fishery when the water level starts decreasing with the onset of winter. The reason for the exclusive use of the *Puntius* sp. for *shidal* production possibly lies with the huge availability of this fish



Fig. 1. Fermented fish product, “*punti shidal*.” It is made from *Puntius* spp. It is a very popular fermented fish product of the Eastern Himalayan region of India. Fermentation period is 3–5 months in an earthen container. This can be stored at room temperature.

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