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Shidal - A traditional fermented Fishery product of North east India

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A survey was carried out in two states of Northeastern India namely Assam and Tripura to study the indigenous technology of *Shidal* (a pasty and solid, semi fermented fishery product) preparation, indigenous fish oil extraction method and *shidal* recipe preparation techniques and data were collected from the experts belonging to ethnic tribes, ethnic Bengali and Muslims communities. The skeletal method of *shidal* preparation had minor differences between the localities. The village fishers followed a method where semi-dried local varieties of *Puntius* spp. were utilized, whereas the commercial producers utilized the fully dried *Puntius* spp mostly imported from other Indian states, as the raw material. Moistened fish are tightly packed into an oil processed earthen pot and sealed almost airtight. Fish are allowed to get fermented anaerobically by some resident bacteria for about 6 months. Mainly the fish protein and lipid are broken down to some peptides, amino acids, fatty acids, indole, sketole, etc. producing a strong characteristic odour of *shidal*.

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Shidal is a pasty and solid product in which the shape of the fish (*Puntius* spp.) remains almost intact. It has several local names, called *shidal*, *sepaa* and *hidal* in Assam, Tripura, Mizoram, Arunachal Pradesh and Nagaland. It is known as *Ngari* in Manipur. It is commonly consumed in all the 7 Northeastern states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura) of India, but most popular in the tribal belts and *Bangla* speaking communities of those states.

It is consumed after preparing *shidal chutney* (*Shidal Bhorta*) or *shidal* curry. Such preparations are believed to have Malaria curing ability[1-3].

Methodology

The study was carried out in Nagaon district of Assam and West Tripura district of Tripura and the information were gathered by interviewing the skilled persons of certain communities, e.g. Bengali communities coming under Scheduled caste such as *Shudra*, *Namashudra,* etc. and schedule tribes such as *Debbarma*, *Chakma* and *Tripuries* in Tripura and Asaam; in Assam, some groups of Muslim communities who are socio-economically backward but legally not placed under OBC or ST/SC. The methods of *shidal* preparation were documented by direct observation at the production sites.

Negligible differences have been noticed among the procedures practised in different localities. A minor difference is placing of polythene sheet on the cover-paste before putting the clay-seal which is seen in procedures followed in Tripura but absent in Assam. However, the main steps remain same in both the production areas.

The main raw materials used are fish, *mutka*, edible oil, cover paste and clay seal.

Fish—Dry *Puntius* spp. of bigger size, with no insect infestation and of uniform size is usually used as basic raw material (Fig. 1).

Earthen pot (*mutka*): Round bottom and narrow necked earthen pots with a capacity of 8- 40 kg are used as fermentation container, locally known as *mutka*. These are processed with edible vegetable oil or fish oil. Fish oil is preferred, if available. While processing, internal surface of the *mutka* is smeared with oil as long as the oil is absorbed by the earth material and subsequently dried under sun. This process is repeated until the *mutka* gets fully saturated

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with oil leaving no air vent open in the earth material (Figs 2 & 3).

Oil—Fish oil is normally extracted from the entrails of fish (Flow chart 1) and used for *mutka* processing. Its main purpose is to prevent the air permeability through the minute pores of *mutka*, to minimize desiccation through evaporation and seepage and to provide additional flavor to *shidal*. An alternative to fish oil is mustard oil, if fish oil is not available in plenty for large scale production (Fig. 4). However, *mutka* processed with fish oil always gives the best quality of *shidal*.

Cover paste—The mouth portion of the *mutka* is filled with fish dough or paste (cover paste) which is prepared from crushed dried fish (broken or smaller *Puntius* spp. and the waste of other dry fish) (Figs 5 & 6).

Cover leaf—Broad plant leaves such as yam or banana leaves, or creepers like bottle-guard leaves normally used to cover the cover-paste temporarily in order to restrict fly infestation and soiling. However, during large scale production newspaper and polythene are also used (Fig. 7).

Clay seal—Thick clay is prepared from fine soil and applied on the mouth of *mutka* as the final seal. It ensures anaerobic condition inside the pot and shields insect infestation. Subsequently layers of clay are applied very promptly as and when cracks appear, failure of which leads to insect infestation and poor quality product (Fig. 8).

The traditional procedure of *shidal* preparation is still followed by the village fishers where raw fresh fish is readily available. In this method, fishers extract fish oil from entrails of *Puntius* spp. (Flow chart 1) and use it for *shidal* preparation. This naturally evolved procedure is most economic and climate friendly and mostly practised in the backyard of village fishers (Flow chart 2). Half-dried fish are smeared with fish-oil and tightly packed into an oil processed earthen pot. The mouth portion of the pot is filled with cover paste which is covered with cover-leaf. After a week the cover-leaf is removed and sealed almost airtight with clay. Fish are allowed to get fermented anaerobically by some resident bacteria for about six months. No salt is added during the processing of *shidal* as in many other indigenous fermented fish product of Southeast Asian countries. Instead of salt, extra oil is added here during product preparation. Salt is added during retailing in order to preserve it from deterioration once taken out from the *mutka*.

A *shidal* with ideal quality will have a sticky surface with the shape of the fish (*Puntius* spp.) almost intact, dark brown in color, moderately soft texture, typical *shidal* smell (ripe palm like smell) and flavor.

In the commercial procedure dry fish is soaked in water, dried under shade overnight and then packed in oil-processed *mutka* without smearing the fish with oil. The quality of *shidal* of this process is found to be highly inferior than that of traditional method in regards to the typical color, texture, flavor, smell and taste. Foot Note for flow chart 2–Oil is smeared in the inner side of the *mutka* and dried in the sun (Fig.4). As the *mutka* absorb the oil and becomes dry, another smear of oil is given in the same way and again dried (Fig.9). This oil-smearing and subsequent drying process is continued for 7 to 10 days, until they become fully saturated with oil and unable to absorb any more oil even after a fresh drying. Now these *mutka* are ready for packing.

A pre-processed *mutka* is buried under the ground so that half (or one third) of the belly remains under ground and rest of the portion in the air (Fig. 3). Now the dug out soil is gathered surrounding the under ground portion of the belly and the *mutka* is fixed to the ground very tightly, ensuring that it stands at exact vertical position. This is done only to make the *mutka* withstand the packing pressure in the ensuing step. Gunny bags are spread surrounding the *mutka* to avoid any raw material getting contaminated with the soil underneath. Now fishes are spread in a layer inside the *mutka* and uniform pressure is applied with bare hand or foot (if the mouth of the *mutka* is big enough). Once the layer gets tightly packed, subsequent layers are put in a similar manner upto the mouth region (Fig. 10).

The preparation procedures of the selected districts of Assam and Tripura are almost same. A minor difference, which was observed, is that the cover-paste is covered with polythene paper before putting the clay-seal in Tripura, but clay-seal is applied after removing the cover-leaf in Assam. *Shidal* of Tripura was observed to have better quality than that of Assam in respect to the typical *shidal*-flavour and taste.

Raw material (Raw fresh fish, *Puntius* spp.)

↓

Select individuals with bulged abdomen

↓

Degut partially (Entrails taken out of the abdomen, but remain attached to the pharynx)

↓

Take them as such in a large mouth earthen pot (locally called *Bhettwa*) with a little water

↓

Stir the mixture with bare hand for 10 to 20 minutes vigorously

↓

Collect the stuck oil gathered on the inner side of the pot by scrapping with hand and store in solid form in a wide mouthed steel or glass pot by scrapping the hand against the rim of the pot

↓

Repeat the steps from 4 to 6 for about 4/5 times until no oil or a negligible amount of oil sticks to the inner surface of the *bhettwa*

↓

Discard the entrails (by now, they will detach from the pharynx) and keep the fish for drying

↓

Boil the oil to make it liquid and store in a narrow necked glass bottle

Flow chart 1—Indigenous oil extraction method

Raw material (Raw fresh fish *Puntius* spp.)

↓

Descale, degut and washing

↓

Semi-dry in the sun (about 50% of the total moisture is retained in fish)

↓

Pack the semidried fish in oil-processed *mutka*s

↓

Fill the mouth portion (from the neck to rim of the *mutka*) with the cover-paste

↓

Cover the paste with the cover-leaf and take out the *mutka* from the ground

↓

Keep it in a sheltered place for 3-4 days as such
Apply a layer of thick mud on the paste after removing the cover leaf

↓

Keep in a dry and sheltered place. If cracks appears on the mud-seal (Fig. 11), put another layer of mud layer on the previous one and repeat it till a crackless seal is attained

↓

Keeping the *mutka* undisturbed for 3-4 months

↓

Removing the mud and putrefied paste carefully and take out the final product one layer after another (Figs.12 & 13).

Flow chart 2—Procedure of *shidal* preparation

Figs 1–13—Raw material (*Puntius* sp); (2) *Mutka* (earthen pot specifically made for *shidal* preparation); (3) *Mutka* fixed under earth before packing; (4) *Mutka* after oil smearing; (5) Crushed dry fish for preparation of cover paste; (6) *Mutka* with Cover paste; (7) *Mutka* with cover leaf; (8) *Mutka* with cover seal (un-cracked); (9) Sun-drying of *mutka*; (10) *Mutka* after packing up to mouth; (11) Clay-seal with cracks; (12) Ready *shidal* before preparation of chutney; (13) Ready *shidal.*

Results and discussion

Shidal might have come into existence at least before the British Era in Northeastern states of India (i.e., before 1824). Because, people of this region did not know the use of salt before British had introduced salt there. Even after the British Era, people used to treat salt as a highly valued and scarce commodity and they used to take an alternative commodity, called *khar*, made from banana plant or papaya. Hence, they could not afford using salt in fish preservation and they were compelled to preserve fish in their own way which had been a cheaper and easier method. Most of traditional fish fermented products of Southeast Asian countries came into existence due to the inconveniency of simple sun-drying method of fish preservation in this region due to persistent cloudy weather[4]. Thus, it is obvious that simple sun drying used to be prolonged due to high humidity in the atmosphere and frequent rainfall, particularly during the peak fishing seasons (May to September). Consequently, experienced fishers had to find out a method through which they could preserve the instant heavy catches comprising of very less valued small fishes like *Puntius* spp. for the consumption and sale in the dry seasons (November to April) when raw fresh fish become scares in the market.

Fishers cannot transport highly perishable catch to the distant markets for getting a profitable price due to the unavailability of ice and good roads. Moreover, they wanted to change the taste and flavor of their daily rice-fish dish, which had become bland and monotonous to them. As a result, they invented the method of *shidal* preparation in which they stored the semi-dried fish in earthen pots or *mutkas* for months together. This, in turn, allowed the fermentation process to set in and a semi-pasty and foul smelling product came into existence, called *shidal*. People gradually acquired the taste and aroma of such fermented product, because it served them as a diet source in the off fishing season and also as a different recipe with changed taste against their daily monotonous diet, i.e. rice-fish dish. The poor economic condition is another reason for the acceptance of such a product. The off smell could not repel them; rather they went on adding different hot spices and oil along with frying or boiling, either during product preparation or recipe preparation to get rid of the smell.

Due to unavailability of raw fish in abundance the commercial *shidal* producers use a separate method in which raw fish is replaced with dry *Puntius* sp. They do not use fish oil, instead they use mustard oil and the fermentation period too is reduced to 2 to 3 months. Such practices, which are aimed at monetary benefits only, are not only affecting the traditional techniques but also deteriorating the quality of *shidal* to a great extent.

Shidal is highly relished by the ethnic groups of Northeast, Bengali communities and some sects of Muslim community. They prepare various *shidal*-recipes and eat it along with their main food. *Shidal-Chutney*, being the most common recipe, is eaten with daily rice dishes. It is very good appetizer and flavouring agent in respect to the food habit of the people. *Shidal-godak*, *shidal-vegetable-jhol* and *shidal-curry* are some of the popular recipes in Tripura other than *shidal-chutney*.

Only one negative aspect of *shidal* is its unpleasant smell for the unfamiliar *shidal*-eaters or non-eaters. During its recipe preparation the smell spreads out which may be annoying the vegetarian or non-*shidal*-eating neighbors.

Malaria has been a common and deadly disease in Northeastern states. The belief related to malaria curing ability of *shidal*, drives people to eat *shidal* as medicine despite of its unpleasant smell. Although there is no scientific validation on this belief still date, the general observations support the belief to some extent, since the ethnic groups like Naga, *Chakma*, *Debbarma*, *Kukis,* etc. being regular *shidal* eater, rarely suffer from malaria.

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