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Review Paper

Some fermented foods and beverages of Nagaland, India

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Abstract

Traditional fermented foods are consumed as an integral part of diet of tribal community since early history. Their products is one of the oldest and economical methods for production and food preservation. In Northeastern region of India, fermented foods are made from local crops and biological resources. Nagaland is one of the states in North Eastern region of India inhabited by indigenous '*Naga*' tribe comprising of 16 tribes having varied forms of rich cultural heritage and food habits. The traditional fermented foods and beverages an important constituents of staple diet of *Naga* tribes are reviewed here. It is more like an art of technology passed from generation to generation. The present paper documents the major fermented foods used by the different *Naga tribes* and the technique of preparation. Some of them are *Axone/ Akhone, Anishi, Bastanga, fermented pork fat, Hungrii, Jangpangnagtsu, Jang kap, Zutho, Tsutocie* and fermented fruit beverages. The method of their preparation and physico-chemical characteristics are briefly reviewed. The future prospects are also discussed.

Keywords: Bamboo, fermented food, beverages, cereal based, meat, Nagaland, soybean.

The loss of biodiversity and traditional knowledge are of great concern in the present day (Tamang and Tamang, 2009, Dixit and Goyal, 2011,). These traditional valuable knowledge systems like local biological resources and their uses for value addition products, unique formulations, local techniques etc are confined to few elderly individuals. Traditional knowledge includes practices, technologies, fundamental role in people's livelihood, health, food and food habits. The people of North Eastern region of India generally depend on shifting cultivation and forest based food products for their survival (Singh *et al.*, 2007). Since time immemorial, rural women of this region have selected many wild plants and non-vegetarian foods through hit and trials generation after generation. Women have conserved many local crops, ethnic vegetables and indigenous fruits used in local diet for food and nutritional security. Traditional fermented foods are popularly consumed and form an integral part of diet since early history (Aidoo *et al.*, 2006). Different fermented and non-fermented foods are used in various combinations with traditional vegetables and other products to meet the food and nutritional security (Singh *et al.*, 2006). It is one of the oldest and most economical methods for producing and preserving foods.

India is traditionally rich in fermented foods. In the Northeastern region of India, fermented foods using local crops and other biological resources are very common. But the nature of the products and base material varies from region-to-region (Sekar and Mariappan, 2007). Nagaland state lies between 13°37′09″ N longitude - 123°10′53″ E latitude and is

surrounded by different states of India (the hills of Manipur, North Cachar and Mikir hills, Lakhimpur, Sabsagar and Nowgong of Assam, in the two districts [Changlan & Tirap] of Arunachal Pradesh) and across the border in Myanmar. Nagaland is inhabited by the native Naga tribe. The Naga tribes consist of 16 different tribes of which 14 are recognised, viz. Angami, Ao, Chankhesang, Chang, Kongyak, Khiamungan, Sema, Rengma, Lotha, Sangtam, Phom, Zeliang, Pochury, Yimchunger. Naga people have rich reserve of traditional knowledge. The people of Nagaland have unique technique of food preparation. In earlier days, the Naga kitchen rarely used oil for preparation of food. Rice, meat, fish, vegetables (boil) were the main constituents of Naga meals (Singh *et al.*, 2007, Das and Deka 2012). The traditional fermented foods and beverages form important constituents of staple diet of the Naga tribe. It is more like an art of technology passed on from generation-to-generation.

The literatures available on the documentation of fermented foods of the state. The present study was under taken on the survey of different fermented food products used in different parts of Nagaland, isolation of microbes involved, nutrition analysis and purification of presented technique. The information is flow chart and photographs. In the first phase of the study we document the different traditional fermented food products used by some major *Naga* tribes of Nagaland.

The various fermented foods and beverages being region specific, documentation was done from different villages of Nagaland. First hand information was collected from the villagers regarding the step-by-step process being followed for the preparation of these traditionally fermented food products. Different traditional fermented food products used by some major *Naga* tribes of Nagaland have been documented. Fermented foods are categorized as follows : (1) Cereal based fermented product (2) Vegetable based fermented products (3) Bamboo shoot based fermented product (4) Meat based fermented products and (5) Fruit based fermented beverages. The technique of preparation of different types of ethnic fermented foods with illustrations and photographs complied during the present study are described here for easy comprehension by the reader/scholars.

Documentation of fermented foods

1. Cereal based fermented products

(i) *Zutho*: The *'Zutho'* (rice beer) is a traditional alcoholic beverage prepared from rice (*Oryza sativa* L.), named according to the *'Angami' Naga* dialect. For preparation of *'Zutho'*, the polished rice grains are soaked in water for about two hours and the excess water is drained-off. It is then, allowed to air dry and pounded into powder. On the other part of the preparation, unhulled rice grains are soaked in water for about 2-3 days and allowed to germinate. The germinated grains are sun dried and made into powder. The polished rice powder and powder of germinated grains are mixed in 10:3 ratio and made to paste by mixing with boiling water slowly. The mixture is then allowed to cool down and incubate in room temperature for 4-5 days. Fermentation gets completed after about 4-5 days (Fig. 1a, b). The first fermented product in its pure form is called '***Thoutshe***' and the *Thoutshe* is diluted with some water called '***Zutho***'. It is consumed as a popular alcoholic beverage in Nagaland.

***Axone*/*Akhone*:** *Axone* is a fermented soybean *(Glycine max* L.) product, named according to the '*Sema Naga'* dialect. Soybean seeds are cooked and packed in bamboo basket with the base lined with leaves of *Ficus* species and covered by the same on top. It is the kept near the fire place for about 3-4 days

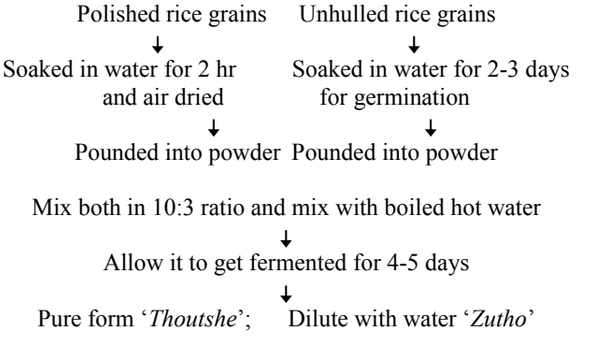

Figure 1a. Flow chart of preparation of *Zutho*

Figure 1b: Steps involves in *Zutho* preparation. a. Polished rice, b. Unhulled germinated rice grains, c. mixed powder of a & b under fermentation, d. *Zutho* ready to serve.

for the fermentation to complete. Most people go for longer fermentation to reduce the strong smell of the fermented product. In this, the fermented soybean is made into a paste and wrapped in banana leaves or *Phrynium pubinerve* leaves and kept for another 3-4 days near the fire place (Fig. 2a, b).

Soybean seeds boiled (3-4 hr in pot or 1 hr in pressure cooker)

⇩

Excess water drained off and packed in bamboo basket lined with leaves of *Ficus* spp. at bottom as well as covered at top

⇩

Keep near the fire place for 3-4 days

⇩

Made into a paste, wrap and keep near the fire place again for about 3-4 days

⇩

Axone

Figure 2a: Flow chart for preparation of *Axone*

Vegetable based fermented foods

(i) *Anishi*: '*Anishi*' is a fermented cake made from leaves of *Colocassia* species. It is exclusively prepared

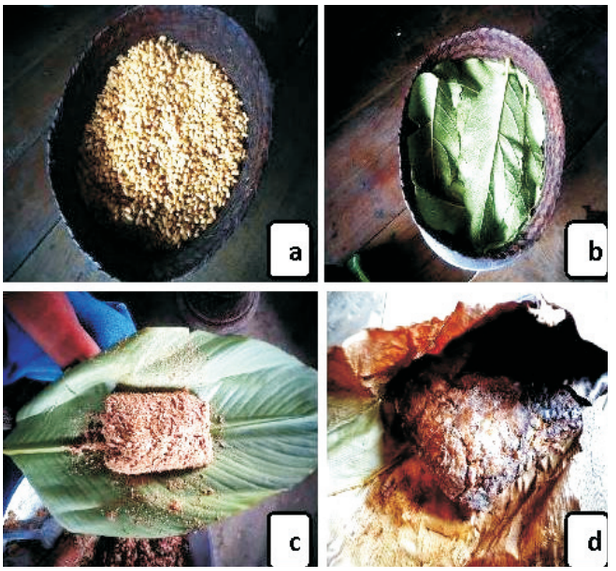

Figure 2b. Different stages of *Axone/Akhuni* preparation. (a) The boiled soyabean seeds, (b) The paste is wraped in leaves, (c) The semi-fermented product, (d) The matured *Axone*.

by the *Ao Naga* tribe. Its preparation involves the packing of the *Colocassia* leaves in gunny bags or wrapped in banana leaves for about 3-4 days till it becomes yellow. It is then, pounded into pastes which are made into cakes. These cakes are then wrapped in banana leaves and kept under the ash near the fire place or exposed to the sunlight till it is completely dried and becomes hard (Fig. 3a, b).

***Hungrii*: '*Hungrii*'** is a fermented product made from the leaves of *Brassica* species. It is prepared popularly by the '*Rengma' Naga* tribe. Fresh mustard leaves are taken and sun dried. A pit is dug out and banana leaves are laid at the bottom of the pit. The dried mustard leaves are then wrapped in the banana

Fresh leaves (*Colocassia sp*. leaves) packed in gunny bags or banana leaves for 3-4 days.

⇩

Cakes made out of the paste of the leaves

⇩

Sun dried or kept over fire place till completely dry.

⇩

Anishi.

Figure 3a: Flow chart for preparation of *Anishi*

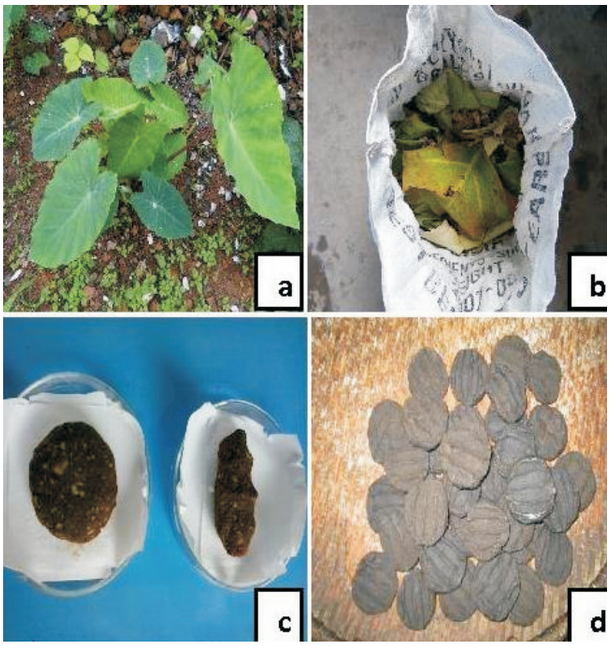

Figure 3b: Different stages of *Anishi* preparation. a. *Clocassia* leaves, b. Yellowing of leaves in the gunny bag, c. Cakes of different shapes made from the paste of the yellow leaves, d. The final *Anishi* product.

leaves and left in the pit, covered with soil for about 15- 18 days (Fig. 4a, b).

Leaves of *Brassica sp*. sun dried and wrapped in banana leaves

⇩

Pit made in the ground where leaves are buried

⇩

Fermentation for 15-18 days

⇩

Hungrii

Figure 4a. Flow chart for preparation of *Hungrii*

Tsutocie: '*Tsutocie'* is made from cucumber fruit and leaves mostly made by the *Angami Naga* tribe.The matured cucumber fruits are preferred, which are cut into pieces. The leaves on the other hand are first washed and then shredded into pieces manually with hands. The mixture of the fruit and the leaves are then put into a container containing sufficient amount of water. It is then allowed to undergo fermentation for about 3 months (Fig. 5). The end product is a thick

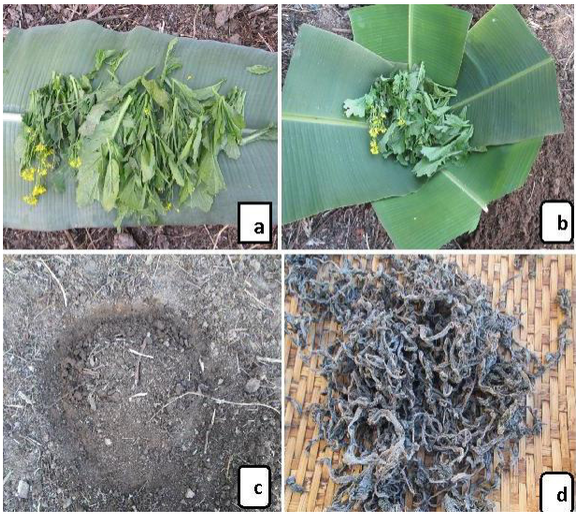

Figure 4b: Different stages of Hungrii preparation. a. Fresh mustard leaves, b. Leaves being wraped in banana leaves, c. Buried in the ground, d. The fermented product Hungrii.

sluggish green paste used as a condiment during preparation of meat and chutney. *Tsutocie* can be kept for over a year.

Matured cucumber fruits and leaves

⇩

Fruits cut into pieces and leaves shredded into pieces

⇩

Put into container along with water

⇩

Fermentation for 3 months

⇩

Tsutocie

Figure 5. Flow chart fot the preparation of *Tsutocie (Angami)*

3. Bamboo shoot based fermented food

(i). ***Bastanga***: '*Bastanga'* is made from succulent bamboo shoots (*Dendrocalamus hamiltonii, Bambusa tulda*). It is prepared mostly by the *Lotha Naga* tribe, named *Rhujuk* in *Lotha* dialect. Young shoots are taken and their sheaths are removed till only the soft white part of the shoot remains. The shoot is then cut into small pieces and pressed tightly into bamboo baskets covered with banana leaves. A hole is made in the middle so as to let the juice drain out.

The preparation is kept in that manner for about 2-3 weeks till the bamboo shoot is completely rained out of its juice. The fermented bamboo shoot is then dried. Different grades of dried bamboo shoots are obtained depending on the way they are cut (Fig. 6a, b). The juice can also be stored for years.

Succulent bamboo shoot (*Dendrocalamus hamiltonii,*

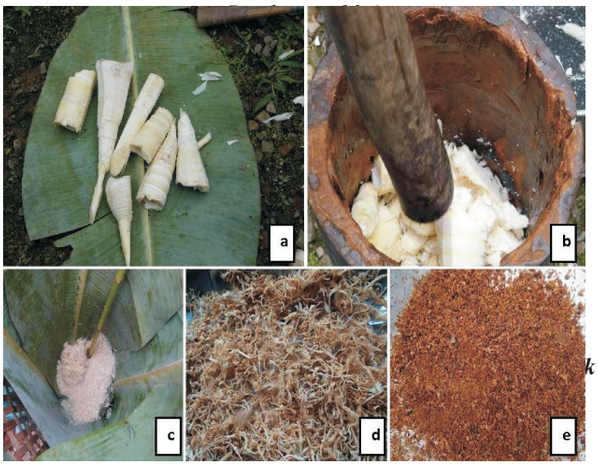

Figure 6b: Different stages of Bastanga preparation. (a) The succulent bamboo shoots, (b) Pounded in traditional mortar and pestel, (c) Bastanga in bamboo basket, d.e. Different grades of dried bamboo shoots.

4. Meat based fermented food

(i) *Jangpangnagtsu*: *'Japangangnagtsu'* a fermented food product made from crab (Scylla *sp*.), named according to the *Ao Naga* dialect. Crabs are first washed thoroughly and shredded into pieces leaving the hard coverings. It is then mixed with ground black *til* (*Sesamum orientale* L.) and wrapped in banana leaves or *Phrynium pubinerve* leaf or kept in a pot. After 3-4 days of keeping near the fire place the fermentation is complete.

(ii) *Jang kap*: *'Jang kap'* is made from buffalo skin, named according to the *Ao Naga* dialect. The skin is separated from the flesh completely and stacked in a tin or pot with tight covering. It is kept for about 1 week to allow the fermentation process. After the hairs are completely scrapped off it is either dried in the sun or kept near the fire place. People usually pressure cook and consume *Jang kap* as it becomes hard after it is dried.

Crabs washed thoroughly (*Scylla sp*.) shredded into pieces leaving hard covering and made into a paste.

⇩

Mixed with ground til (*Sesamum orientale* L.)

⇩

Ferment for 3-4 days.

⇩

Jangpangnatsu

Figure 7a: Flow chart of preparation of *Jangpangnatsu*.

Figure 7b: Different stages of *Jangpangnatsu* preparation. a. The shredded pieces of crab , b. Black til (*Sesamum orientale* L.) fry, c. Mixture of a & b and made paste, d. The fermented product *Jangpangnatsu*.

(iii) ***Fermented pork fat***: Pork fat is fermented and consumed as a condiment during preparation of vegetables and curries by almost all the *Naga* tribes. Pork fat is cut into small pieces and boiled. It is then, put into bamboo containers and the mouth of which is sealed with banana leaves. The fermentation process gets completed in about 1 week or so.

5. Fruit based fermented beverage.

The different Naga tribes usually prepare different kinds of fruit beverages from fruits like Naga apple (*Docynia indica*), passion fruit (*Passiflora edulis*), plum (*Prunus sp*.) and gooseberry (*Phyllanthus emblica*). The steps involves in preparation of fermented beverages

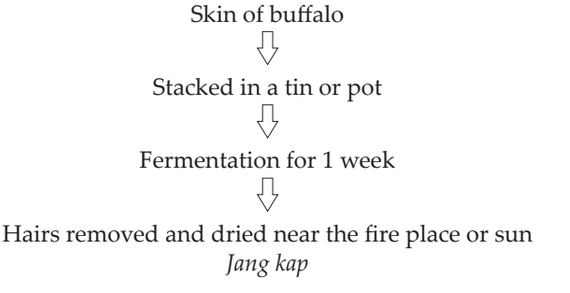

Figure 8. Flow chart of preparation of *Jang kap (Ao)*.

is given in Fig. 10. The fruits/ pulps are collected after removing the seeds and boiled. The boiled fruits/ pulp is soaked in sugar syrup for ~1-2 week for fermentation. The fermented product is taken as a beverage.

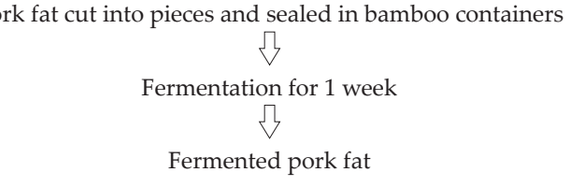

Figure 9. Flow chart for the preparation of fermented pork fat.

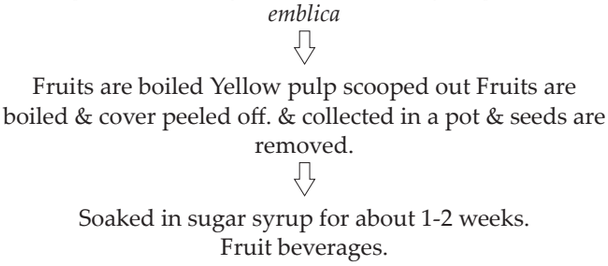

Figure 10. Flow chart of preparation of different fruit beverages.

Conclusion and future prospect

Research on traditional knowledge is mainly done with an aim of preserving indigenous knowledge for the benefit of the future. Thus, the documentation of the various traditional fermented food products is much needed at the present time. Indigenous food fermentation is one of the oldest biotechnology process in which microorganisms play an essential role in production and preservation. The fermentation process causes enrichment and improvement of food. Another aspects to be cosidered is that in Nagaland, villagers depend entirely on agriculture for their livelihood as well as for their economic wealth. Therefore, the knowledge of utilizing the local crops for producing these fermented foods and beverages have to be translated into economically viable products through various biotechnological tools.

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