

Kinema

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Kinema is one of the important components of the diverse food culture of the ethnic communities in the Eastern Himalayan regions of Nepal, the Darjeeling hills and Sikkim in India, the northeastern hills of India and Bhutan. *Kinema* is a whole-soybean fermented food with a sticky texture, gray tan in color and flavorful. It is similar to Japanese *natto*.

Hypothesis on the Origin of *Kinema*

The common word *kinema* is derived from “*kinambaa*” of the Limboo dialect (Limboo, being one of the major ethnic communities of Nepalis), “*ki*” means fermented and “*nambaa*” means flavor. The kingdom of “*Limbuwan*” (presently the eastern Nepal districts of Therathum, Taplejung, Panchthar, Dhankuta, and Ilam) was established by the Limboo earlier than the seventh century and remained independent till the unification of Nepal in the seventeenth century. Though there is no historical document on the origin of *kinema*, it is certain that among the Nepalis, the Limboo started production and consumption of this unique fermented flavorful soybean food. The unification of Nepal, the existence of a mixed society of multiethnic communities and the migration of people from one place to another might have resulted in the spread of *kinema* making and eating to other related Nepali communities such as the Rai, Tamang, Gurung, Mangar, etc. However, even now *kinema* is not popular among the Brahmin Nepalis. Other mountain ethnic communities in the Eastern Himalayas now share the delicacy of *kinema*. In Sikkim the Lepchas call it *satlyangser* and the Bhutias call it *bari*.

Methods of Preparation

In the Sikkim Himalayas, during the preparation of *kinema* (see next page), small-sized (up to 6mm) yellow-coated seeds of local cultivars of soybeans are soaked in spring water overnight and cooked by boiling until they can be pressed easily. Excess water is drained off and the seeds are cracked lightly by a wooden pestle (locally called a *muslo*) in a wooden mortar (locally called an *okhli*) to split the cotyledons, probably to accelerate fermentation and increase the surface area for aerobic spore-forming bacteria. Grits are placed in a bamboo basket lined with locally grown fresh fern fronds



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{*Glaphylopteriopsis erubescens* (Well ex. Hook.) Ching}, covered with a jute bag and left to ferment naturally at ambient temperatures (25°–40°C) for two to three days above an earthen-kitchen oven. In some villages, about one percent of fresh firewood ash is added to the cooked soybeans during production. In eastern Nepal, dark-brown-coated seeds of soybean are used to make *kinema*. Instead of fern leaves, *Ficus* and banana leaves are used as wrapping materials. Other methods remain the same. Completion of fermentation is indicated by the appearance of a white viscous mass and a typical *kinema* flavor with a slight ammonia-like odor. The “shelf life” of fresh *kinema* is two to three days during summer and a maximum of one week in winter without refrigeration. Sun-dried *kinema* is stored for several months at room temperature.

The preparation of *kinema* varies from place to place and is still restricted to household level. It is interesting to note that the mountain women use their indigenous knowledge of food production exclusively to prepare *kinema*. This unique indigenous knowledge of *kinema*-making is protected as a hereditary right and is passed from mother to daughter.



Cooked soybeans are pestled.

Flow chart of the traditional method of *kinema* production practiced in Sikkim



Cooked soybean grits are placed in fern leaves.



Firewood ash is added.



Wrapped in fern leaves, the grits are kept in a bamboo basket, covered with a jute bag.



KINEMA CURRY Ingredients

serves 6

Kinema	250 g
Onion	1 (chopped)
Tomato	1 (sliced)
Green chilies	3
Turmeric powder	1/4 tablespoon
Salt	1 teaspoon

Kinema Dishes

Kinema is eaten as a side-dish curry with cooked rice. The delicacy of *kinema* can be perceived from its appealing flavor and sticky texture. The most common traditional recipe for *kinema* curry is as shown above. To prepare: Heat vegetable oil in a frying pan and add chopped onion and fry until it becomes tender. Add tomatoes and turmeric powder and fry for two minutes. Add fresh *kinema*, salt, and sliced green chilies and fry for three to five minutes. Pour in a little water to make a thick curry, and cook for five to seven minutes. *Kinema* curry is now ready for serving with boiled rice. Sun-dried *kinema* is sometimes mixed with leafy vegetables to make mixed curry as a side dish.

Socio-economic Factors

Kinema production is an income generator for some families. It is sold in all local periodical markets, called “haats” in these regions, by rural women. Usually, it is sold by volume measured in a small silver mug containing 150-200 grams of *kinema*, and packed in the leaves of *Ficus hookeriana*, and then tied loosely with straw. Polyethylene bags are not used for packing *kinema*. One kilogram of *kinema* costs about 30 Indian rupees (72 yen). An average of five kilograms is sold by each seller in a local market and brings a profit of about forty percent. This small profit is spent on children’s education and on domestic expenses. This trade has been protected as a hereditary right passed from mother to daughter. Though there is a good market for *kinema*, and some rural women are involved in it for income generation, processing is still restricted to the individual household; there is no organized processing unit or factory. An inexpensive and ready-to-use pulverized starter culture

of *Bacillus subtilis* has been developed for *kinema* production, which can be adapted to local conditions for more income generation.

Microbiology and Nutritive Value of *Kinema*

The heat resistant spore-forming bacterium *Bacillus subtilis*, lactic acid bacteria such as *Enterococcus faecium*, and a few types of yeast, *Candida parapsilosis* and *Geotrichum candidum*, for instance, have been recovered from *kinema*. However, *Bacillus subtilis* is the dominant microflora in *kinema* fermentation, followed by *Enterococcus faecium*. The rich microbial diversity in various sources, particularly the soybeans, equipment and leaves used as wrapping materials, harnesses indigenous microbiota for the spontaneous fermentation of *kinema*. The rural practices of not cleaning the mortar and pestle, and using fresh leaves used as wrapping materials, significantly correlate with their indigenous knowledge of “microbiology” to preserve and supplement microorganisms for the spontaneous fermentation of *kinema* without using starter cultures.

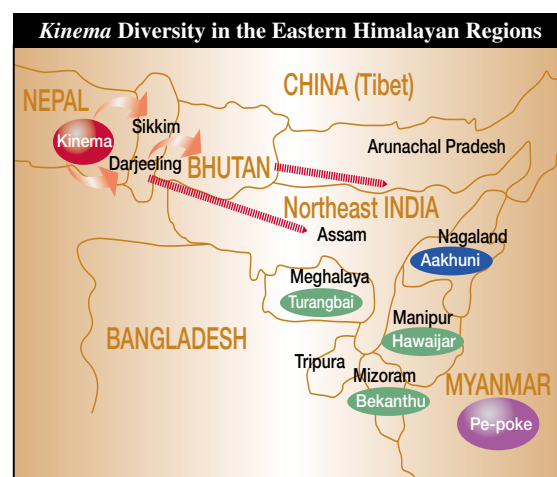
On a protein cost per kilogram basis, *kinema* is the cheapest source of plant protein and cheaper than animal and dairy products. During *kinema* production, soya-proteins, which have been denatured by the cooking process, are hydrolyzed by proteolytic enzymes produced by *Bacillus subtilis* into peptides and amino acids, enhancing digestibility. A remarkable increase in water-soluble nitrogen, trichloroacetic acid-soluble nitrogen contents, total amino acids, free amino acids and mineral content occurs during *kinema* fermentation, and subsequently enriches the nutritional value of the product. *Kinema* contains (per 100 grams dry matter):

protein 48 grams, fat 17 grams, carbohydrates 28 grams and 478 kilocalories.

Transition in Food Culture

The food culture in the Eastern Himalayas shows a transition to a mixed food culture containing both a “rice-soybean-alcoholic beverage diet,” the characteristic food culture of Southeast and East Asia, and the “wheat-milk-non-alcoholic beverage diet” of Central and West Asia. This is seen in the case of fermented soybean foods, which are prepared and consumed in the Eastern Himalayas and the adjoining foothills, such as *kinema* in eastern Nepal, the Darjeeling hills, Sikkim and Bhutan, *aakhuni* in Nagaland, *hawaijar* in Manipur, *turangbai* in Meghalaya, and *bekanthu* in Mizoram. Consumption of fermented soybean food is uncommon in Central and West Asia, and even in other parts of the Indian subcontinent. These fermented soybean foods are similar to the *natto* of Japan, *chungkok-jang* of Korea, *thua-nao* of northern Thailand and *pe-poke* of Myanmar.

The diversity of *Bacillus*-dominating fermented soybean foods of Asia needs to be studied to trace the antiquity and similarity in the food cultures of Asia.



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Born in Darjeeling (India) in 1961, Dr. Jyoti Prakash Tamang holds a Ph.D. degree in microbiology from North Bengal University in India. He did post-doctoral research in *kinema* and *natto* at the National Food Research Institute, Tsukuba, Japan, under a United Nations University-Kirin fellowship in 1994-95. He is one of the growing authorities on the

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