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Indigenous Fermented Food and Beverages: A Potential for Economic Development of the High Altitude Societies in Uttaranchal

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INTRODUCTION

Globally, there are varieties in fermented foods and beverages and so does the ingredients and recipes for making them. For instance, in Russia, a slightly sour weak beer called *Kvass* is made from rye flour and malt. In Australia *Kefyr* is made from milk with the help of a Mushroom variety. *Airag* is a traditional fermented drink in Mongolia. *Kumyss* is made in Russia and Turkey from sour and fermented milk. *Tsampa* is made in Tibet from tea, roasted ground barley, Yak-butter and sugar. *Pulque* is a traditional alcoholic drink made in Mexico and *Posca* was once the main beverage of the Roman Army (Linskens and Jackson, 1988; Frank, 1995; Ituen and Modo, 2000).

In the Indian subcontinent, making and use of fermented food and beverages using local food crops and other biological resources is very common amongst the high landers of Himalaya, though the name of the products and the base material vary from region to region. The people of Indian trans-Himalayan region such as Ladakh and Lahaul-Spiti make local beverages from barley called as *Chang*. While, the people in Kinnaur district of Himachal Pradesh call it *Ghanti*, which is made from fermented musk. In Sikkim and Darjeeling finger millet is the main substrate for their local beverages called as *Kodo ko Jaanr* (Rizvi, 1983; Bajpai, 1987; Tamang *et al*., 1996). The high altitude residents of Uttaranchal State that comprises of two regions viz., Garhwal and Kumaon call it as *Chakti* in Dharchula, *Daru* in Munsyari and *Chang* in Chamoli and Uttarkashi.

The present paper deals with indigenous knowledge of fermented foods and beverages of high altitude regions of Uttaranchal Himalaya in India. Uttaranchal is situated geographically in the eastern side of the northwestern Indian Himalaya. The study was focused on the Bhotiyas of Pithoragarh, Chamoli and Uttarkashi districts of Uttaranchal. These high landers of Uttaranchal are popularly known as the Bhotiyas, however, these people prefer to call themselves as *shaukas* in Kumaon region. Traditionally, the Bhotiyas of Uttaranchal were trans-border traders, and traded between India and erstwhile Tibet (Pant, 1935; Raipa, 1974; Farooquee and Nautiyal, 1999). They used sheep and goat as pack animals, and to feed their animals, they had adapted themselves as transhumant pastoralists. Their traditional economy revolved around sheep and goat rearing, besides little agriculture and trade (Hoon, 1996).

Most of these Bhotiya communities have now settled down permanently giving up their migratory nomadic life. As a result, some of their knowledge systems have already lost, and many others are on the verge of eradication. The traditional method of Bhotiya food fermentation and beverage making was designed in such a way, that it utilized those available crops, which did not make their main food crops. The common fermented drinks of this community are *jann* and *daru*. Among the fermented foods is the semi-fermented rice called *sez*, which is taken as a light snacks by these communities.

SURVEY METHODS

Extensive surveys were made in the Bhotiya dominated high altitude villages of three districts in Uttaranchal such as Pithoragarh, Chamoli and Uttarkashi from 1999 to 2001 to identify and explore the indigenous methods of preparing various fermented beverages and foods. The information on this indigenous practice was acquired through participatory field research methods such as semi-structured interviews, field inspections, field observations, participation in their social life and events.

PREPARATION OF *BALAM* (STARTER CULTURE)

The traditional catalyzing agent used in the preparation of fermented food and beverage is called *balam* in Kumaon and *balma* in Garhwal region, which is not prepared by all villagers in the society. The alpine grazers called as *anwals*

Table 1: Ingredients required in the making of *balma* or *balam*

Name of the ingredient	*Processing*	*Quantity required*
Wheat (*Triticum aestivum)*	Flour	1 Kg
Clove (*Chinnamomum zeylanicum)*	Powder	5-10 gm
Cardmum (*Amomum subulatum*)	Powder	5-10 gm
Pepper (*Piper longum*)	Powder	20-30 gm
Old balma powder	Powder	40-60 gm
Pipal seeds* (*Ficus religiosa*)	Powder	3-4 gm
Mirchi ghash*	Powder	2-3 gm

*These are not often used.

have specialized knowledge to prepare this starter culture. It is made up of wheat by mixing a number of herbs and spices. First the raw wheat is washed in water and sun dried, later this is grinded into flour, and then it is roasted over fire and removed before it becomes brown in colour. The roasted flour is then mixed with spices like long *(Chinnamomum zeylanicum),* elachi *(Amomum subulatum),* kalimirch *(Piper longum),* leaves of mirchi-ghash (wild chilies), and seeds of pipal (*Ficus religiosa*). In this mixture, powder of old *balam* is also added. The appropriate quantity of required ingredients in the preparation of *balam* are shown in table 1. The addition of old *balam* powder is a must, without this production of fresh *balam* is not possible. The mixture so prepared is then thoroughly mixed up with the required quantity of water, and is rolled into a thick paste. This mixture is then pressed between palms to make *balam* balls of the required size. These balls are then dried in shade and stored for future use for an indefinite period of time.

PREPARATION OF *JANN* (LOCAL BEER)

Jann is a traditional soft drink of the Bhotiyas, and contains very low concentration of alcohol. It is commonly prepared out of rice; however, it can also be made out of a good number of substrates of both cereals and fruits (Table 2). Some of the common cereals from which *jaan* can be made are rice (*Oryza sativa*), wheat (*Triticum aestivum*), jau (*Hordeum vulgare*), koni (*Setaria italica*), china (*Panicum miliaceum*), oowa (*Hordeum himalayens),* and chuwa (*Amaranthus paniculatus*). Similarly, amongst the fruits, apple is most desired and is also very delicious. But *jann* prepared from *koni* is considered to be the best in quality. The quality of *jann* is best judged by its taste (sweetness), smell and strength.

Mostly rice *jann* is commonly used and is prepared almost in every household in this society, but now its preparation and consumption has declined. In the making of rice *jaan*, first rice is cooked or boiled for about half an hour or until it becomes soft and edible. The cooked rice is drained off the excess of water and spread on a flat container allowing to be cooled quickly. The cooked rice is then thoroughly mixed with *balam* powder. The quantity of the *balam* powder required is proportionate to the quantity of rice to be fermented (Table 3). This mixture is then kept in an airtight container (the mouth of the container is sealed usually by piece of cloth) and is kept in a dark and warm place for fermentation. In cold conditions, the rate of fermentation is slow as compared to warm. But for a good quality *jann* slow fermentation at low temperature is a required condition. The process of fermentation takes place in the absence of oxygen, and usually after a week of fermentation *jann* is prepared.

However, for a better quality of *jann* the fermentation period is extended as long as possible but not more than a year. Longer the

Table 2: Preference of cereals in the preparation of *jaan*

Cereals	*Most common*	*Best quality*	*Less preferred*
Rice (*Oryza sativa)*	*		
Koni (*Setaria italica*)		*	
Wheat (*Triticum aestivum*)			*
Jau (*Hordeum vulgare*)	*		
Oowa (*Hordeum himalayans)*	*		
Chuwa (*Amaranthus paniculatus*)			*
China (*Panicum miliaceum*)			*

Table 3: Yield rate of local beverages using rice as a substrate

Beverages	*Input*				*Yield Rate*
	Rice	*Balma*	*Jaggary*	*Fuel wood*	
Jaan	5 Kg	40 gm	-	-	3-4 Liters (partially fermented) 6-7 Liters (fully fermented)
Daru	5 Kg	100 gm	2 Kg	10-12 Kg	3-4 Liters

period of fermentation the less is the undigested remains of rice, and in that case the quantity of *jann* produce is more. It has been proved that longer the period of fermentation, there is more and significant reduction in phytic acid content while the availability of in-vitro minerals increases (Bhatiya and Khetarpaul, 2002). After the completion of fermentation, the *jann* so produced is filtered with the help of a sieve. The filtrate is a whitish liquid, which is abandoned or used as animal fodder. Earlier, when Bhotiyas migrated to their winter settlement in lower valleys, before their migration they prepared *jaan* material and left them for fermentation. For six months of winter, their entire settlement got submerged under snow, and as result of the internal heat generated due to the external pressure of ice from the top, the *jaan* fermentation was slow but steady. On their return to the place again in summer the people found their *jann* ready for drink, and *jann* produced in this way is considered to be the best in quality.

Similarly, the preparation of *jann* is same from other cereals like *koni*, wheat, *jaw, oowa, chuwa* and *cheena.* Like rice, first the seeds of any of these cereals are boiled in water until they become soft and edible. Then they are mixed with *balam* powder and the rest of the stages of storing and fermentation, and finally yielding of *jann* is the same. Only in the case of *jaw* the seeds are partially grinned before boiling, which enables quick fermentation and optimum yielding.

Jann is also prepared from fruits like apple, banana, pumpkin and orange. Apples are first cut into pieces and then are mixed with *balam* powder for fermentation. The rest of the method is the same, except in case of orange, where either the juice or the complete fruit after peeling is mixed with *balam* powder and fermented for yielding *jann*. Banana is used without removing its outer skin. The preparation of *jann* from pumpkin is slightly different, where a small cut is made in a large sized pumpkin in such a way that the cut piece is again fitted back to its place. First the seeds and loose tissues contents of the fruit is removed through the opening, and boiled rice or other substrate mixed with *balam* powder as usual is poured into the empty space of the fruit. It is then sealed again by placing back the cut piece in its place. The process of fermentation takes place inside as a result of which along with rice the inner soft tissue of the fruit also gets digested, and thus yields *jann* in due course of time.

PREPARATION OF *DARU* (ALCOHOLIC DRINK)

Daru is the distilled liquor containing ethyl alcohol at a much higher concentration than other alcoholic beverages. Rice and jaggery are the

Table 4: Comparative fermentation process of *daru* and *jann*

Characteristics	*Jann*	*Daru*
Optimum temperature	Room temperature 10^0 C– 15^0 C	30^0 C to 40^0 C
Fermentation nature	Anaerobic	Anaerobic
Fermentation container	Porous earthen ware	Non porous metallic ware
Fermentation rate	Slow fermentation is preferred (6-10 months)	Rapid fermentation; completed within 2 to 3 days under optimum temperature (30^0 to 40^0 C)
Taste	Vary according to the substrate used.	Constant irrespective of substrate used.
Yield	Ethyl alcohol <10 % plus carbo-hydrate, amino-acid, vitamins, etc., depending upon the substrate used.	Ethyl alcohol invariably to the quality of the substrate used.

common substrate used for preparation of *daru*. Apart from rice, the cereals like *koni, chuwa, oowa* and wheat are used in the preparation of *daru*. However, unlike in the case of *jann* the taste (i.e. quality) of the *daru* does not vary according to the type of substrate used. Therefore, choice of substrate does not matter in the preparation of *daru*. The most commonly available and cost effective materials used in the preparation of *daru,* is rice and jaggary.

Cooked rice on becoming cool is mixed with the powder of *balam*, the proportion of *balam* powder required in preparation of *daru* is much more than what is required in *jann* preparation (Table 4). This mixture is then kept in an airtight container for fermentation, and is kept in preferably a warmer place. To ensure the warmth, either the fermentation container is covered with woolen cloth or else it is kept near the cooking hearth, direct heating is, however, avoided. After about a week of fermentation, when the mixture is in a semi liquid condition, it is distilled in a distillation vessel. The distillate substance is the *daru,* which is collected in bottles. The undigested residue is called *chak,* is dirty white in colour, this can be used again for preparation of *daru* by fortification with jaggary and fresh *balam* powder. This way *chak* is recycled or reused in *daru* preparation. However, this is not used for more than three times, and is given to animals to eat.

DISTILLATION AND COLOURING OF DARU

The traditional distillation method is still practiced in this region, the indigenous set, which is quite simple has three parts *parar, jokhal* and *tal,* as called in the local dialect. The *parar* is a big saucepan like container with flat bottom, and *jokhal* is a flat wooden device like a dish having an elongated channel with a hole at the center, and is indigenously prepared by the people. The *tal* is a simple cooking vessel, but the neck of *tal* and the bottom of *parar* is of such a size that they hold the *jokhal* perfectly. This whole system is put on fire, on being heated the alcoholic vapor first evaporate and come through the central hole of the *jokhal*. But on coming in contact with cold bottom of *parar* the vapor gets condensed into liquid. This liquid is collected in a container, and this distillate is the alcohol or *daru*.

The *daru* collected in first three to four bottles during the process of distillation contains very high percentage of alcohol, and is always diluted before consumption. The alcohol content gradually reduces and finally only water evaporates. Traditionally *daru* is graded into three categories the initial few bottles containing high percentage of alcohol is called *paileful*; the final few bottles containing very low contents of alcohol is called *piskani*, and a few bottles in between them containing moderate contents of alcohol is rated good for consumption. For making the *daru* attractive in appearance, a small quantity of turmeric is hanged right at the mouth of the distillation set through which the distillate is collected. This makes the liquid a light but brilliantly shining yellow in colour.

SEZ (SEMI-FERMENTED FOOD)

The traditional semi-fermented food used by the Bhotiyas is called *sez,* it is made from rice, and is mostly used as a snacks. Earlier, it was a delicacy and was prepared only during certain festivals. In most cases, *sez* is extracted while preparation of rice *jann* (*chaul-ki-jann*). In the case of *daru* preparation the intermediate stage yielding *sez* is very unstable. The quantity of *balam* powder added is the determinant factor for the rate of fermentation. In *daru* preparation quantity of *balam* used is maximum. Thus whenever extraction of *sez* is required the fermentation process has to be slowed down. To that effect a small quantity of *balam* powder is mixed with the substrate. Under a slow fermentation it becomes easy to intervene into the process removing the *sez* easily. Once *sez* has been removed fresh *balam* powder is added to hasten the process of fermentation so that *jann* or *daru* could be yielded.

PRODUCTION OF *JANN, SEZ* AND *DARU* FROM A COMMON CYCLE OF FERMENTATION

All the three different categories of fermented beverage and foods can be prepared from a common fermentation cycle, only when rice is used as substrate. Rice is first cooked or boiled in water for half an hour or until become soft and edible. This is then kept in a flat container to be drained off excess water and also to be cooled down. This boiled rice is mixed with *balam* powder (ratio of *balam* and rice is important). The mixture is kept in an airtight container preferably in a dark and cool place. The container (traditionally is a earthen ware or a wooden vessel) nowadays even plastic vessel is also used.

After one or two days of fermentation, the *sez* is ready for consumption. The required quantity of *sez* could be removed at this stage. After that the container is again kept airtight for another five to ten days for further fermentation, then *jann* is produced. *Jann* is removed by filtration, i.e. by passing the content through a sieve or a piece of cloth. In the remaining mixture, jaggary and fresh balls of *balam* at a ratio of one ball per kg jaggary is added for the preparation of *daru.*

The jaggary is boiled and cooled, and is mixed with *balam* powder. This is then added to the mixture and kept for fermentation in a tin container. Earthen ware is not used in *daru* preparation. The container set for fermentation is made air tight and kept in a warmer condition. *Daru* is produced within three to four days of fermentation.

The emergence of this indigenous knowledge system in this part of high altitudes of the Himalaya was due to the cold climatic conditions of the Bhotiya dominated areas. The way this society carved a niche in the making and living on the surrounding natural resources for adaptation to the emerging circumstances in the region. However, there is a shift in livings due to the intervention of outside forces, which have been damaging the traditional and self- sustaining systems in the name of development through introducing the outside made products. The indigenous knowledge of making fermented food and beverages developed over a long period of time. However, due to the expansion of road network and market forces, the availability of prepared yeast and modern liquor has changed the quality and quantity of indigenous fermented food and beverages. The age-old indigenous fermentation techniques should be encouraged as it led to the development of nutritious food items, which can cope up the inhospitable climatic conditions of high altitude areas.

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KEYWORDS High Altitude. Bhotiya Community. Traditions. Fermented Food. Beverages. Conservation

ABSTRACT The high altitude Himalayan region is characterized by diverse ethnic groups, which have developed their own cultures based on available natural resources, giving rise to a cultural diversity on par with the high level of biological diversity found in the region. Amongst the high landers of Himalaya making and use of fermented food and beverages using local food crops and other biological resources is very common. Traditionally, Bhotiya tribal community of Uttaranchal State in Western Himalaya use to make two types of beverages such as *jann* (local beer), and *daru* (alcoholic drink) and also prepare fermented food locally called as *sez*. The traditional catalyzing agent used in the preparation of fermented foods and beverages is called *balam* in Kumaon and *balma* in Garhwal region of Uttaranchal, which is not prepared by all villagers in the society. This paper tries to document the various ingredients used in making indigenous beverages and the recipes for making them along with the linkages involved in the marginalisation of this practice and eco-friendly knowledge systems of the remote Himalayan region.

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