Preparation of Phabs - an indigenous starter culture for production of traditional alcoholic beverage, Chhang, in Ladakh

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Phabs is an indigenous inoculum of the Trans-Himalayan Ladakh region of India. It is used by the people of Ladakh for the fermentation of two traditional barley based alcoholic beverages chhang and aarak. Chhang is an important part of sociocultural life of local inhabitants and its consumption is more common than aarak. The paper deals with the indigenous method of phabs preparation by the people of Nubra valley of Ladakh. Phabs is made from the coarse flour of husked roasted barley (Hordeum vulgare L.). Fresh twigs of shrub Artemisia sp. locally available is used to incubate the fresh tablet of phabs. In traditional medicine phabs is used in hydrotherapy to treat arthritis and joints pain.

Keywords: Phabs, Chhang, Aarak, Nubra valley, Ladakh, Trans-Himalaya

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Worldwide alcoholic beverages are of great significance but the tradition of using ethnic starter culture for fermentation of alcoholic beverages is more common in Asian continent1. The starter culture preparation varies from region to region which involves the use of local food crops, spices or herbs of particular region. It carries the functional microflora of fermentation from generation to generation and is available in different shapes from flat cake or brick to granulate or ball form. The starchy traditional starter culture such as Bubod of Philippines, chu of China, benh men of Vietnam, chuzo of Mongolia, jui paing of Malaysia, loogpang of Thiland, ragi of Indonesia, nuruk of Korea and marcha of Sikkim in India, Nepal and Bhutan are some of the indigenous starter cultures of Asian countries2.

In Indian subcontinent, making and use of starter culture is common in tribal and rural belts of Himalayan region. Dhehli, herbal based starter culture of laq valley of Kullu, Himachal Pradesh used to produce traditional beverage sura3. The people of Bhotiya community from Uttarakhand Himalaya use balam for production of two traditional fermented beverages jaan and daru4. A rice based beverage of Manipur atingba is prepared from ethnic starter culture Hamei5. Jhara or harhia a traditional alcoholic beverage of West Bengal is fermented by using starter culture ranu dabar6. Vekur pitha of Assam is used for the making fermented beverage ahom7. Starter culture similar to the phabs of Ladakh region have also been also reported from the belts of Lahaul, Spiti and Kinnaur in Himachal Pradesh for the production of beverage chhang8,9.

Phabs is an ethnic inoculum of Ladakh used in the fermentation of two traditional barley based alcoholic beverages locally called chhang and a distilled clear liquor called aarak. In the past, preparation of aarak was common on special occasions but now it production is decreased. Chhang is a local beer and its alcohol content is 5-7%9. It is brewed by every second house in all the villages of Ladakh but art of making phabs is limited to some of the villages of Nubra valley such as Hundir, Skamphuk, Tarsei, Udmaru and some families of Hunder. Chhang is prepared on a regular routine at household level for domestic consumption and ceremonial purposes. Phabs is made by the bhoto community (Buddhist) at a household level and sold loosely in the market of Leh town of Ladakh. In the ancient time traders from various region of Ladakh used to visit Nubra valley and trade through barter system by buying phabs in exchanged with cereal grain or other household goods. It is carried by a Ladakhi army personal posted in Nubra valley as a token of present for his home and
relatives during vacation. A phabs has therapeutic importance in traditional medicine system. An amchi local practitioner use phabs in hydrotherapy along with other medicinal plant to cure a disease like arthritis and joint pain.

**Study site**

*Nubra* valley is situated in the northern part of Ladakh and reached by passing across *Khardhung La* pass (18380 ft). It has an area of 9216 sq mile, with about 128 miles in length and 72 miles in breadth and enclosed on North by *Karakorum* range and on South by *Ladakh* range. It extends between approximately 34° 15'45 to 35° 30' N latitude and 76° 55' to 78° 05' E longitude. The mean maximum and minimum temperature and relative humidity % of Ladakh lies between 18.9 ± 9.5°C and –5.8 ± 9.8°C and 35.54 ± 7.3% and 25.0 ± 3.7%.

**Methodology**

Survey was carried out in the three villages of *Nubra* valley, i.e. *Hunder*, *Skamphuk* and *Udmaru*, from June-September, 2012. An observation for indigenous method of phabs preparation was made by visiting homes and interacting with locals. The information was gathered through frequent questionnaire and discussion with elderly and experienced peoples of villages. The moisture content of phabs was determined using the oven drying method and expressed as percentage fresh weight. In total 93 persons from three different villages were consulted and Prior Informed Consent (PIC) was ensured.

**Results**

A phabs preparation is a temperature dependent and involves a microbial process. *Saccharomyces cerevisiae* and *Bacillus* sp. have been reported from phabs. It is prepared from mid-June to October during which the temperature ranges between 20°C-38°C and relative humidity 44.03%-51.46% i.e. the time when shrub *Artemisia* sp. locally called *burnak* (Fig.1) is fully grown. The shrub *Artemisia* sp. plays a central role in phabs preparation. The *Artemisia* sp. (burnak) is a wild, strong aromatic shrub with yellow colored flower. It is grown in clumps on side of irrigation canals or on the edge of terrace field. According to some ladies whose families are involved in making phabs for centuries, the strong fragrance of burnak is similar to the aroma of phabs. The *Artemisia* sp. had an inhibitory effect on the growth of some common food borne bacteria. The antibacterial properties of *Artemisia* sp. might be inhibiting the growth of bacteria present in the ingredient used or environment and allows only microflora present in previous year phabs to grow in fresh inoculated starter tablets. September is considered to be the best for the preparation of phabs as temperature drops down which is suitable for the preparation good quality of phabs and its indigenous method of preparation is given in Flowchart.

*Tolgong* (residual husked barley grains after winnowing) are cleaned by removing tiny stones and some of the hay or straw is allowed to remain. In olden times *swa* (variety husked barley grain) is also used but now a days *swa* (husked barley grain) is no longer used as it is not widely cultivated. A raw tolgong without washing is roasted on the fire for a while until it became little brownish in color (Fig. 2). Roasted tolgong is ground into coarse flour in rantak (Fig. 3), a traditional flour mill. The rantak functions by forceful flow of water that exerts a pressure on wooden wheel which make the long wooden rod to move that in turn rotates the big circular stone grinder. The *swa-phey* (roasted coarse barley flour) is transferred by bho, a wooden mug into lain (large plate) and kneaded into dough with required quantity of either lukewarm or cold water (Fig. 4). Traditionally a wooden mug locally called as *bho* (Fig. 5) is used to measure the quantity of flour. Each *bho* is equivalent to 1or 2 kg depending upon its size. A small piece of dough is taken in palms of both hands to roll into a small
spherical ball, each weighing 2.5-3.3 gm and diameter 1.83-2.36 cm (Fig. 6). These tablets or balls were placed on a piece of cloth. A previous year phabs is grounded to powder and sprinkled on it. For per bho, i.e. nearly 1 kg of flour, single phabs tablet was used. A cloth on the both ends is hold by the two people who mix freshly prepared tablets with powdered older year phabs properly by continuously shaking the cloth. In this inoculated ball, wheat flour is added to it and mixed thoroughly (Fig. 7). Usually, each handful of two-three times wheat flour is added to 1 bho (1kg) of flour. These inoculated tablets are then laid on the layer of burnak (shurb) (Fig. 8) and another layer of burnak (shurb) is placed over it. The whole thing is further covered by either sack or a warm cloth and left undisturbed to ferment in the dark room. A number of layers of clothes increase with the decrease in temperature. After 2-3 days a distinct alcoholic and fermenting aroma with puffy appearance of tablets indicates the completion of fermentation. The clothes and layer of burnak over the tablets are removed. The tablets are picked up one by one from the bed of burnak and then flat spread on another piece of cloth and allowed to dry in shade for 5-7 days (Fig. 9). After complete drying, the tablets become hard, white in color (Fig. 10) and stored for further use. The moisture content of dried phabs was 2.9%-3.4%. Due to low temperature and humidity in the environment and low moisture content of phabs, it can be stored at a room temperature for longer period of time. In the past earthen pots are used for storage of phabs but now it has been replaced by tin or barrel. Usually one year old phabs is preferred than newly made phabs for brewing the chhang.

In the olden times, Aconitum sp. (shrub) locally called bonya and smoke powder are also mixed during the phabs preparation as these two ingredients makes phabs that produces strong alcoholic beverage. Aconitum sp. has a long history of usage in Chinese herbal medicine and possess a various pharmacological properties such as analgesic, anesthetics and sedative\(^{15}\). Hence drinking of this strong alcoholic beverage causes a feeling of euphorbia, supremacy and extremely elevated mood and it may further lead to the habit of addiction. Subsequently due to alcohol use disorders like alcoholism Aconitum sp. is no longer in use during the preparation of phabs.

In the traditional medicine phabs is used by amchi in hydrotherapy treatment called the dursi nya lung. In dursi nya lung, phabs along with five other medicinal plants such as Juniperus sp. (shukpa), Ephedra sp. (tsapat), Tanacetum sp. (khampa), Myricaria sp. (umbu) and Leontopodium sp. (palu) is used to treat joint pain and arthritis.

**Discussion**

Phabs has as an ethnic importance for the production two beverages chhang and aarak. Chhang plays a central role in the life of Ladakhi people. Chhang has not been commercialized yet but it is prepared on a regular routine at a household level for domestic consumption and ceremonial purposes. It is consumed during wedding, birth of child and festival like losar (New Year)\(^9,16\). It is a gesture of welcome to the guest by holding chapskan (brass kettle) filled with chhang. After a daylong work at field, chhang served as thirst-quencher or refreshing drink\(^9\). Besides, being a part of socio-cultural life it also provides nutrition. Chhang mixed with namphey (roasted barley flour) and consumed 1-2 glass per day is considered beneficial for health. Amchi, the local practitioner, recommended daily intake of the beverages in limited amount as it helps to improve the digestion.
Traditional significance of study

The preparation and consumption of traditional alcoholic beverage is very prevalent among the people living in Himalayan region. The starter culture used by the tribal people in Himalayan region for preparation of alcoholic beverages is *phabs*. There has been a number of studies on the microbiological, biochemical and nutritional aspects of the traditional fermented beverage of Himalayan region but the method for preparation of *phabs* was hitherto undocumented or not precisely known to the scientific community. In the present study the method of preparation of *phabs* by the tribal in *Nubra* valley has been documented. The documentation of traditional

Figs. 2-10 — (2) Roasting of barley grain; (3) *Rantak* a traditional flour mill; (4) Kneading of barley flour with water; (5) *Bho* a wooden mug; (6) Dough rolls into small tablet form; (7) Fresh tablet inoculated with previous year *phabs*; (8) *Phabs* is laid on the bed of fresh twigs of *Artemisia* sp. (*burnak*); (9) Shade drying of *phabs* after fermentation is completed; (10) *Phabs* starter inoculum.
knowledge of *phabs* preparation is highly significant to
the mountain society/Himalayan tribal people as this
important art is under threat due to rapid modernization,
availability of commercial beverage and reluctance of
younger generation to get involved in the preparation of
traditional fermented beverages. In view of this present
study assumes greater significance otherwise after
sometime the traditional tribal knowledge of preparing
starter culture may become extinct. It is a simple method
of preservation of microbial consortium involved in
fermentation and thus this method has potential to be
tested, extended and perfected to preserve microbial
cultures in a microbiology laboratory.

**Conclusion**

The present study has documented the traditional
art and method of preparation and preservation of
starter culture used in the production of fermented
beverages in the Himalayan region.

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