

***Morchella esculenta* (Guchhi): Need for scientific intervention for its cultivation in Central Himalaya**

Pankaj Prasad¹, Kusum Chauhan¹, L. S. Kandari¹, R. K. Maikhuri^{1*}, Aditya Purohit¹, R. P. Bhatt² and K.S. Rao³

¹G.B. Prant Institute of Himalayan Environment and Development, Garhwal Unit, P.B. 92, Srinagar (Garhwal), 246174, India

²Department of Botany, H.N.B. Garhwal University, Srinagar (Garhwal), 246174, India

³Sustainable Development of Rural Ecosystem, G.B. Prant Institute of Himalayan Environment and Development, Kosi-Katamal, Almora 263643, India

Abstract

Morchella esculenta is an important mushroom belonging to the family Helvellaceae and is locally known as Guchhi. It is found in the forest between 1800 and 3600 masl and is locally sold to middlemen and traders at 5000 per kg. It is cooked as food and used in medicine and health care system by the traditional societies and also considered important for clinical use. It is noticed that the local people set the ground on fire assuming that such a practice will improve its yield but it may have negative impact on forest biodiversity and ecosystem services. Therefore, the present article suggests that in-depth scientific studies are required on this precious species to provide package of practices for its large-scale cultivation.

Revitalizing drink: An assessment of traditional knowledge system in Bhotiya community of Central Himalayas, India

Aditya Purohit¹, R K Maikhuri^{1*}, K S Rao² and S Nautiyal²

¹Garhwal Unit. G.B. Pant Institute of Himalayan Environment and Development. P. Box 92, Srinagar (Garhwal) 246 174. Uttarakhand, India

²Sustainable Development of Rural Ecosystems, G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal. Almora 263 643, Uttarakhand. India

Received 3 October 2001

Abstract

Bhotiya communities inhabiting the higher altitudes of the Central Himalayas use traditional tea throughout the year and consider it very energetic and nutritive for health. A variety of wild plants and their different parts, i.e. bark of *Taxlis baccata* subsp. *wallichiana*, dry leaves of *Bergenia ligulata* gum of and fresh leaves of *Origanum vulgare*, are used in traditional tea preparation. Among the species used in traditional tea preparation, *T. baccata* is consumed maximum, followed by *B. ligulata*, *B. utilis* and *O. vulgare*. However, the quantity and frequency of tea consumption varied with the season and climatic conditions. The present paper discusses the collection and consumption pattern of the wild plants and their parts used in various purposes including traditional tea preparation and the indigenous knowledge involved in.

Keywords: *Betula utilis* Bhotiya. Central Himalayas, Traditional tea, *Taxlis baccata* subsp. *Wallichiana*, *Bergenia ligulata*, *Betula utilis*, *Origanum vulgare*, acculturation.

Soor: A traditional alcoholic beverage in Tons Valley, Garhwal Himalaya

T S Rana*, Bhaskar Datt and R R Rao**

Plant Biodiversity and Conservation Biology Division, National Botanical Research Institute, Lucknow 226001

E-mail: rana_ts@yahoo.co.uk

Ph.: 0522-2205831-35, Ext. 233

**Central Institute of Medicinal and Aromatic Plants, Field Station, Allalsandra, Yellahanka, Bangalore 560065

Received: 14 July 2003; revised 27 November 2003

Abstract

The aboriginal communities in the hilly and mountainous Tons Valley have traditionally had recourse to Soor — a traditional alcoholic beverage to cope with adverse climatic conditions and also on ceremonial occasions as well as festivals. This paper describes the indigenous method of preparing Soor. It also explores the role of Soor in the life and culture of aboriginal people.

Keywords: Soor, Keem, Garhwal Himalaya.

Characterization of some traditional fermented foods and beverages of Himachal Pradesh

Navdeep Thakur, Savitri and Tek Chand Bhalla*

Department of Biotechnology, Himachal Pradesh University,
Summerhill, Shimla 171005, Himachal Pradesh

Received 6 May 2003; revised 1 January 2004

Abstract

Traditional fermented foods and beverages are very popular in the tribal and rural areas of Himachal Pradesh. A number of fermented foods and beverages were identified and the traditional fermentation processes were studied. Some of the popular fermented foods and beverages were analysed for their microbiological characteristics. The fermented products that are unique to the tribal and rural belts of Himachal are *Bhaturu*, *Siddu*, *Chilra*, *Manna*, *Marchu*, *Bagpinni*, *Seera*, *Dosha*, *Sepubari*, *Sura*, *Chhang*, *Lugri*, *Daru*, *Angoori* and *Behmi*. Besides source of nutrition, these fermented foods e.g. *Bhaturu*, constitute staple food in larger part of rural areas of Kullu, Kangra, Mandi and Lahaul & Spiti districts of the state while others are consumed during local festivals, marriages and special occasions. Traditional starter cultures like 'Phab' (dehydrated yeast formulations), 'Treh' (previously fermented wheat flour slurry) and 'Malera' (previously fermented wheat flour dough) are the inocula used in preparing fermented products. Microbiological studies revealed that species of *Saccharomyces cerevisiae* is a dominant microorganism in fermentation along with species of *Candida*, *Leuconostoc* and *Lactobacillus*. The ethanol content of some of the fermented beverages was also analysed.

Keywords: Traditional Foods, Traditional Beverages, Fermented Foods, Fermented Beverages, Tribals, Himachal Pradesh.

Preparation of rice beer by the tribal inhabitants of tea gardens in Terai of West Bengal

Chandra Ghosh and A P Das*

Taxonomy & Environmental Biology Laboratory, Department of Botany,
North Bengal University, Darjiling 734430, West Bengal

Received 24 May 2004

Abstract

The ingredients and the method of preparing starter mixture (*Ranu Dabai*) and the fermentation of boiled rice for production of rice beer (*Jhara* or *Harhia*) have been recorded as it is practiced by the Oraon and Santhal workers in Terai Tea Gardens. In addition to the use of five core plants (*Oryza sativa*, *Coccinia grandis*, *Plumbago zeylanica*, *Vernonia cinerea* and *Clerodendrum viscosum*), tribals use quite a few more plants to modify the taste and/or colour of *Jhara*.

Keywords: *Jhara*, *Harhia*, Oraons, Santhals, *Ranu Dabai*, Rice beer.

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

B. Roy, C. Prakash Kala, Nehal A. Farooquee and B.S. Majila

G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora
263 643, Uttarakhand, India

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 highlanders 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 Uttarakhand 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 Uttarakhand, 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.

Keywords: High Altitude. Bhotiya Community. Traditions. Fermented Food. Beverages. Conservation

Preparation Techniques and Nutritive Value of Fermented Foods From the Khasi Tribes of Meghalaya

D. AGRAHAR-MURUGKAR ICAR

Research Complex for NEH Region, Meghalaya, India

G. SUBBULAKSHMI

Nirmala Niketan, College of Home Science, Mumbai, India

Abstract

Fermented products form an intrinsic part of the diet of the tribal peoples in northeastern India. This study describes the preparation methods and the nutritive value of fermented soybean (tungrymbai), bamboo (lungsiej), and fish (tungtap) consumed by the Khasi tribes from Meghalaya in northeastern India. Results of the analysis are reported on a dry matter basis. Analysis showed that tungtap was a good source of protein (40.6 g/100g), calcium (5040 mg/100g), phosphorus (1930 mg/100 g), sodium (6.26 mg/100g), and potassium (53.18 mg/100g). Tungrymbai contained high amounts of protein (45.9 g/100g), fat (30.2 g/100g), fiber (12.8 g/100g), carotene (212.7 µg/ 100g), and folic acid (200 µg/100g). Lungsiej was found to be of better nutritive value than its unfermented counterpart in terms of protein (8.5 g/100g) and iron (1 mg/100g on a fresh weight basis). Fermented foods are typical of the region and exhibit unique flavors and textures that may not be palatable to everyone. It is well established that the process of fermentation enhances the nutritional quality of any product by increasing amounts of vitamins and protein solubility, and by improving amino acid patterns and the same is true with these products studied.

Traditional alcoholic beverage, Yu of Meitei communities of Manipur

P K Singh* & K I Singh

Ethnobotany and Plant Physiology Laboratory, Department of Life Sciences,
Manipur University, Canchipur, Imphal 795 003, Manipur

E-mail: potksingh@indiatimes.com

Received 10 December 2004; revised 4 February 2005

Abstract

From time immemorial the people of Manipur use *Yu* for medicine, relaxant and offerings. It is a distilled product of the fermented local rice. The technology of the preparation of *Yu* is a traditional one and the product is a source of income generation to the poorer sections of people. The technology is amenable for upgradation in a scientific way. *Yu* is a strong solvent for many important active constituents of medicinal plants, whose actions play a potent role in the traditional medicine. The paper deals with the uses of 12 plant species belonging to 12 families, their mode of action and applications collected from traditional healers.

Key words: *Yu*, Traditional beverage, Alcoholic beverage, Meitei tribe, Manipur

Natural Product Radiance, 5(5): 377-381, (2006).

Hor, the traditional alcoholic beverage of Karbi tribe in Assam

Robindra Teron

Department of Botany, Diphu Government College, P.O. Diphu Karbi Anglong- 782 462, Assam, India E-mail :

robindra_teron@yahoo.co.in ; robin_kongkat@rediffmail.com

Received 23 January 2006; Accepted 22 May 2006

Abstract:

The Karbis have an age old tradition of preparing *Hor Alank* (rice beer) by fermenting cooked rice with locally prepared yeast culture called *Thap* and distilling the alcohol called *Hor Arak* from the beer. *Thap* is traditionally prepared from leaves of *Croton joufra* Roxb. and uncooked rice. Highly concentrated alcohol in small quantities has been used among rural masses to cure dysentery, pharyngitis and cholera; while *hor alank* is used as preservative and for flavouring dried fish (*manthu*). The paper describes the indigenous method of preparing the beverage, various substitutes and adulterants used for the preparation of *thap* and its uses. The traditional Still called *Bhot* as well as improved Still have also been described in detail.

Keywords : Karbi tribe, Karbi Anglong, Assam, Traditional beverage, Alcoholic beverage, *Hor alank*, *Hor arak*, *Thap*, Rice beer, Rice, *Croton joufra*, *Amomum corynostachyum*, *Acacia pennata*, *Bhot*, Still, Substitute, Adulterant.

Traditional foods and beverages of Himachal Pradesh

Savitri & Tek Chand Bhalla*

Department of Biotechnology, Himachal Pradesh University, Summerhill, Shimla-171005, Himachal Pradesh

E-mail: bhallatc@rediffmail.com

Received 3 August 2006; revised 28 November 2006

Abstract

Himachal Pradesh presents anthropological, cultural, environmental and topographical diversity. Its reflection is seen in the variations of architecture of houses, clothing styles, food and food habits. The variations in availability of raw materials, environmental conditions clubbed with the time tested traditional knowledge and wisdom have made the people of different regions of this hill state to formulate, develop and perpetuate the consumption of a wide range of traditional foods and beverages unique to its places since ages. Bhatooru, siddu, marchu, seera, chilra, manna, aenkadu, sepubari, patande, doo, baari, dosha, malpude, babroo, bedvin roti, madrah, tchati, churpa, sura, chhang, kinnauri, angoori, chulli, lugri, arak/ara, rak, chukh and pickles (e.g. brinjal, lingri, bidana, peach, pear, plum, tomato, bottle gourd, etc.) made from different fruits and vegetables, etc. are some popular traditional products that are unique to the tribal and rural belts of Himachal Pradesh. Some of these products, e.g. bhatooru, chilra and tchati constitute staple food in rural areas of the state while others are prepared and consumed during marriages, local festivals and special occasions, and form part of the sociocultural life of hill people. However, the production of these foods and beverages is largely limited to household level.

Keywords: Traditional foods, Traditional beverages, Himachal Pradesh

Traditional Foods of Monpa tribe of West Kameng, Arunachal Pradesh

Ranjay K Singh¹ *, Anamika Singh² & Amish K Sureja³

¹Department of Agriculture Extension

² Department of Food Science & Nutrition, Mahila Mahavidyalaya, Banaras Hindu University, Varanasi, Uttar Pradesh

³ Department of Vegetable Science, College of Horticulture and Forestry, Central Agricultural University, Pasighat 791 102, Arunachal Pradesh

E-mail: ranjay_jbp@rediffmail.com

Received 30 August 2006; revised 23 October 2006

Abstract

Learning about edible plants, processing of foods and medicine using location specific wisdom and conservation of food related resources has been in the large part due to incremental and cumulative learning among the societies living in close connection with nature. Looking to the importance of location specific traditional knowledge in processing of foods, a study was conducted among *Monpa* tribe of Thembang and Dirang circle of West Kameng district of Arunachal Pradesh. Data were collected using the participatory and conventional tools. The study demonstrates that *Monpa* tribe prepares a range of alcoholic beverages from finger millet (*Eleusine coracana* Gaertn.), maize (*Zea mays* Linn.), barley (*Hordeum vulgare* Linn.) and rice (*Oryza sativa* Linn.). Traditional foods are mainly based on yak milk, soybean (*Glycine max* Merrill.), buckwheat (*Fagopyrum esculentum* Moench), Amaranthus, maize, barley, chilli and various indigenous of fruits and vegetables. The foods consumed by *Monpa* tribe are nutritionally rich and are compatible with their ethnicity. The variability in the altitude, diversities in the socio-cultural and ecological edges affect the preservation, selection and use pattern of ethnic foods. The types of foods used in daily diet also signify the knowledge and learning network of women, governed by many institutions like *mila*, *lakpa* & barter system and elders of society. Diversities in the culturally and nutritionally important foods have made possible the conservation of indigenous biodiversity. Social gathering and cultural occasions provide opportunity in sharing the foods and learning the related knowledge systems.

Keywords: Arunachal Pradesh, Beverages, Biodiversity conservation, Ethnic foods, Fermentation, *Monpa* tribe, Traditional Foods

Traditional fermented foods of the Naga tribes of Northeastern, India

Ashiho A Mao* & N Odyuo

Botanical Survey of India, Eastern Circle, Laitumkrah, Shillong 793 003, Meghalaya

Received 29 August 2006; revised 25 September 2006

Abstract

The paper describes the various traditional fermented foods of Naga tribes, their method of preparation, uses and the potential for improving using modern biotechnological tools.

Keywords: Fermented food, Traditional fermented foods, Naga tribes, Northeast India

Traditional fermented foods of Lahaul and Spiti area of Himachal Pradesh

S S Kanwar, M K Gupta, Chhaya Katoch, Rajeev Kumar & Promila Kanwar*

Departments of Microbiology and *Home Science Extension Education,

CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur 176062, Himachal Pradesh

Email: promilak@hillagric.ernet.in sskanwar@hillagric.ernet.in

Received 24 July 2006; revised 10 November 2006

Abstract

Some traditional fermented foods consumed by people of Lahaul and Spiti area of Himachal Pradesh were explored microbiologically and documented. *Chilra*, *Jhan chang*, *Babru*, *Bhaturu* and *Seera* were the main food products made from cereals. These products were prepared by using traditional / natural inoculum, i.e. *khameer/ malera or phab* as a starter culture. All the fermented foods were acidic in nature. Microbiological examination of these food products and their source of inoculum revealed the dominance of yeasts mainly from genera *Saccharomyces*, *Debaromyces* and *Schizosaccharomyces*. The bacteria were mainly from the genera *Lactobacillus*, *Lactococcus*, and *Leuconostoc*.

Key words: Traditional foods, Fermentation, Cereals, Indigenous knowledge, Fermented foods, Lahaul, Spiti, Himachal Pradesh

Cultural significance and diversities of ethnic foods of Northeast India

Anamika Singh¹, Ranjay K Singh^{2*} & Amish K Sureja³

¹Department of Food Science and Nutrition, Mahila Mahavidyalaya, Banaras Hindu University (BHU), Varanasi, Uttar Pradesh

²Department of Agriculture Extension

³Department of Vegetable Science, College of Horticulture & Forestry, Central Agricultural University, Pasighat 791 102, Arunachal Pradesh

E-mail: ranjay_jbp@rediffmail.com

Received 30 August 2006; revised 23 October 2006

Abstract

The traditional foods processed and prepared by women of Northeastern region are intimately connected to their sociocultural, ecological, spiritual life and health. The processing and preparation of ethnic foods not only demonstrate the creativity and treasure of food heritage of tribal women but also their incremental learning to sustain the life and ecosystem as a whole. Looking to the diversities in ethnic foods, an attempt has been made to explore the ethnic foods made of local soybean, bamboo shoot, tree bean, *lai patta* (leafy mustard) and *rai* (*Brassica juncea* (Linn.) Czern. & Coss.) from different selected tribes of Northeast India.

Tribal women of Northeastern region have a wide range of variability in the ethnic foods made of soybean, bamboo shoot, *lai patta*, tree bean and *rai*. In each state, the processing method of these foods is somewhat different based on the culture, variability in the materials used in the food, climate and overall knowledge of the processing and preparation. The foods used in the dietary system were found to be nutritionally rich and culturally important in various festivals and ceremonies. Ethnic foods prepared and consumed by women cannot be seen in the isolated mode, instead it is a complex dynamics in which nutrition, health, food security, culture, ethics, subsistence economy and ecological sustainability are integral components. A policy framework with clear directives on recognition of traditional foods and associated knowledge systems is urgently needed.

Keywords: Cultural significance, Ethnic food, Traditional food, Fermentation, Indigenous knowledge, Tribal women, Women empowerment, Northeast India, *Adi*, *Galo*, *Apatani*, *Sherdukpen*, *Ao*, *Sema*, *Mizo*, *Khasi*, *Bhutia*, *Gurung*, *Meitei*, *Barman*

Ethnological observations on fermented food products of certain tribes of Arunachal Pradesh

S C Tiwari¹ * & Debajit Mahanta²

¹ Department of Forestry, Wild Life & Environmental Sciences, Guru Ghasidas University, Bilaspur, 495009, Chhattisgarh

² Arunachal Pradesh State Council for Science & Technology Vivek Vihar, Itanagar 791 113, Arunachal Pradesh

E-mail: sct_in@yahoo.com

Received 31 May 2006; revised 28 September 2006

Abstract

The Northeastern region of India, with various ethnic groups, offers an excellent opportunity for ethnological studies. The paper deals with the observations of ethnological significance of traditional fermented food products prepared by some tribes of Arunachal Pradesh. Fermented foods are important and inseparable constituents of food consumed by these tribes and play a vital role in their indigenous traditional life style.

Keywords: Indigenous Knowledge System, Fermented foods, Tribes, Arunachal Pradesh, *Monpas* tribe, *Adis* tribe, *Nyishis* tribe, *Apatanis* tribe

Kiad—A popular local liquor of Pnar tribe of Jaintia hills district, Meghalaya

Hajal Samati & Samim Sofika Begum*

Botanical Survey of India, Eastern Circle, Shillong 793003, Meghalaya

Email: samimbegum@rediffmail.com

Received 16 January 2006; revised 21 August 2006

Abstract

Kiad, popular local liquor plays an important role associated with various socio-cultural life of the *Pnar* tribe of Jaintia hills district. The paper highlights the indigenous method of preparation of the popular local liquor.

Key words: *Kiad*, Local liquor, *Pnar* tribe, Meghalaya

Fermentation of traditional beverages prepared by Bhotiya community of Uttarakhand

Himalaya Chandra Prakash Das & Anita Pandey*

Environmental Physiology and Biotechnology Department,
GB Pant Institute of Himalayan Environment and Development,
Kosi-Katarmal, Almora 263 643, Uttarakhand

E-mail: anita@gbpihed.nic.in

Received 25 November 2005; revised 17 May 2006

Abstract

Balam, a wheat based starter culture, is used in several fermentation processes practiced by Bhotiya community of high altitude of Uttarakhand Himalaya. A total number of 32 microbial cultures were isolated from nine samples of Balam. Two species of Gram-positive spore forming bacteria (belonging to genus *Bacillus*) and three of yeasts (*Saccharmycopsis fibuligera*, *Kluyveromyces maxianus*, and *Sacharomyces* sp.) dominated the microflora of Balam. The fermentation causing microbes exhibited wide range of temperature, pH and alcohol tolerance.

Key words: Starter culture, Balam, Bhotiya tribe, Traditional beverages, Bacteria, Yeast

Traditional knowledge of biopreservation of perishable vegetable and bamboo shoots in Northeast India as food resources

Buddhiman Tamang* & Jyoti Prakash Tamang

Food Microbiology Laboratory, Department of Botany,
Sikkim Government College, Sikkim University, Tadong 737102, Sikkim

E-mail: jyoti_tamang@htmail.com

Received 10.11.2008

Abstract

Biopreservation of perishable vegetables is a native skill of Northeast Indian women. Lactic acid fermentation is the actual mechanism involve in the biopreservation process of perishable vegetable and bamboo shoots. Some ethnic fermented vegetables of Northeast India are *gundruk*, *sinki*, *goyang*, *inziangsang*, *khalpi*, *anishi*, etc. and ethnic fermented bamboo shoot products are *mesu*, *soidon*, *soibum*, *soijim*, *ekung*, *eup*, *hiring*, and *lung-siej*.

Keywords: Ethnic fermented vegetables, Biopreservation, LAB, *Gundruk*, *Sinki*, *Goyang*, *Khalpi*, *Inziangsang*, *Mesu*, *Soidon*, *Soibum*, *Soijim*, *Ekung*, *Eup*, *Hiring*, *Lung-siej*, *Anishi*, Northeast India

Traditional knowledge of the Himalayan people on production of indigenous meat products

Arun K Rai¹, Uma Palni² & Jyoti Prakash Tamang¹ *

¹Food Microbiology Laboratory, Department of Botany, Sikkim Government College, Sikkim University, Tadong 737102, Sikkim;

²Department of Botany, DSB Campus, Kumaun University, Nainital 263002, Uttarakhand

E-mail: jyoti_tamang@hotmail.com

Received 14.July 2008

Abstract

Ethnic people of the Himalayan regions of India, Nepal, Bhutan and China (Tibet) prepare various types of indigenous meat products using their traditional knowledge. Some of these ethnic meat products such as sausages and dried or smoked meats are sold in local markets contributing to local economy. There is no literature on traditional processing of indigenous meat products of the Himalayas. The paper is aimed to document the traditional knowledge of the ethnic Himalayan people on preparation of various traditionally processed sausages and meat products such as *kargyong*, *kheuri*, *satchu*, *suka ko masu*, *chilu*, *chartayshya*, *gemma* and *arjia*.

Keywords: Traditional knowledge, Indigenous meat products, Himalayas

Traditional processing of *Selroti*—A cereal based ethnic fermented food of the Nepalis

Hannah Yonzan & Jyoti Prakash Tamang*

Food Microbiology Laboratory, Department of Botany, Sikkim Government College, Sikkim University, Gangtok 737102, Sikkim

E-mail: jyoti_tamang@hotmail.com

Received on 23.07.2008

Abstract

The Nepali communities of the Himalayan regions of India, Nepal and Bhutan prepare a cereal-based fermented food, *Selroti* using their indigenous knowledge. This paper is aimed to document the traditional knowledge of the ethnic Himalayan people on preparation of *Selroti* and its ethnical importance.

Keywords: Traditional knowledge, *Selroti*, Traditional food, Fermented food

Traditional fermented foods of Manipur

K Jeyaram^{1*}, Th Anand Singh¹, W Romi¹, A Ranjita Devi^{1,3}, W Mohendro Singh¹, H Dayanidhi², N Rajmuhon Singh² & JP Tamang³

¹Microbial Resources Division, Institute of Bioresources and Sustainable Development, Takeyapat Institutional Area, Imphal 795001, Manipur;

² Department of Chemistry, Manipur University, Canchipur 795003, Manipur;

³ Food Microbiology Laboratory, Sikkim University, Tadong 737102, Gangtok, Sikkim

E-mail: saccharomyces@rediffmail.com

Received 03.08.2008

Abstract

In Manipur, traditional fermented soybean (*Hawaijar*), bamboo shoot products (*Soibum/Soijim*, *Soidon*), fish products (*Ngari*, *Hentak*), mustard leaf extract (*Ziang Sang*, *Ziang Dui*) and fermented beverages, viz. *Atingba* and fruit wines have been consumed as a regular food in different recipes over a long period of time. These household arts are handed down through generation by generation. In the study, the traditional preparation processes of fermented foods of Manipur were documented.

Keywords: Traditional foods, Traditional fermented foods, Manipur, *Hawaijar*, *Soibum/Soijim*, *Soidon*, *Ngari*, *Hentak*, *Hamei*, *Atingba*, *Ziang Sang*

Indigenous knowledge of Northeast women on production of ethnic fermented soybean foods

Jyoti Prakash Tamang*, Rajen Chettri & Rudra Mani Sharma

Food Microbiology Laboratory, Department of Botany, Sikkim Government College, Sikkim University, Tadong 737 102, Sikkim

E-mail: jyoti_tamang@hotmail.com

Received 12:11:2008

Abstract

Several ethnic communities of Northeast India have invented the traditional technology of converting protein rich soybeans into flavoured fermented food with easy digestibility and bio-nutrients. This is exclusively carried out by the ethnic women in Sikkim, Manipur, Meghalaya, Nagaland, Mizoram and Arunachal Pradesh. Worth native knowledge of these women has been documented and six sticky fermented soybean foods have been listed out which include *kinema*, *hawaijar*, *tungrymbai*, *aakhone*, *bekang* and *peruyyan*.

Keywords: Ethnic fermented soybean foods, Fermented foods, Northeast India, *Kinema*, *Hawaijar*, *Tungrymbai*, *Aakhone*, *Bekang*, *Peruyyan*

Traditional foods and beverages of Ladakh

Angchok D*, Dwivedi SK & Ahmed Z Defence

Institute of High Altitude Research, DRDO, C/o 56 APO

E-mail: achuk_iari@rediffmail.com

Received 12 February 2007; revised 14 January 2008

Abstract

Ladakh, truly described as high altitude cold-arid desert is one of the far most eastern regions of J&K state, India. Because of unfavourable and hostile environment prevailing over the region, cultivation is limited to a very less scale (both time and place). Under these conditions, one of the major reasons behind human habitation is the ingenuity of local people, who has devised new and sustainable way of living. One major product of this ingenuity is the traditional foods and beverages, which over the time has been evolved (through outside influence and local resources available) and established in the fooding system of *Ladakhi* people. An attempt has been made to bring forth those dishes and beverages, which are true representative of the region. The very common dishes like *kholak* and *paba* has been described in detail including the preparation methods.

Keywords: Ladakh, Traditional foods, Beverages, *Ladakhi*, *Kholak*, *Paba*

Tungrymbai- A traditional fermented soybean food of the ethnic tribes of Meghalaya

Ibakordor Sohliya, SR Joshi*, Ranjan K Bhagobaty & Rakshak Kumar

Microbiology Laboratory, Department of Biotechnology & Bioinformatics, North Eastern Hill University, Umshing, Shillong 793 022, Meghalaya

Email: srjoshi2006@yahoo.co.in

Received 25 July 2007; revised 10 July 2008

Abstract

Tungrymbai is a fermented indigenous soybean food, common to the ethnic tribes of Meghalaya. The microbial diversity in this food is studied to assess the nature of microbes and their source during spontaneous fermentation. The microorganisms associated with this fermented food are also present in the equipment and materials used during preparation and packing. Various species of lactic acid bacteria, yeasts and spore forming forms were recovered in the isolation process which included *Bacillus subtilis* (Ehrenberg), *Enterococcus faecium* (Orla-Jensen) Schleifer and Klipper-Balz, *Candida parapsilosis* (Ashford) Langeron and Talice, *Geotrichum candidum* Link, *Saccharomyces bayanus* Sacc. and *Saccharomycopsis fibuligera* (Linder) Klocker. The fermenting microbes were found to be associated with the equipments and materials used during the spontaneous fermentation of *Tungrymbai*. Spore forming forms were isolated from all the materials and equipments used during the process while lactic acid bacteria and yeasts could be isolated only from selective materials.

Keywords: Tungrymbai, Traditional food, Microbial diversity, Fermented food, Fermented soybean food, *Khasi*

Traditional knowledge of the ethnic Himalayan people on production of indigenous meat products

Arun Kumar Rai¹, Uma Palni² & Jyoti Prakash Tamang¹ *

¹Food Microbiology Laboratory, Department of Botany, Sikkim Government College, Gangtok 737 102, Sikkim;

²Department of Botany, DSB Campus, Kumaun University, Nainital 263 002, Uttarakhand

E-mail: jyoti_tamang@hotmail.com

Received 16 July 2007; revised 26 May 2008

Abstract

Ethnic people of the Himalayan regions of India, Nepal, Bhutan and China (Tibet) prepare various types of indigenous meat products using their traditional knowledge. Some of these ethnic meat products as sausages, dried or smoked meats are sold in local markets contributing local economy. There is no literature on traditional processing of indigenous meat products of the Himalayas. The paper is aimed to document the traditional knowledge of the ethnic Himalayan people on preparation of various traditionally processed meat products such as *kargyong*, *kheuri*, *satchu*, *suka ko masu*, *chilu*, *chartayshya*, *gemma* and *arjia*.

Keywords: Traditional knowledge, Traditional food, Indigenous meat products, Himalayas

Native plant genetic resources and traditional foods of Uttarakhand Himalaya for sustainable food security and livelihood

P S Mehta, K S Negi* and S N Ojha

National Bureau of Plant Genetic Resources, Regional Station,

Bhowali-263 132, Niglat Distt. , Nainital, Uttarakhand

Received 21 November 2008; Accepted 7 July 2009

Abstract

In view of changing of food habits of local communities of Uttarakhand Himalaya, a study to document the native plant genetic resources of food importance and traditional recipes was conducted. Both cultivated and wild edible plant species were documented through scheduled interviews. With the help of respondents the questionnaires were filled up. After conducting the survey in the whole Uttarakhand state the plant species of food importance were identified and a large number of traditional food items were enumerated. The relationship between plant species of food importance and sustainable livelihood was also discussed.

Keywords: Traditional foods, Plant genetic resources, Uttarakhand Himalaya, Food security, Sustainable livelihood, Wild species, Cultivated species, Natural drinks, Food grains, Spices, Recipes.

Indigenous knowledge of traditional processing of *Selroti*, a cereal-based ethnic fermented food of the Nepalis

Hannah Yonzan & Jyoti Prakash Tamang*

Food Microbiology Laboratory, Department of Botany, Sikkim Government College, Gangtok 737 102, Sikkim

E-mail: jyoti_tamang@hotmail.com

Received 10 September 2008; revised 12 August 2009

Abstract

The *Nepalis* of the Himalayan regions of India, Nepal and Bhutan prepare a cereal-based fermented food, *Selroti* using their indigenous knowledge. The paper documents the traditional knowledge of the ethnic Himalayan people on preparation of *Selroti* and its ethnical importance.

Keywords: Traditional knowledge, *Selroti*, Fermented food, *Nepalis*

Traditional recipes of district Kangra of Himachal Pradesh

Anju Kapoor, Promila Kanwar* & Radhna Gupta

College of Home Science, CSKHPKV, Palampur 176 062, Himachal Pradesh

E-mail: kanwar. promila@gmail.com ; anjukapoor_s@yahoo.com

Received 25 July 2008; revised 16 March 2009

Abstract

Himachal Pradesh, a hilly state, has lot of variation in recipes prepared by local people. The communication deals with traditional recipes of district Kangra as per seasonal availability of plant material. Although food habits of local people have changed these days, still they relish the local preparations. Participatory Rural Appraisal techniques were used for documentation of required information. The plant material used by the people for recipes included its leaves, flowers, stem, fruits and root. The period of availability of raw material ranged from 1-3 months approximately. Various traditional recipes prepared especially from leaves of plants, viz. *Colocasia*, fig, basil, pigweed, buck wheat, and water cress are very good source of calcium, phosphorous and iron. These recipes are losing its sheen in the fast-food culture. So, there is a need to conserve our traditional food recipes as the plant material used for these is completely organic thus nutritious and healthy /safe to eat.

Keywords: Traditional recipes, Traditional food, Himachal Pradesh

Cereal based Traditional alcoholic beverages of Lahaul and Spiti area of Himachal Pradesh

SS Kanwar¹ *, MK Gupta¹, Chhaya Katoch¹ & Promila Kanwar²

Departments of Microbiology¹ and Home Science Extension Education²,

CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur 176 062, Himachal Pradesh

E-mail: sskanwar@hillagric.ernet.in ; promilak@hillagric.ernet.in

Received: 27.11.2008; revised: 29.04.2010

Abstract

Some cereal based traditional alcoholic beverages, *Chhang*, *Lugari*, *Aara* and *Chiang* consumed by people of Lahaul and Spiti area of Himachal Pradesh were documented and explored microbiologically. All these beverages were made by cooking their grains and then inoculating them with inocula called *Phab/ Dhaeli*. Chemical analysis of these products showed an acidic nature with pH in the range of 3.31-4.02 in undistilled samples, and 3.95-5.17 in distilled samples. Total soluble solids in all the undistilled samples were in the range of 14.58 to 18.56°B, whereas in distilled samples these were in the range of 7.19-8.0°B. Ethanol contents (%v/v) were 5-12 % in undistilled and 13-19% in distilled products. A wide variation in certain other chemicals constituents, viz. acetaldehyde, methanol, ester, n-propanol, etc. was observed in the distilled alcoholic beverages. Microbiological examination of these beverages and their source of inocula revealed the dominance of yeasts mainly from genus *Saccharomyces* and *Endomyces*. Bacteria encountered in these beverages were from genus *Lactobacillus*, *Acetobacter*, and *Bacillus*.

Keywords: Traditional alcoholic beverages, Fermentation, Cereals and indigenous knowledge

Traditional pre- and post natal dietary practices prevalent in Kangra district of Himachal Pradesh

Promila Kanwar* & Neetu Sharma

College of Home Science, CSK Himachal Pradesh Krishi Vishva Vidyalaya, Palampur 176 062, Himachal Pradesh

E-mails: kanwar.promila@gmail.com ; promilak@hillagric.ernet.in

Received: 27.11.2008; revised: 29.04.2010

Abstract

Rural women constitute a storehouse of traditional knowledge. The paper attempts to present a rich variety of traditional foods served to the rural women specifically at pre- and postnatal stage. The traditional knowledge was documented from rural women using questionnaire based survey along with focused group discussion with key informants, local health workers and aged rural women. The information pertaining to ingredients used, method of preparation, frequency of consumption and logic behind consumption of these food preparations were recorded. The dietary practices followed by the local people at pre- and postnatal stages are based on different concepts. At the initial prenatal stage, to check abortion, seera is served as it is considered to possess cooling effect, while during ninth month, dietary practices emphasize on improving digestion and appetite, and provide energy to bear the stress of delivery. Decoctions and mixtures of herbs that can provide strength and stimulate the uterine contractions to aid in comfortable delivery are given at the time of labour pains. At post natal stage, food preparations like kharani, sund and moong dal halwa are served which are nourishing, provide energy and increase lactation. Since, the knowledge has been passed on from generation to generation orally; understanding and documentation of such knowledge can help to conserve the dying wisdom.

Keywords: Traditional dietary practices, Himachal Pradesh

Microorganisms and Nutritional value of Ethnic fermented foods and alcoholic beverages of North East India

Jyoti Prakash Tamang*, Namrata Tamang, Saroj Thapa, Sailendra Dewan, Buddhiman Tamang, Hannah Yonzan, Arun Kumar Rai, Rajen Chettri, Jayasree Chakrabarty & Niki Kharel

Food Microbiology Laboratory, Sikkim Government College, Sikkim University, Tadong 737102, Sikkim

E-mail: jyoti_tamang@hotmail.com

Received 28.02.11; revised 28.09.11

Abstract

Very few have realized that the North East India is the centre of the diverse food culture comprising fermented and nonfermented ethnic foods and alcoholic beverages. More than 250 different types of familiar and less-familiar ethnic fermented foods and alcoholic beverages are prepared and consumed by the different ethnic people of North East India, which include milk, vegetable, bamboo, soybean, meat, fish, cereal and alcoholic beverages. Diverse microorganisms ranging from filamentous fungi to enzyme and alcohol producing yeasts, lactic acid bacteria, bacilli and micrococci are associated with fermentation and production of ethnic foods and alcoholic drinks. Ethnic foods are fermented naturally, except the alcoholic beverages which are produced by using consortia of microorganisms in the form of dry, cereal-based starter. Diversity within the species of lactic acid bacteria and bacilli has created the ethnic foods with different sensory characteristics. It has demonstrated that functional microorganisms present in the ethnic fermented foods of North East have many biological functions enhancing the health-promoting benefits, bio-preservation of perishable foods, bio-enrichment of nutritional value, protective properties and therapeutic values.

Keywords: Ethnic fermented foods, Alcoholic beverages, North East India, Microorganisms

An Insight into Traditional foods of North-western area of Himachal Pradesh

Sharma* Neetu & Singh Anand

KVK Hamirpur at Bara-177044, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur

E mail: neepradu@gmail.com

Received 16.05.11; revised 05.08.11

Abstract

A survey of food practices of natives of North western part of the outer area of Himachal Pradesh revealed a wide range of variability in ethnic foods made of cereals, pulses, milk, tubers. Some of the famous dishes include *Bhaturu*, *Babru*, *Beduan roti*, *Mithdoo*, *Seera*, *Madra*, *Sepubari*, *Kadi*, *Lasurae ki sabji*, *Bhruni ki sabji*, *Patrode*, etc. In addition to these conventional foods they use many types of uncultivated fruits and vegetables to supplement their diet. Simple indigenous methods are employed for processing and preparing these foods. The ethnic foods of the state not only exhibit a treasure of food heritage but it is an integral component of the state as some of the foods are specially prepared during marriages, local festivals and special occasions.

Keywords: Himachal Pradesh, Traditional foods, Fermentation

Traditional, ethnic and fermented foods of different tribes of Manipur

Devi P & Suresh Kumar P*

ICAR RC NEH Region, AP centre, Basar, Arunachal Pradesh- 791101

E-mail: psureshars@gmail.com

Received 03.12.09; revised 10.08.10

Abstract

Traditional knowledge exists among different tribes on preparing boiled foods, fermented foods, beverages and nutritionally rich traditional foods from various indigenous crop plants, forest products and meat of wild and domesticated animals. Manipur has great ethno-cultural diversity, with two major tribes, the *Nagas* and the *Kukis*. The *Naga* tribe comprises the *Maring*, *Mao*, *Maram*, *Kabui*, *Tangkhul*, *Tadubi*, *Kolya*, *Khoiras/Mayangkhong*, *Koirangs*, *Chirus* and *Maring* where as the *Kuki* tribe comprises the *Mizos*, *Paite*, *Thadou* and *Vaiphei*. Meitei and Meitei Pangals are two non tribal communities of Manipur who has individual identity. The traditional foods of the Manipurians comprises *Iromba*, *Champhu*, *Kangshoi*, *Hawaichar*, *Soibum*, *Ngaree*, , *Paknam*, *Chagem pomba*, *Kangshu*, *Hentak*, *Khazing*, *Heikak*, sticky rice chapatti/bread, etc. Alcoholic beverages made up of rice are very common in almost all the festivals of the tribal peoples of Manipur locally called as *Yu*. Among different produces, the people of Manipur have the habit of taking variety of leafy vegetables which are available in plenty in the dense forests.

Keywords: Manipur, Traditional foods, Fermented foods, Bamboo products, Ethnic foods

Biotechnology in Tradition – A process technology of alcoholic beverages practiced by different tribes of Arunachal Pradesh, North East India

Karuna Shrivastava¹ *, Greeshma A G² & Brijesh Srivastava³

^{1,2}Department of Forestry, ³Department of Agricultural Engineering, North Eastern Regional Institute of Science and Technology, Nirjuli-791109, Arunachal Pradesh, India

E-mail: karuna.nerist@gmail.com

Received 28.04.09; revised 24.08.10

Abstract

North eastern region of India in general and Arunachal Pradesh in particular is well known for their age old practice of preparation of alcoholic fermented beverages. These beverages are produced manually and locally using traditional practices as transferred to them by their ancestors. There are 25 major and about 125 sub-tribes inhabiting in the state. These ethnic groups offer an excellent opportunity for studying their traditional practices of preparing alcoholic drinks. Different cereal and millet based fermented beverages are major dietary constituent of their day to day life. These drinks are considered nutritious and of high caloric value. However, whole fermentation process is done without any technical control and hygienic input. In this paper, traditional biotechnological processes of alcoholic beverage preparation as followed by 21 different tribes residing in 14 (out of 16) districts of Arunachal Pradesh, their consumption pattern and per capita consumption of these beverages have been documented. Socio-cultural importance of alcoholic drinks in relation to tribal lifestyle of the state has also been studied.

Keywords: Alcoholic beverages; Arunachal Pradesh; Tradition; Process technology

***Chhang* - A barley based alcoholic beverage of Ladakh, India**

Konchok Targais, Tsering Stobdan*, Sunil Mundra, Zulfikar Ali, Ashish Yadav, Girish Korekar & Shashi Bala Singh

Defence Institute of High Altitude Research (DRDO), Leh-Ladakh-194101, India

*E-mail: ts_mbb@yahoo.com

Received 08.07.09; revised 04.02.10

Abstract

Chhang is one of the important and indispensable barley based alcoholic beverage prepared and consumed by the people of Ladakh for centuries. *Chhang* forms a part of sociocultural life and no social activities is complete without the beverage. It quenches thirst, gives energy and provides nutrition. *Kholak* made of *chhang* and barley flour is a preferred food of shepherds. Steps involve in *chhang* preparation includes cleaning and boiling of barley grains, cooling, addition of starter culture, fermentation, filtration and blending. The beverage was analysed for alcohol content, pH and titrable acidity using standard analytical methods. Results showed that the fermented beverage contains 5-7% alcohol, pH 3.6 to 3.8, acidity 0.55 to 0.65%.

Keywords: Alcoholic, Beverage, *Chhang*, Ladakh

Biotechnology in Tradition-Methods of starter preparation for alcoholic beverages employed by different tribal communities of Arunachal Pradesh

Shrivastava¹ *Karuna, Greeshma AG² & Srivastava³ B

^{1,2}Microbial Biotechnology Laboratory, Department of Forestry,

³Department of Agricultural Engineering

North Eastern Regional Institute of Science and Technology, Nirjuli 791 109, Arunachal Pradesh

E-mail: karuna.nerist@gmail.com

Received 28.04.09; revised 26.06.10

Abstract

Traditional fermented foods and beverages occupy special place in North-Eastern states of India particularly in Arunachal Pradesh due to their nutritive value, taste, health aspects, social, ritual and cultural importance. Among ingredients of traditional beverages, starter cultures are source of yeast cells which is responsible for conversion of carbohydrate into ethanol. Starter cultures are prepared by the local people themselves, in which female members of the community are generally involved. Arunachal Pradesh is an ethnically diverse state and so its method of starter preparations. This paper mainly deals with the review of traditional process technology and the raw materials used for the preparation of starter cultures by different tribes of Arunachal Pradesh. For this purpose, a field study was conducted among major tribes residing in 14 districts following participatory and conventional methods. The data were also collected on the cost incurred, time of preparation and period of storage of starter cultures in their traditional systems.

Keywords: Starter culture, Alcoholic beverages, Traditional practices, Tribes, Arunachal Pradesh

***Shidal* - A traditional fermented Fishery product of North east India**

¹Armaan Ullah Muzaddadi & ²S Basu

¹Department of Fish Processing Technology, College of Fisheries, Central Agricultural University, Lembucherra, Tripura-799210

²Department of Fish Processing Technology, C I F E, Mumbai-61

Email: drarmaan@gmail.com , drarmaan@hotmail.com

Received 05.05.2009; revised 25.02.2010

Abstract

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*.

Keywords: *Shidal*, *Hidal*, *Ngari*, *Sepaa*, *Puntius* spp, Fermentation, Fishery product

Adaptations of culturally and nutritionally important traditional foods in Eastern Himalaya: A case study with Adi women of Arunachal Pradesh

Anamika Singh¹, Ranjay K. Singh^{2*}, Rakesh Bhardwaj² & AK Singh³

¹Mahila Mahavidyalaya, Banaras Hindu University, Varanasi, UP

²College of Horticulture & Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh-791102,

*Department of Technology Evaluation & Transfer, Central Soil Salinity Research Institute, Karnal-132001

³Centre for Protected Cultivation technology, Indian Agricultural Research Institute, New Delhi

E-mail: ranjaysingh_jbp@rediffmail.com

Received 06.03.11, revised 20.03.12

Abstract

Adi tribal women living in far-flung areas of mountainous ecosystems of Arunachal Pradesh have evolved tremendous amount of traditionally knowledge (TK) to identify, collect, process and use biological resources as foods, nutrition and ethnomedicines. In this article, we discuss about the use of culturally important indigenous biodiversity used by *Adi* women as food, nutrition and ethnomedicines. Data reported in this study is based on three projects completed with *Adi* tribe in Arunachal Pradesh. Information pertaining to study was collected using conventional and participatory methods. Results reveal that *Adi* women are knowledgeable in accessing indigenous biodiversity to use in making culturally, nutritionally and medicinally rich foods. A number of uncultivated indigenous plants and crop resources are adapted to prepare traditional foods. Beside, a large number of wild animals and insects are integral part of food system. Most of the foods are consumed in boiled forms, fermented and alcoholic beverages. Few most commonly consumed indigenous plants are *onger* (*Zanthoxylum rhetsa*), *poi* (*Basella rubra*), *dhenkia saag* (*Diplazium esculentum*), *marsang* (*Spilanthes acmella*), *ongin* (*Clerodendrum colebrookianum*), *kalmu* (a creeper) and *rori* (a herb) and considered most dependable food plants. These ethnobotanicals are source of income and as well as the part of adaptive strategies on food security during the climatic variability. The other species such as *banko*, *champa*, *fayong*, *gende*, *kekir*, *kopi*, *koppir*, *kordoi*, *mamang*, *marshang*, *onger*, *ongin*, *oyik*, *paput*, etc. are observed as part of both food and ethnomedicines. A number of fermented foods and alcoholic traditional beverages are consumed by *Adi* tribe, and make them novel in food habits from others. *Adi* have rich socio-cultural capitals to sustain adaptive practices associated with traditional foods.

Keywords: *Adi* women, Indigenous biodiversity, Cultural capital, Traditional foods, Ethnomedicines

Nutritional content evaluation of traditional recipes consumed by ethnic communities of Meghalaya, India

Mandari Mary Blah¹ & SR Joshi^{2*}

¹Department of Home Science, St Mary's College, Shillong 793 003, Meghalaya, ²Department of Biotechnology & Bioinformatics, North-Eastern Hill University, Shillong 793 022 Meghalaya

*E-mail: srjoshi2006@yahoo.co.in

Received 30.09.11, revised 08.04.13

Abstract

In the present investigation, various traditional foods consumed by the ethnic *Khasi* tribe of Meghalaya, India were sampled, standardized and evaluated for their nutritional contents. This food comprised of the main lunch or dinner dishes, and side dishes consumed with the meals, and also the food items taken as snacks. A total of 80 different most preferred recipes of vegetarian and non-vegetarian types were selected and standardized. A panel of 10 local women evaluated the recipes for sensory acceptance. The nutritive values of the standardized recipes were calculated for one portion size meal for all the major and micronutrients like protein, fat, carbohydrate, fibre, calcium, iron, vitamin C, carotene and calories. The nutritive values also incorporate the nutritional contributions made by wild edible fruits, berries, nuts, roots and spices, edible green leaves including *salad* and *chutney* consumed by the ethnic tribes as part of the whole meal. The findings reveal that the whole meal taken together makes a good balanced diet in the tribal food habits.

Keywords: *Khasi* tribe, Traditional foods, Nutritional content, Food habits

Traditional milk, meat processing and preservation techniques of the Yak Pastoralists of Arunachal Pradesh

Leema Bora*, Joken Bam, Vijay Paul & Sanjit Maiti

NRC on Yak (ICAR), Dirang -790101, Arunachal Pradesh

E-mail:* leemabora@gmail.com

Received 15.11.11, revised 14.08.13

Abstract

Yak milk products like butter (*Mar*) and wet cheese (*Churpy*) form an inseparable part of the ethnic food of *Monpa* tribe in Arunachal Pradesh. Dried yak meat (*Sah Sangbu*) is also highly relished by them. These products are exclusively prepared by the *Brokpa* community, yak pastoralists belonging to the *Monpa* tribe. They have traditional ways of processing and preserving yak milk and meat. The *brokpa* economy mostly rotates through trading of Yak products. This paper is an attempt to document the traditional ways of processing and preserving yak milk and meat in the *Brokpa* community.

Keywords: Milk, Meat processing, Preservation, Churpy, Butter, *Brokpa*, Arunachal Pradesh

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

Kunzes Angmo & T C Bhalla*

Department of Biotechnology, Himachal Pradesh University, Summer Hill, Shimla-171 005, India

E-mail: bhallatc@rediffmail.com

Received 30.10.12, revised 04.03.13

Abstract

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 *arak*. *Chhang* is an important part of sociocultural life of local inhabitants and its consumption is more common than *arak*. 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*, *Arak*, *Nubra* valley, Ladakh, Trans-Himalaya

Value addition and nutritional fortification of finger millet [*Eleusine coracana* (L.) Gaertn.] using bark of Gethi (*Boehmeria regulosa* Wedd.) tree

RK Khulbe*, Salej Sood, Anubhuti Sharma, PK Agrawal & JC Bhatt

Vivekanand Parvatiya Krishi Anusandhan Sansthan (Indian Council of Agricultural Research)

Almora, Uttarakhand-263 601, India

E-mail: rkkhulbe@gmail.com

Received 02.09.13, revised 25.11.13

Abstract

Finger millet [*Eleusine coracana* (L.) Gaertn.], an important coarse cereal of Indian Subcontinent and Africa, is devoid of gluten and, therefore, lacks the bread making quality of wheat. A traditional method of imparting finger millet the bread making quality of wheat using bark of a tree locally known as *Gethi* (*Boehmeria regulosa* Wedd.) and, the physical properties and nutritional composition of the bark are reported in the present study. The method has been found effective with other coarse cereals such as maize, sorghum, pearl millet and barnyard millet, and pseudo-cereals, viz. buckwheat and amaranth. Preliminary phytochemical analysis of the bark showed presence of appreciable amounts of phenolics, flavonoids and antioxidant activity, besides high viscosity. The bark is also rich in iron and zinc, signifying its potential efficacy in nutritional fortification of coarse cereals and pseudo-cereals apart from improving their bread making quality.

Keywords: Finger millet, Value addition, Nutritional fortification, *Roti*, Indian flatbread, *Gethi*, *Boehmeria regulosa*

Traditional technology and product characterization of some lesser-known ethnic fermented foods and beverages of North Cachar Hills District of Assam

Jayasree Chakrabarty¹, GD Sharma² & Jyoti Prakash Tamang³ *

¹Cotton College, Guwahati;

² School of Life Sciences, Assam University, Silchar, Assam

³Department of Microbiology, Sikkim University, Gangtok, Sikkim

E-mail: jyoti_tamang@hotmail.com

Received 17.02.14, revised 10.03.14

Abstract

The present paper is aimed to document traditional knowledge, microbial profiles and nutritional value of some ethnic fermented foods and beverages of North Cachar (NC) Hills district of Assam. We selected two popular ethnic fermented bamboo shoot products (wet-*Tuaithur* and dry-*Tuairoi*), an ethnic fermented pork/boar meat product (*Honoheingrain*), a non-food dry mixed amyolytic starter (*Humao*), and an ethnic fermented beverage (*Judima*) for studies. Based on observation and interviews with the producers and consumers, traditional knowledge of ethnic fermented foods and beverages production, their mode of consumption, socio-economy and ethnical value were documented. A total of 21 samples of *Tuaithur*, *Tuairoi*, *Honoheingrain*, *Humao* and *Judima* of NC Hills were analyzed for the microbial population which was recorded at the level of 10⁴ to 10⁹ cfu/gm. Microorganisms isolated and identified from *Tuaithur*, *Tuairoi*, *Honoheingrain*, *Humao* and *Judima* were: bacteria- *Lactobacillus brevis*, *Lb. plantarum*, *Enterococcus faecium*, *Leuconostoc mesenteroides*, *Pediococcus pentosaceus*, *Lactococcus lactis*, *Bacillus subtilis*, *B. cereus*, *B. circulans*, *B. firmus*, *B. pumilus*, *B. licheniformis*, *B. stearothermophilus*, *B. sphaericus*, *B. laterosporus*, *B. polymyxa*, *Staphylococcus aureus* and *Micrococcus sp.*; yeasts- *Debaryomyces hansenii* and *Saccharomyces cerevisiae*; moulds- *Mucor* and *Rhizopus*. The nutritional composition of ethnic fermented foods showed the nutritional value essential for local people in their diet. Higher minerals contents in *Judima* indicate contribution of mineral intake in the daily diet of the local people in NC Hills of Assam. Documentation of cultural and biological importance of ethnic fermented foods and beverages of NC Hills of Assam would help to understand the role of native microorganisms in traditional food fermentation.

Keywords: Product characterization, Fermented foods, Beverages

AN OVERVIEW OF EDIBLE INSECTS IN EASTERN HIMALAYAS: INDIGENOUS TRADITIONAL FOOD OF TRIBALS

Samik Chowdhury, Pritin P. Sontakke, Jayashree Bhattacharjee, Debashre Bhattacharjee,
Amit Debnath, Arvind Kumar and Jayasree Datta

Abstract

Edible insects are good source of supplement food item that could meet the people present and future need. In some parts of the world insect are used for human food, while being a taboo in other places and cultural groups. Edible insects are natural renewable resource that provides food and economical safety to many ethnic groups in Eastern Himalayas. The present study deals with the different edible insects consumed by the different ethnic communities and tribes inhabited in Eastern Himalayan. Red ants are one of the food items in Assamese festival like Bohag Bihu especially by the Mishing Tribe and Ahom Community. The adult termites are eaten fried by the tribal communities of Manipur, Assam and Nagaland which is rich source of protein, fat and essential amino acids. Most of the tribal communities in North Eastern India prefer pre pupal stage of Eri pupa for consumption. Manipuris preferred special recipe of snail which is made in combination with dry fish, locally called Tharoi thongba whereas, Manipur tribal consumed the giant water bug by pushing the dry rice inside the body and boiled it. Honey bees are mostly eaten in Assam and Manipur by making chutney, fry and bakery product. Grasshopper, field cricket are simply fried with salt, chilly spices and mustard oil and consumed directly. Hence, the edible insect can be comparable with other conventional food products by integrating scientific cultivation and validation to the traditional wisdom for livelihood development of the tribals.

Fermented milk products of Ladakh

Anup Raj*¹ & Punam Sharma²

¹Highland Agriculture Research and Extension Station, Zanskar, Kargil-194103 Jammu and Kashmir;

²Society STADD, Solan-173212, HP

E-mails: arajleh@yahoo.co.in ; p.sharma@stadd.com

Received 28 October 2013, revised 09 December 2013

Abstract

Ladakh, situated in the western Trans Himalaya, is a high altitude cold arid region of India. It is one of the remotest and least accessible regions in the world. The area remains cut off from rest of the country for about five months in a year. Meagre precipitation and extremely low temperature during winter months results in a very short growing season. Limited availability of vegetables and fruits is a major concern for the general health of the local inhabitants. Thus, milk and fermented milk products are very crucial for nutritional security of the local people. Being pastoralist by tradition, *Ladakhis* have developed various methods of fermenting and preparing ethnic milk products. Milk of female yak and yak-cattle crossbreeds (*zho*) is the main substrate used for preparing fermented milk products. *Jho*, *tara*, *labo*, *chhurphe*, *maar* and *thuth* are the such important ethnic products relished by the local people. These products not only supplement their nutritional intake but also augment their income.

Keywords: Ladakh, Trans Himalaya, Fermented milk products, Yak, Nutrition

Ethnomedicinal value of traditional food plants used by the Zeliang tribe of Nagaland

N Premkumar, Singh¹, PR Gajurel* & P Rethy

Department of forestry, North Eastern Regional Institute of Science and Technology, (Deemed University) Nirjuli-791 109, Arunachal Pradesh India;

¹ Department of Botany, Patkai Christian College, Dimapur -797 103, Nagaland

*E-mail: prgajurel@gmail.com

Received 10 February 2014, revised 30 December 2014

Abstract

The *Naga* tribes of Nagaland have a unique tradition of selection and utilization of plant resources. Many food plants both from cultivation and wild are being used as ethnomedicinal plants by the herbal healer in *Naga* society. The *Zeliang* is one of the dominant tribe of Nagaland with rich indigenous knowledge systems and have minimum impact of present day modernization. The tribe has aged old unique food habits for their nutritional support and health cares. The present paper highlights the ethnomedicinal uses of 35 food plants belonging to 26 families used by the *Zeliang* tribe of Nagaland. These food plants include mostly the species used for vegetables, condiments and fruits.

Keywords: Nagaland, *Zeliang* tribe, Ethnomedicinal uses, Traditional food plants

Diversified traditional cured food products of certain indigenous tribes of Tripura, India

Devananda Uchoi¹, Deepayan Roy²*, Ranendra K Majumdar² & Prabir Debbarma²

¹Central Institute of Fisheries Education (CIFE), Versova, Mumbai, 400061, MS

²College of Fisheries, Central Agricultural University, Lembucherra, Agartala, West Tripura, 799210

*E-mail: hellodeepayan2008@gmail.com

Received 19 August 2014, revised 06 April 2015

Abstract

The diversified traditional cured food products which include fermented, dried and smoked bamboo shoot, wild leaf, vegetable, fruit, alcoholic beverage and fish are processed and prepared by the ethnic groups of Tripura and these are intimately associated to their ecological, socio-cultural, spiritual life and health. These cured foods are consumed as a regular food item in different recipes and culinary style over a long period of time by the original inhabitants of this state. From the socio-cultural point of view, although these are nutritious, moreover, there are popular beliefs on the use of such traditional food products regarding their curing effect of number of seasonal and chronic health problems. The paper describes the various traditional cured foods of certain tribes of Tripura, their method of preparation, uses, nutritional and medicinal values as they play a vital role in the traditional life style of the people of Tripura.

Keywords: Fermented foods, Dried foods, Smoked products, *Debbarma* tribe, *Uchoi* tribe

Traditional pickles of Himachal Pradesh

Monika, Savitri, Anila Kumari, Kunzes Angmo & T C Bhalla*

Department of Biotechnology, Himachal Pradesh University, Shimla-171005, India

E-mail: bhallatc@rediffmail.com

Received 18 March 2015, revised 17 April 2015

Abstract

The traditional pickles of indigenous fruits and vegetables, viz., *galgal*, *lingri*, *aaroo*, *plum*, *lasura*, *dehu*, *kachnar* and *beedana* are popular in rural and urban areas of Himachal Pradesh since the very early times. These are used as appetizers and served practically with every meal. The traditional pickles of Himachal Pradesh are unique in the raw material, method of preparation and taste from the pickles in other parts of country. In the present study, the methods of preparation of traditional pickles as practiced by the rural folk have been documented.

Keywords: Himachal Pradesh, Traditional, Pickles, Fermentation