

## Preparation Process, Sensory Profile and Chemical Composition of

### *Sargyangma* - A Traditional Food of Limbu Community

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*The aim of present work was to describe the traditional process of preparation, sensory profile and chemical composition of Sargyangma. Sargyangma was prepared in lab and its descriptive sensory test and chemical analysis were performed. The colour of Sargyangma was slightly brown and unevenly distributed. Sargyangma had characteristic aroma and taste mainly due to cooked blood and Yangben. Yangben is local word used by Limbu ethnic community for edible lichen. This had moderately intense bloody aroma and taste. Very intense Yangben aroma and taste was readily detectable. In the overall, Sargyangma had moderately intense pleasant, porky-meaty, spicy aroma. Sargyangma was found to be compact and juicy containing high amount of fat (29.2%) and moderate amount of protein (13.33%).*

**Key words:** Chemical composition, Preparation process, *Sargyangma*, Sensory profile

#### Introduction

Nepal is notable for its diverse food culture. A wide variety of indigenous foods are prepared by different ethnic communities of Nepal (Subba, 2012). *Sargyangma* is an indigenous sausage product named and made by Limbu ethnic people of Nepal living in Eastern mountain region of the country. It is popular in Limbu community. *Sargyangma* is normally prepared during festive and cultural occasions rather than being a commercial product. Limbu people have tradition of raising pig in house backyard. When a family slaughters pig they offer it to god before the family consumes its meat. During such occasions of house slaughtering of pig its meat, blood and organs are used for preparing a type of sausage called *Sargyangma*. The regularly used ingredients for preparing *Sargyangma* are pork belly, blood, liver, heart, killing fats and *Yangben*. *Yangben* is local word used by Limbu ethnic community for edible lichen (Bhattarai *et al.*, 1999). *Yangben* is indispensable flavouring ingredient used in *Sargyangma*. *Yangben* is traditionally processed and preserved by cooking in ash water, washing and drying. Occasionally rice, vegetables, pig head meat and lean meat also be used. The meat, fat and organs are coarsely chopped by *Khukuri* (a local word used for heavy knife) on wooden chopping block and mixed with blood, *Yangben*, salt and spices. The mixture is stuffed in a cleaned hog large intestine (middle) and cooked properly. The information on technology of *Sargyangma* is too general, in form of personal communication and imprecise. To date, only one publication, a book by Kharel *et al.* (2010) contains introductory information on this product. The aim of this work was to describe the traditional process of preparation and sensory profile of *Sargyangma* and determine its chemical composition.

#### Materials and Methods

Traditional knowledge was used as basis for the preparation of *Sargyangma*. Random qualitative survey was conducted in East mountain region of Nepal to gather information on ingredients, their proportions and process of preparation of *Sargyangma*. The subjects involved were the households and individuals (total 52) who either knew to prepare *Sargyangma* or had some knowledge about it. Most commonly used recipe and process of preparation was taken as reference to reproduce *Sargyangma* in lab. Pork belly, leaf fat, blood, liver, heart and large intestine were brought from the local market. Belly was skinned and cut into small pieces. Likewise, heart, liver and fat were cut into small pieces. The pieces of meat, fat and organs were mixed and ground coarsely by passing through a 5mm grinder plate of kitchen meat grinder. Dry *Yangben* obtained from local market was soaked in water and cut into fine pieces. The grinded meat and by-product was mixed properly with blood, *Yangben*, salt and finely ground fresh ginger and garlic. The proportions of different ingredients were belly 50, blood 20, fat 5, liver 15, heart 10 to make 100 parts by weight of the mixture. *Yangben* and table salt were added at the rate of 5g and 2 g per 100 g of the mixture respectively. The spices were added in quantities sufficient to give taste. The sausage batter was filled in properly cleaned pig large intestine and tied at 15 cm length intervals. This was cooked in hot water (85°C) for 45 min. Core temperature of the *Sargyangma* recorded was 75°C. The product was then cooled in water.

The sensory analysis of *Sargyangma* was performed as per the principle and procedure of Spectrum™ Descriptive Analysis Method developed by Civille (1979). For this at first, orientation training was organized for sensory test panel so to make the panelists familiar with terminology used in the sensory analysis. The training involved 8 senior students of food technology and the training was conducted for four consecutive days. A lexicon similar in style of

Johnsen and Civille (1986) comprising all terms used for developed. sensory analysis of *Sargyangma* as shown in Table 1 was

**Table 1** Lexicon for descriptive sensory analysis of *Sargyangma*

Terms used for sensory attributes	Description
<b>Aroma</b>	
Overall aroma	Aroma associated with a typical sausage aroma that is pleasant, porky, spicy and meaty.
Bloody aroma	Aromatics associated with cooked pork blood, could be present but not overpowering (not too intense).
Offal aroma	Aromatics associated with cooked offal such as a mixture of pork heart, liver, and intestines. Could be present but not too overpowering or intense.
<i>Yangben</i> aroma	Aromatics associated with a typical strong aroma of <i>Yangben</i> .
<b>Taste</b>	
Overall taste	Typical sausage taste
Bloody taste	A blood taste that is readily detectable part of the overall taste of the <i>Sargyangma</i> but it should not be too intense.
Offal taste	Taste associated with cooked offal such as a mixture of pork heart, liver, and intestines.
<i>Yangben</i> taste	Typical <i>Yangben</i> taste that is readily detectable part of the overall taste of the <i>Sargyangma</i> .
<b>Texture</b>	
Consistency	The consistency refers to the product cohesiveness as how much does it hold together or break up when beginning to bite, shear and chew. Pasty – smooth but sticking to top of mouth Compact – firm or solid, sticks together.
Toughness and chewiness	The amount of energy and number of chewing required before swallowing. If it is soft and mushy, it is easy to swallow. If it is tough and chewy it requires a lot of energy to shear and chew it.
Juiciness	Perception of wetness in palate and mouth as impressed by water and fat/oil

The sausage was cut in 5 mm thin slices and presented in warm condition to the panelists.

Eight-point descriptive rating test (Table 2) was used to rate the sensory attributes colour, aroma, taste and texture, where 1 represented extremely weak intensity and 8 represented extremely strong intensity (Table 2). The panelists were

asked to assign the most justified point in the rating scale. Chemical composition of fresh *Sargyangma* was determined (three determinations) according to AOAC (2005).

**Table 2** Sensory rating scale for descriptive rating test

Colour  
8 Extremely dark brown and evenly distributed

7 Very dark brown and evenly distributed	5 Slightly tough and chewy	5 Slightly compact
6 Moderately dark brown and evenly distributed	4 Slightly soft and mushy	4 Slightly pasty
5 Slightly brown and unevenly distributed	3 Moderately soft and mushy	3 Moderately pasty
4 Brownish and unevenly distributed	2 Very soft and mushy	2 Very pasty
3 Moderately light and unevenly distributed	1 Extremely soft and mushy	1 Extremely pasty
2 Very light and unevenly distributed		
1 Extremely light and unevenly distributed		

**Aroma**

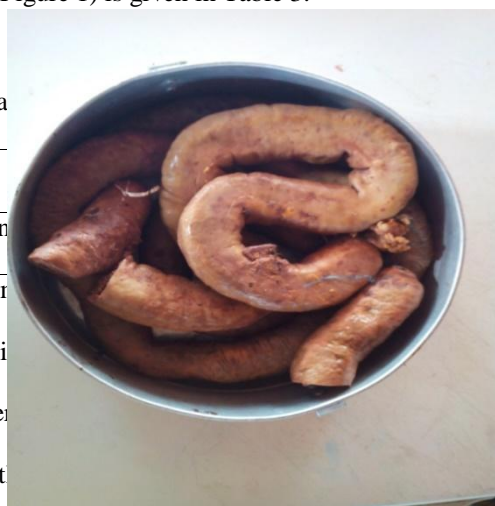
overall aroma	bloody aroma	offal aroma
8 Extremely intense	8 Extremely intense	8 Extremely intense
7 Very intense	7 Very intense	7 Very intense
6 Moderately intense	6 Moderately intense	6 Moderately intense
5 Slightly intense	5 Slightly intense	5 Slightly intense
4 Slightly bland	4 Slightly bland	4 Slightly bland
3 Moderately bland	3 Moderately bland	3 Moderately bland
2 Very bland	2 Very bland	2 Very bland
1 Extremely bland	1 Extremely bland	1 Extremely bland

**Results and discussion**

All communities have their traditional foods. Many of them have been well studied and documented and many of the traditional processes have been industrialized (Anon., 1992; Steinkraus, 1996; Steinkraus, 2014; Tamang, 2010). Scientific enquiries are essential for preserving traditional knowledge and one's intellectual property. Preparing *Sargyangma* is further way to utilize traditionally important meat by-products like blood and liver. This can prove effective to alleviate protein malnutrition in affected communities. *Sargyangma* has simple technology and it is a low price food product. The mean panel score for sensory quality of *Sargyangma* (Figure 1) is given in Table 3.

**Taste**

overall taste	bloody taste	yangben
8 Extremely intense	8 Extremely intense	8 Extremely intense
7 Very intense	7 Very intense	7 Very intense
6 Moderately intense	6 Moderately intense	6 Moderately intense
5 Slightly intense	5 Slightly intense	5 Slightly intense
4 Slightly bland	4 Slightly bland	4 Slightly bland
3 Moderately bland	3 Moderately bland	3 Moderately bland
2 Very bland	2 Very bland	2 Very bland
1 Extremely bland	1 Extremely bland	1 Extremely bland



(a)



(b)

**Texture**

Toughness, Chewiness	Consistency
8 Extremely tough and chewy	8 Extremely compact
7 Very tough and chewy	7 Very compact
6 Moderately tough and chewy	6 Moderately compact

**Fig. 1 Sargyangma, cooked, whole (a) and cut sections (b)**

The colour of *Sargyangma* was slightly brown and unevenly distributed. The lightness of colour and unevenness in colour was due to presence and distribution of fat. The brown shade of colour could be due to the appearance of cooked blood and liver. *Sargyangma* had characteristic aroma and taste mainly associated to cooked blood and *Yangben*. This had slightly intense bloody aroma and moderately intense blood taste. Very intense yangben aroma and taste was readily detectable in *Sargyangma*. *Sargyangma* smelled slightly after offal due to cooked liver, heart and intestine used as casing. In the overall, *Sargyangma* had moderately intense

pleasant, porky-meaty, spicy aroma. The texture of *Sargyangma* was considered to be slightly tough and chewy. The impression of toughness and chewiness was due to middle as casing. The consistency of *Sargyangma* was moderately compact, material held well together. The sausage was moderately juicy due to high moisture and moderate fat content.

**Table 3 Sensory evaluation of *Sargyangma***

Attributes	Mean±SD
Color	3.95±0.75
<b>Aroma</b>	
Overall sausage aroma	6.1±0.64
bloody aroma	5.65±0.74
offal aroma	5.35±0.67
yangben aroma	6.85±0.59
<b>Taste</b>	
Overall taste	6.1±0.64
Bloody taste	6.25±0.55
Offal taste	5.2±0.69
<i>Yangben</i> taste	6.9±0.64
<b>Texture</b>	
Chewiness	5.35±0.67
Consistency	5.75±0.44
Juiciness	6.2±0.61

**Table 4 Chemical composition of *Sargyangma***

Parameters	Mean $\pm$ SD (% of weight basis)
Moisture	53 $\pm$ 2.32
Protein	13.33 $\pm$ 1.52
Fat	29.2 $\pm$ 2.64
Ash	1.83 $\pm$ 0.25
Crude fibre	0.4 $\pm$ 0.024
Carbohydrate	2.43 $\pm$ 0.15

*Sargyangma* is fatty and moderate protein containing meat product. In dry weight basis *Yangben* contains liberal amounts of carbohydrate, crude fibre and total ash (Bhattarai *et al.*, 1999). *Yangben* could have contributed carbohydrate and crude fibre and also some ash to *Sargyangma*. Further investigation of nutritional quality and sensory preference will give better picture of *Sargyangma*.

#### Conclusions

*Sargyangma*, prepared in laboratory with assimilated traditional knowledge was found to exhibit its characteristic color, aroma, taste and texture. Quality of the product was measured on the basis of hedonic ratings which depicts moderately light and unevenly distributed color (3.95 $\pm$ 0.75) of *sargyangma*. However it was well accepted with its moderately intense overall aroma (6.1 $\pm$ 0.64), taste (6.1 $\pm$ 0.64) and moderately juicy texture (6.2 $\pm$ 0.61). Proximate analysis of the product reveals the food to be abundantly rich in fat (29.2 $\pm$ 2.64) and protein (13.33 $\pm$ 1.52)

nutrients. Thus, by products like organs, offals could be used with edible lichen to prepare nutritious and savory food item.

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