

Short Communication

Some properties and sensory characteristics of Lebeni made from cow's and sheep's milk yogurt

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Lebeni is a traditional food made from yogurt and yarma (processed wheat), consumed as appetizer or soup. It is a nutritious meal for digestible protein, calcium and phosphor, which constitute very important source to prevent osteoporosis. In case of preparing cold, lactic acid bacteria may be introduced via lebeni. In this research lebeni samples were prepared from cow's milk and sheep milk yogurt, they were served as hot or cold. Into hot served lebeni samples egg was added to improve its structure. The lebeni samples were generally liked by tasters, however, those samples made from cows' milk and served as cold were most preferred.

Key words: Traditional foods, lebeni, yogurt, cereal, yarma.

INTRODUCTION

Lebeni is a milk-based soup with unique slightly acid taste. It is preferably consumed together with main meals or as an appetizer in East and South Eastern regions of Turkey (Akin, 2006; Soran and Soran., 2009) which indicates an underexploited market opportunity.

Lebeni is a traditional food with nutritious and balanced composition. It is widely produced in different ways and consumed in east and southeastern regions of Turkey (Turkoglu and Hayoglu, 2009). It is produced mainly with yogurt and wheat, and traditionally in some regions chickpea is also added. Yogurt has been produced and consumed for a long time for its nutritive, organoleptic and therapeutic qualities (Cakmakci et al., 1993). General composition of yogurt is similar to milk from which it is produced. In addition, yogurt is more digestible than milk. Yogurt made from milk of sheep and goat is more digestible than that made from cow's milk (Ozer, 2006). Yogurt supplies a wide range of minerals. Calcium is not only found in high amount in yogurt, but also it is better absorbed from milk and yogurt than cereals and vegetables, which is especially important for development of bone and teeth, and also for breast-feeding women

against osteoporosis. In addition, milk and yogurt supply zinc, magnesium, potassium and cobalt as vitamin B₁₂ being only iron is in short supply (Gurr, 1992). Due to changes brought about by fermentation, yogurt has long been considered to have beneficial effect for human health. Lactose intolerants, who lack lactase enzyme and cannot consume milk, can consume yogurt (Deeth and Tamime, 1981). In lebeni production, yogurt is generally added into boiled wheat, in which case it may be considered a means to introduce yogurt bacteria intestinal system to some extent. When consumed together with other foods, milk protein is able to raise the value of poorer quality of proteins such as that of cereals.

Yarma is pearled intact grain of wheat produced from hard white bread wheat varieties, with process of boiling, drying and beating to remove its husk. Separation of husk is generally achieved by pearling process with pressure. Its nutritional content is similar to that of whole wheat that processed. As a result of boiling, it becomes highly digestible.

Elgün and Ertugay (2002) reported that it was possible to supply 2000 kcal of daily energy requirement from cereal without causing any adverse impact on nitrogen balance of body. Moreover, they stated that 380 g bread made from whole wheat in conjunction with 46 g milk would supply essential amino acids including lysine and

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Table 1. Mean scores of organoleptic characteristics of lebeni types.

Type of Lebeni	Appearance	Colour	Taste-aroma	Consistency	Rate of grain	Overall acceptance
CC	7.717 ^a	5.917 ^{ab}	6.143 ^{ab}	7.250 ^a	6.750 ^a	7.084 ^a
CS	7.336 ^a	4.917 ^b	5.472 ^b	4.500 ^b	5.334 ^a	5.084 ^{bc}
HCE	6.494 ^b	6.333 ^{ab}	6.857 ^a	6.833 ^a	6.584 ^a	6.084 ^{ab}
HSE	6.425 ^b	7.250 ^a	4.280 ^c	7.250 ^a	7.000 ^a	5.365 ^b
HC	5.500 ^c	7.333 ^a	6.167 ^{ab}	6.917 ^a	7.334 ^a	6.917 ^a
HS	5.601 ^c	7.584 ^a	2.667 ^d	6.417 ^a	7.167 ^a	3.834 ^c
MSE*	0.063	0.537	0.177	0.444	0.755	0.272
LSD**	0.617	1.794	1.031	1.632	2.127	1.276

Means in the same column with different subscripts are significantly different ($p < 0.05$) * Mean Square Error ** Least significant difference.

tryptophan, which lack cereals.

Yarma and sometimes chickpea are sown in warm water overnight (approximately eight hours) to soften to some extent, and then boiled for a while at low heat to get convenient hardness to eat. Salt is added into boiling cereals. The duration of heat treatment is not standard. The cereal is then cooled down and washed into one kg cereal one and half kg of yogurt is added. It is generally serviced together with main meal as cold. Since water is not sieved, nutritional value is preserved. In some regions, bean is also included into ingredients, and the mixture may be heated after yogurt addition. Hot soup is prepared in a similar way with addition of mint and other herbs (Turkoglu and Hayoglu, 2009).

The aim of this study was to determine organoleptic characteristics and some properties of lebeni made from cereal and yogurts from cow's and sheep's milk.

MATERIALS AND METHODS

Lebeni production

Yarma (*Triticum aestivum*) that obtained from local market was washed and sowed overnight, and then boiled in two-fold (w/w) water in pressure cooker until the water is almost absorbed. Six types of lebeni were prepared:

- 1) CC: Stirred cow-milk yogurt by hand mixer (Moulinex) and salt were added into boiled cereal, mixed thoroughly and served as cold.
- 2) CS: Lebeni made with sheep milk yogurt and served as cold.
- 3) HCE: Lebeni made from cows' milk yogurt, added with an egg and served as hot.
- 4) HSE: Lebeni made from sheeps' milk yogurt, added with an egg and served as hot.
- 5) HC: Lebeni made from cows' milk yogurt without egg addition, and served as hot.
- 6) HS: Lebeni made from sheeps' milk yogurt without egg addition, and served as hot.

Physiochemical analyses

Viscosity was measured using rotary viscometer (Brookfield DV-II Viscometer) using spindle no 6, at 20 rpm. The grain fraction was

crumbled using electrical mixer (Moulinex), and mixed with liquid fraction, and acidity was determined with titration method. pH was measured using Consort C931 (Electrochemical analyzer) pH-meter. Total solids, protein and ash contents were measured as gravimetrically. Fat content of yogurt fraction was measured using Gerber method (Kurt et al., 1993).

Sensory analyses

Lebeni samples were subjected to a blind sensory evaluation by a panel of 10 trained local tasters from Southeastern Anatolia region who are familiar with this product.

Taste-aroma and other parameters such as appearance, colour, taste-aroma, consistency, rate of grain, overall acceptance were assessed on a scale of 1 to 10 (1, low; 10, high).

Attributes of lebeni samples were evaluated using a 10-point scale (0: poorest; 10: best).

The samples were coded with three digit code (letter-number-letter) and presented in random order. The samples were tasted in two separate sessions. Each sample was evaluated in duplicate. Each panelist was provided with deionized water to rinse.

Statistical analyses

Variance analysis was applied to the data obtained from tests on lebeni samples. LSD test was applied to the significant means using STATISTICA (ver. 5.0, 1995) package software.

RESULTS AND DISCUSSIONS

Lebeni is a traditional meal consumed together with main meal in South-eastern Anatolia. Depending on cooking method, there are various types of which are consumed in almost all over the Anatolia.

Physical, chemical and sensory properties of lebeni produced with cow's and sheep's milk yogurt were investigated. The results of sensory analysis were depicted in Table 1.

According to organoleptic evaluations, the panelists judged lower scores to the lebeni samples made by adding yogurt into boiling wheat, most probably due to formation of granular particles, and disappearance of homogenous structure. Addition of egg into lebeni

Table 2. Some chemical and physical properties of lebeni types produced from sheeps' and cows' milk yogurts (n=2).

Parameters	Dry matter (%)	Fat (%)	Protein (%)	Ash (%)	pH	Acidity (%)	Viscosity (cP)
CC	41.725 ^a	3.284 ^a	3.246 ^a	0.562 ^{ab}	3.709 ^a	0.694 ^a	628.50 ^a
CS	45.752 ^b	4.082 ^{bc}	3.723 ^{bc}	0.672 ^b	3.841 ^a	0.635 ^a	675.00 ^b
HCE	41.729 ^a	3.445 ^{ab}	3.399 ^{ab}	0.450 ^a	3.685 ^a	0.586 ^a	622.00 ^a
HSE	47.685 ^c	4.479 ^c	3.810 ^c	0.642 ^b	4.001 ^a	0.625 ^a	680.00 ^b
HC	42.245 ^b	3.339 ^{ab}	3.341 ^a	0.533 ^{ab}	3.910 ^a	0.593 ^a	619.00 ^a
HS	47.830 ^c	4.054 ^{bc}	3.842 ^c	0.661 ^b	3.755 ^a	0.595 ^a	686.00 ^b
MSE*	0.412	0.094	0.023	0.004	0.333	0.005	145.08
LSD**	1.572	0.749	0.372	0.150	1.412	0.179	29.49

Means in the same column with different subscripts are significantly different ($p < 0.05$) * Mean Square Error ** Least significant difference.

improved general appearance of the products significantly ($p < 0.05$), however, these samples could not get as high scores as cold ones. Because yogurt contains a certain amount of lactic acid, it was not unexpected that the resulting product should acquire a rough, lumpy or gritty appearance when heated.

The color scores of lebeni samples were similar ($p > 0.05$) except for cold sample produced from sheep-milk yogurt (CS), the reason of which is not clear. Probably the panelists, who were familiar with lebeni produced in this region, preferred the colour that they got used to.

Concerning taste and aroma, the values given by judges for lebeni samples with sheep-milk yogurt were significantly lower ($p < 0.05$) than for those made with that of cow, probably reflecting the negative effect of intense unique flavor of sheep's milk. This result may have arisen from the fact that cows' milk is consumed more widely in this region.

The results of organoleptic test showed that the ratio of one and half kg of yogurt in one kg wheat was liked by panelists.

Specifically, the lowest taste and aroma score that was observed for heat served lebeni made from sheep-milk yogurt indicated that intense unique flavor of sheeps' milk became more perceptible at the service temperature.

The total score for organoleptic characteristics of lebeni types with cow-milk yogurt were significantly ($p < 0.05$) higher than that of sheep milk, especially when they were served as cold condition.

Chemical composition and some physical properties of lebeni samples were given in Table 2.

Dry matter and fat contents of lebeni types made from sheep's milk were significantly ($p < 0.05$) higher than cow's milk (Table 2), due to higher dry matter and fat content of sheep's milk. All the samples showed similar acidity and pH values. As for viscosity, sheep's milk lebeni samples showed generally higher ($p < 0.05$) viscosity values, most probably due to higher total solids. A significant ($p < 0.01$) positive correlation ($R^2 = 0.960$) was found between total solid contents and viscosity values of the samples. As

expected, protein and ash contents of sheep milk lebeni samples were higher ($p < 0.05$) than cows' milk samples.

Conclusions

Lebeni is with its rich composition, a nutritious soup, and also a refreshing appetizer during hot summer season. Lebeni samples were generally liked by panelists; however, samples made from cows' milk yogurt, especially served cold were most preferred to that made from sheeps' milk yogurt. Habits of consumers may have played on this preference. It is consumed as hot soup especially cold regions. Lebeni is an important source of calcium and phosphor to prevent osteoperosis.

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