

Full Length Research Paper

Physicochemical analysis of desi yoghurts produced by the local community in Gilgit District

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This study was carried out in the Department of Food Technology, Karakoram International University Gilgit, Pakistan. The desi yoghurt samples were collected from various narrow villages of Gilgit District. The desi yoghurt is prepared with pure cow milk by a hygienic and organic process. Results indicate that yoghurt of Oshikandas showed high moisture content and total soluble solids; whereas, Gilgit town yoghurt showed low moisture content and high titratable acidity. Likewise, Danyoure yoghurt showed low total soluble solids as compare to other yoghurts. This study concludes that Gilgit town yoghurt is recommended to be followed for manufacturing since its shelf life is high due to having low moisture content than other two, furthermore; these yoghurts are as per standard of high quality. Yoghurt being nutritious, having healing characteristics and curing gastro intestinal problems, is very beneficial for human's health. Therefore, uses of yoghurt may be considered mandatory in the daily diet.

Key words: Desi yoghurt, different villages, Gilgit-Baltistan.

INTRODUCTION

Yoghurt is a fermented milk product. The word yoghurt originates from Turkish word 'Yogen' meaning thick. Yoghurt is a partially solid fermented milk product which originated centuries ago in Bulgaria. Its attractiveness has grown and is at this time used in most parts of the world (Lee and Lucey, 2010). It is one of the most unique dairy products (Ebenezer and Vedamuth, 1991). Yoghurt is considered highly nutritious for having significant concentration of Ca⁺⁺ and many other bioactive compounds to carry probiotics to the lower part of the intestine, which can significantly influence the intestinal microflora (Coisson et al., 2005). Preservation of milk by lactic acid bacterial through the acidification process is being practiced since centuries and use of different starter cultures, manufacturing techniques and milk types considerably change the characteristics of fermented milk products (Thapa, 2000). Under normal milk processing

industry, special lactic starter cultures are used to ferment milk during preparation range of fermented dairy products (Tamime and Robinson, 1999). Quality and shelf life of fermented dairy products greatly depends upon the quality of raw milk, low total bacterial counts, absence of antibiotics and bacteriophages (Thapa, 2000).

The quality of industrial yoghurt can vary up to some extent due to difference in chemical composition of yoghurt milk, manufacturing process and distribution. Technology of yoghurt, microbiology of starter culture and quality appraisal is the prime importance of any type of yoghurt (Yadav et al., 1993). Yoghurt is highly nutritious and an easily palatable diet due to the predigested nutrients by bacterial starters. It is perishable in view of its unused lactose content (Durga et al., 1986). There is an apparent need for a valuable preservation method to control acid-tolerant spoilage yeasts and molds

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Table 1. Determination of percent chemical characteristics.

Sample	Moisture	pH	Acidity	TSS
Gilgit yoghurt (S1)	79.5C	5.3A	0.81A	12.6B
Danyour yoghurt (S2)	80.2B	5.29A	0.75B	11.3C
Oshikandas yoghurt (S30)	81.5A	4.91B	0.68C	13.7A

*Means followed by same letter in a column are not significantly different at 0.05.

in yoghurt. Micotoxigenic fungi and pathogenic bacteria are able to grow at refrigeration temperature to numbers, which can result in an infection (Potter and Hotchkiss, 1995). Physical properties of yoghurt are changed by milk ingredients and manufacturing conditions, variables affect physical properties such as heat treatment which apply to milk, acidity, additives, protein content, culture, homogenization mechanical handling of coagulum and presence of stabilizers (Rasic and Kurman, 1978). Changes in the chemical, physical and microbiological composition of yoghurt determine the storage and shelf life of the product (Sofu and Ekinci, 2007). Keeping in view the importance of yoghurt and variable manufacturing processes, this study was conducted to access the physicochemical characteristics of desi yoghurt made from cow milk either meeting the international standard of yoghurt or not.

MATERIALS AND METHODS

Determination of moisture content

The moisture content was determined according to AOAC (2000). In this regard, the sample materials were taken in a flat-bottom dish (pre-weighed) and kept overnight in an oven at 100 to 110°C and weighed. The loss in weight was regarded as a measure of moisture content which was calculated by the following formula.

$$\text{Moisture (\%)} = \frac{\text{Weight of fresh sample} - \text{Weight of dry sample}}{\text{Weight of fresh sample}} \times 100$$

Determination of titratable acidity

Titratable acidity as tartaric acid was determined according to the method of AOAC (2000). Each sample of the products was treated with 0.1 N NaOH solution using titration kit; of which three to five drops of phenolphthalein indicator were used. The volume of alkali used was noted and calculated using following formula.

$$\text{Titratable acidity (\%)} = \frac{1 \times \text{Eq. Wt. of acid} \times \text{Normality of NaOH} \times \text{titer} \times 100}{10 \times \text{Weight of sample (g)}}$$

Determination of TSS

The total soluble solids (TSS) were determined as per method described by Mazumdar and Majumder (2003) using Digital-Bench-

Refractometer. Before use, the instrument was cleaned and adjusted to zero at 20°C using distilled water. An appropriate quantity of sample of each product prepared was placed on the prism-plate of the refractometer with the help of a glass rod and folding back the cover. For each sample, the instrument was calibrated using distilled water. The reading appeared on the screen was directly recorded as total soluble solids as brix.

Determination of pH

For determination of pH (hydrogen ion concentration) in the products, a method of AOAC (2000) was adopted and digital pH meter was used. Sample solution was taken in the beaker and directly inserted the electrode into the solution. When the first reading was completed, the electrode was wiped with distilled water and dried-up with tissue paper. Similarly, as a continue series, all other samples were determined accordingly.

RESULTS AND DISCUSSION

In Table 1, results at column one show that Oshikandas yoghurt has comparatively higher moisture content (81.5%) whereas Gilgit yoghurt has lower moisture content (79.5%). The results are in agreement with Ammara and Imran (2010) who analyzed the moisture content during storage by using different starter cultures and recorded 84.66, 85.32, 85.16, 86.29, 86.22 and 86.40%. pH of Gilgit, Danyour and Oshikandas yoghurts were 5.30, 5.29 and 4.91, respectively. Gilgit yoghurt has high pH value as compared to Danyour and Oshikandas yoghurts. Our results relatively correspond to Rodrigues et al. (2010) who concluded that pH of yoghurt is 4.30 to 5.08. The low pH of yoghurt is due to environment for the growth of acid tolerant yeasts and molds (Banaquio et al., 1981; Spillmann and Geiges, 1983). Furthermore, results indicate that mean acidity of all three yoghurt is 0.75%. However, comparatively, Oshikandas yoghurt has the lower acidity, whereas Gilgit yoghurt has higher acidity. This result is also in agreement with Younus et al. (2002) who analyzed the quality evaluation of market yoghurt/dahi and recorded 0.89, 0.87 and 1.13 titratable acidity. Our findings are also in accordance with the findings of Saleh et al. (2007) who concluded that the titratable acidity of stirred yoghurt is 0.93. Likewise, TSS was determined as 12.6, 11.3 and 13.7 brix for Gilgit, Danyour and Oshikandas yoghurts, respectively. To show whether TSS of these three yoghurts meets the

standard or not, another study was reviewed (Zekai, 2003) which is agreement to d value of TSS found (14.58 Brix)

Conclusion and recommendation

From the research it is concluded that the Oshikandas yoghurt has high moisture content and total soluble solids. The Gilgit yoghurt has low moisture content but high titrable acidity; while Danyoure yoghurt have low total soluble solids as compared to other yoghurts. Thematically, all three yoghurts are strongly recommended to be used because these yoghurts have all quality characteristics of international standard. Yoghurt being nutritious, having healing characteristics and curing gastro intestinal problems is very beneficial for human's health.

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