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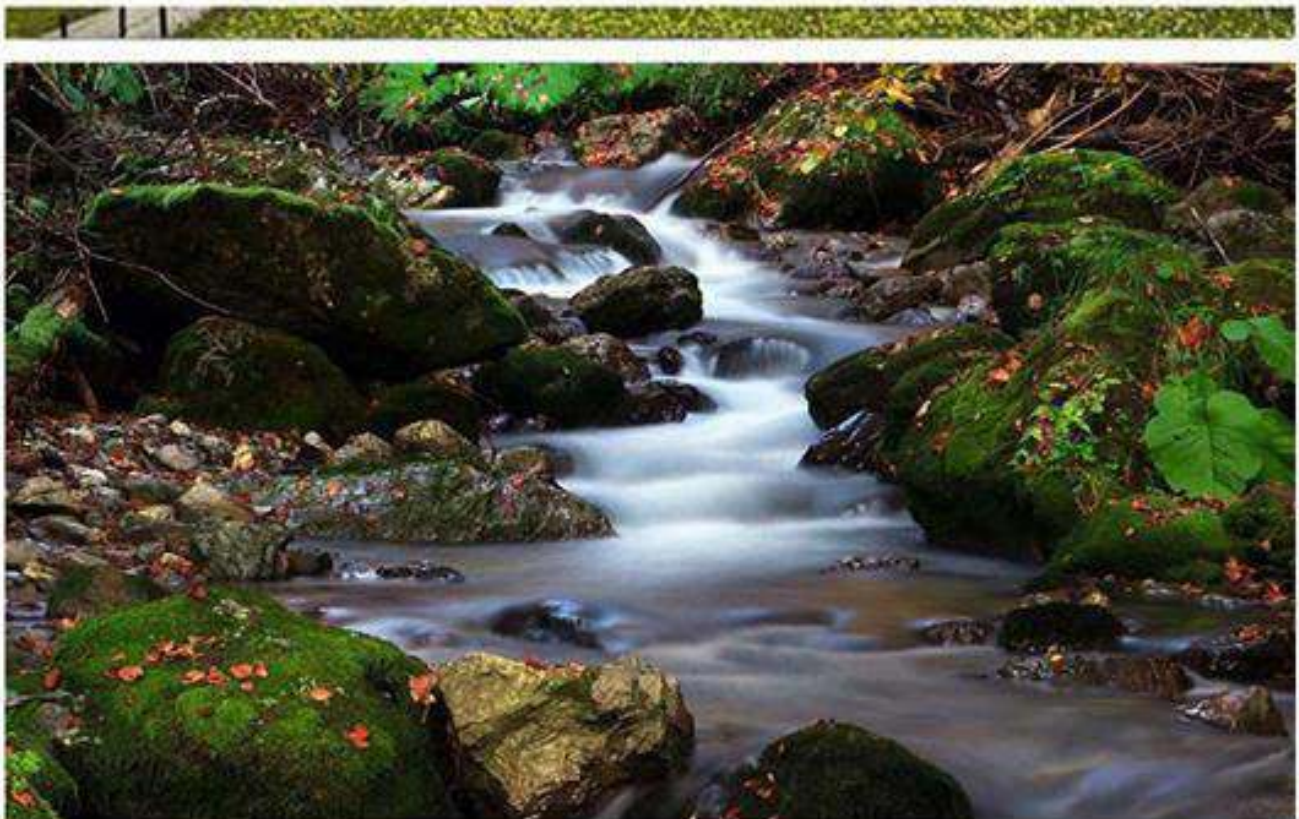


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Article

Monitoring the titration acidity as one of the most important parameters for yogurt quality

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Abstract: Fermentation is one of the oldest methods for extending the life span as well as improving the sensory characteristics of milk. Today, the most commonly consumed fermented milk products include yogurt that offers a range of health benefits. The purpose of our research was to monitor the titration acidity of yogurt from the retail chain within five days of opening, in order to detect the occurring changes. The obtained results showed that time of storing have no impact on the quality properties of yogurt. Storage time had no significant effect on titration acidity ($p > 0.05$)

Keywords: titration acidity, yoghurt, quality

1. Introduction

In many modern societies, fermented dairy products make up a large percentage of total daily food intake. It has also long been believed that consuming such products has many health benefits (Metchnikoff, 1901).

Yogurt is a fermented milk product that is used as part of the human diet or as a refreshing drink. It is a nutritionally balanced product that contains almost all the nutrients present in milk, but in a much more accessible form. It is obtained by lactic-acid fermentation of milk as a result of the action of added starter cultures *Streptococcus thermophilus* and *Lactobacillus bulgaricus* (Adolfsson *et al.* 2004).

Yogurt is considered a healthy food due to its easy digestibility and high nutrient content, and is also recommended for people who are lactose intolerant, have gastrointestinal problems and for people who need to control their weight. (Lourens and Viljoen 2001; Mckinley, 2005). It is an excellent source of protein, calcium, phosphorus, riboflavin (vitamin B2), thiamine (vitamin B1) and vitamin B12, it also has folic acid, niacin, magnesium and zinc. Protein is of high biological importance, and the vitamins and minerals present in dairy products are bioavailable (Anila, 2016).

Today, markets offer a wide variety of yogurts to suit all tastes. Yogurts are made with different textures, different fat content and additives. The healthiest and most nutritious option is the low-fat yogurt (Isleten and Karagul-Yuceer 2006), but in the production of that yogurt, more attention should be paid to the texture due to the reduced viscosity and the separation of the whey, as well as the taste. This wide range of products, along with the health benefits, contributes to the high consumption of yogurt (Mckinley, 2005).

2. Materials and Methods

The aim of this study was to investigate 10 samples of yogurt, purchased from a small sales network with a different percentage of fat. The yogurt was opened on the first day of the research just before the start of the analysis and then stored at a temperature of 0-4°C. Analyzes were performed in duplicates every day until the fifth day of opening the yogurt.

The titration acidity (°SH) was performed by the Soxhlet Henkel method (Trajkovska, 2017). 20g of yogurt, 20ml of water and 2 ml of 2% phenolphthalein (indicator) are being titrated with 0.1 M NaOH until the appearance of a pale pink color.

Microsoft Office Excel version 2017 (Microsoft Office Corporation, USA) was used for statistical analysis of the obtained results.

3. Results and Discussion

Depending on the composition of the milk, the technological process and storage conditions (Ezeonu *et al.* 2016), the quality of yogurt and its physiochemical properties vary from manufacturer to manufacturer (Younus S. *et al.* 2002). However, according to the Rulebook on the requirements for the quality of raw milk, the quality standards of consumable milk, dairy products and the use of their names, the quality and activity of starter culture, whey fermentand other specific substances and the manner of their use, the method of additional labeling milk and dairy products as well as the additional weight deviation from the declared one (Official Gazette of RM no. 96/2011) yogurt must be white to white-yellow in color, have a characteristic odor and a pleasant sour taste, thick liquid consistency and active acidity (pH) of not less than 4.0 and / or titration not exceeding 55 °SH.

Titration acidity is among the most important parameters that are analyzed in yogurt and which can easily and simply determine the quality, i.e. the shelf life and acceptability of the same (Al-Kadamany *et al.* 2002).

Table 1. Table of the results obtained from the analysis of the titration acidity of yogurt

Number of samples	Titration acidity (°SH)				
	Day 1	Day 2	Day 3	Day 4	Day 5
Sample 1	37.4	39.4	39.4	39.2	39.2
Sample 2	37.2	40.2	39.9	39.5	40
Sample 3	36.6	41.9	42	42.3	41.7
Sample 4	38.4	41	40.4	40.4	41.2
Sample 5	36.8	37.8	36.2	36.4	37
Sample 6	41.6	44	42.3	42.2	42.5
Sample 7	45.2	44.3	43.5	43.3	43.5
Sample 8	37	40.4	39.2	41.5	41.8
Sample 9	51.6	56.2	55	56.4	56.3
Sample 10	48.6	50.8	49.7	49.8	52.1

*n.s. $p > 0.05$

From the obtained results shown in table no. 1 we can observe that the storage period (5 days) at $T = 0-4^{\circ}\text{C}$ that there is no effect on the increase in titration acidity (Younus S. *et al.* 2002), i.e. the statistical difference between the obtained values from the first and fifth day is

$p > 0.05$. In addition, according to research by Adam (2008), the period of storage of yogurt under appropriate conditions does not lead to significant changes in its composition. In addition, the increase in titration acidity is followed by a sharp and sour taste which is one of the indicators of reduced quality of yogurt (Al-Kadamany *et al.* 2002).

Out of the total of 10 analyzed samples, an increase in titration acidity above the allowable value (55 °SH) was observed only in sample 9 (56.2 °SH) on the second day after opening, but the same sample has initially higher titration acidity than other products. According to Vucic (2014), increased titration acidity may be the result of postacidification or metabolic activity of starter cultures that leads to a change in sensory properties and a decrease in viability or microbiological contamination during storage (Alkali *et al.* 2007).

4. Conclusions

Titration acidity is one of the most important parameters for determining the quality of yogurt. The results of the research conducted to monitor the change in the titration acidity of yogurt over a period of five days from the opening day indicate, that the time and storage conditions have a significant impact on the qualitative properties of yogurt. Nine out of ten examined samples had a satisfactory degree of acidity, while the observed variations were considered to be the result of postacidification. However, no statistical significance ($p > 0.05$) was observed between the samples during the study period.

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