

PHYSICO-CHEMICAL QUALITY EVALUATION OF PEACH YOGURTS FOR CHILDREN

EVALUAREA FIZICO-CHIMICĂ A CALITĂȚII IAURTURILOR CU PIERSICI PENTRU COPII

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Abstract. Nutritional research has mentioned that fortification of food by using natural resources is one of the best ways to improve the total nutrient intake of foods with minimal side effects. One of the product categories that can be enriched is fermented products, especially yoghurts. A special category is those for children. In this study the physico-chemical characteristics of four types of yogurts were evaluated. Following the color evaluation, the total color difference (TCD) increased with the increase in the peach purée concentration, and the values varied between 7.2 and 19. Total acidity values are between 118.75 and 150 °T, respectively 3.85 and 4.17 pH units. The sodium chloride concentration values were between 0.14 and 0.2 g NaCl/100 g. For fat content the determinate values were lower than those declared (3.2%; 2.7% and 0.8%). Rheological measurements performed showed that all samples behave like a yogurt.

Keywords: fortified yogurt, peaches, acidity, fat

Rezumat. Cercetările din domeniul nutriției au menționat că fortificarea produselor alimentare prin utilizarea resurselor naturale este una dintre cele mai bune modalități de a îmbunătăți aportul total de nutrienți al alimentelor, cu efecte secundare minime. Una din categoriile de produse ce pot fi îmbogățite o reprezintă produsele fermentate în special iaurturile. O categorie specială o reprezintă cele destinate copiilor. În prezentul studiu s-au evaluat caracteristicile fizico-chimice a patru tipuri de iaurturi. În urma evaluării culorii, diferența totală de culoare (TCD) a crescut cu creșterea concentrației de piure de piersici, iar valorile variază între 7,2 și 19. Valorile obținute pentru aciditatea totală sunt cuprinse între 118,75 și 150 °T, respectiv 3,85 și 4,17 unități de pH. La concentrația de clorură de sodiu s-au obținut valori cuprinse între 0,14 și 0,2 g NaCl/100g produs. Pentru determinarea conținutului de grăsime s-au obținut valori mai mici decât cele declarate de producători (3,2%, 2,7%; 0,8%). Măsurătorile reologice efectuate au arătat că toate probele se comportă ca un iaurt.

Cuvinte cheie: iaurt fortificat, piersici, aciditate, grăsime

INTRODUCTION

Yoghurt is a very popular fermented milk that is produced all over the world by acid coagulation of milk without drainage. It is considered by

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nutritionists as having high nutritional value and positive bioactive effects (Sodini *et al.*, 2004).

Fruit yoghurt is among the most common fermented dairy products consumed around the world (Saint-Eve *et al.*, 2006). To increase the functionality and antioxidant capacity of these dairy products, food ingredients such as strawberry fruit is commonly added (Coisson *et al.*, 2005; Trigueros *et al.*, 2011).

Fruits are considered as an excellent source of antioxidants and prebiotic fibers and polyphenols. Consumption of fruits and yoghurt in combination has a potential to provide extra nutritional-physiological value that involve in synergetic effect on health (Fernandez and Marette, 2017).

Nutrition scientists have mentioned that fortification of food products using natural resources (fruits, cereal, etc.) is one of the best ways to improve the overall nutrient intake of food with minimal side effects (Nestle, 2013).

Regarding the fat content, the results obtained for the yogurt samples analyzed indicate lower values than those declared by the manufacturer.

MATERIAL AND METHOD

Sample collection

Four samples of commercial yogurt for children between 6 and 36 months were purchased from a local market of Suceava (Romania) in order to study the physico-chemical characteristics, named H., N., P. and J.

Yogurts characterization

Color determination. Yogurt color was evaluated using a Konica CR 400 colorimeter (Konica Minolta, Japan) and the results were expressed as L * (brightness) and chromaticity of a * (green / red) and b * (yellow / blue) on the Hunter scale.

The pH determination

According to SR EN 1132: 1996 the free acidity of baby yogurt is expressed by pH, which represents the logarithm with changed sign of the concentration of hydrogen ions in the solution. The pH values were determined using the pH meter HQ11d.

Total acidity was determined by titration with a standardized solution of 0.1 N NaOH in the presence of phenolphthalein (1%) as indicator and the results were expressed in °Thörner.

The total ash was determined by calcinations in an oven at 500°C for 3 hours.

The fat content was performed by the acid-butirometric method (Gerber method).

The salt content was determined by the Mohr method.

Determination of viscosity. To determine the rheological properties of peach children yogurt, the dynamic rheometer Thermo Haake Mars, plate type geometry, with a diameter of 40 mm, at 8°C was used.

The determination of the water content was carried out by drying in the oven at a temperature of $102 \pm 2^\circ\text{C}$ for 3-4 hours, stirring the contents from time to time.

RESULTS AND DISCUSSIONS

Yogurt color was measured in the sense of brightness (L^*) and chromaticity for red-green (a^*) and yellow-blue (b^*). With them, the total color difference (TCD) was estimated for children's yogurt samples compared to J. yogurt used as a control sample (fig. 1).

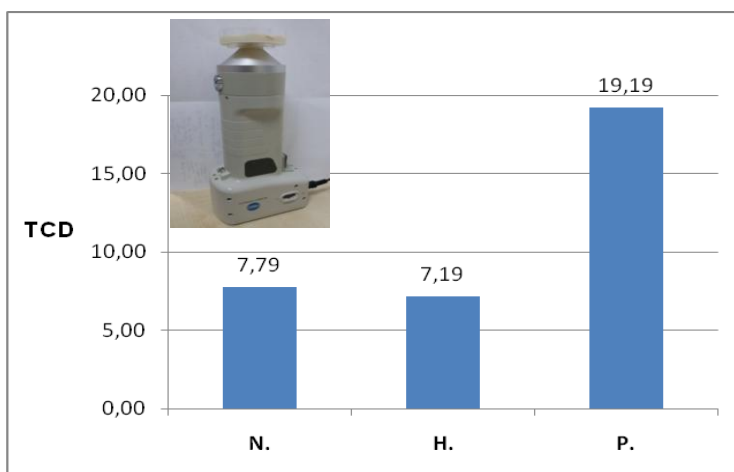


Fig. 1 The total color difference (TCD) of the special yogurt for children reported in the comparison with the control sample

Table 1 shows the values obtained for the total acidity and pH of the analyzed yogurts. The values are between 105 and 150 °T, respectively 3.84 and 4.17 pH units. In the case of acidity as well as of the pH values, a decrease of them is observed with the increase of the quantity of peach puree in yogurts.

Table 1

Evaluation of pH and acidity of yogurt

Yogurt sample	pH	Acidity [°T]
N.	4.17	150
H.	4.07	137.5
P.	3.85	118.75
J.	4.1	120.5

In figure 2 are presented the values obtained for the sodium chloride content of the yogurt samples and the sodium chloride content declared by the manufacturer. For all samples analyzed higher quantities were obtained compared with those presented on the product label.

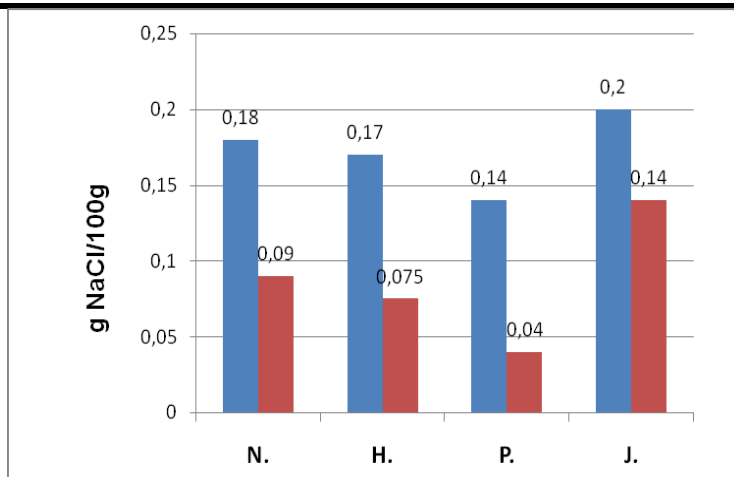


Fig. 2 Variation of the sodium chloride content of the analyzed samples in comparison with the declared values
(■determined values ■ declared values)

Regarding the fat content, the results obtained for the yogurt samples N., H. and P. indicate lower values than those declared by the manufacturer. For the J. yogurt sample, the value obtained were the same as the product label presented (fig. 3).

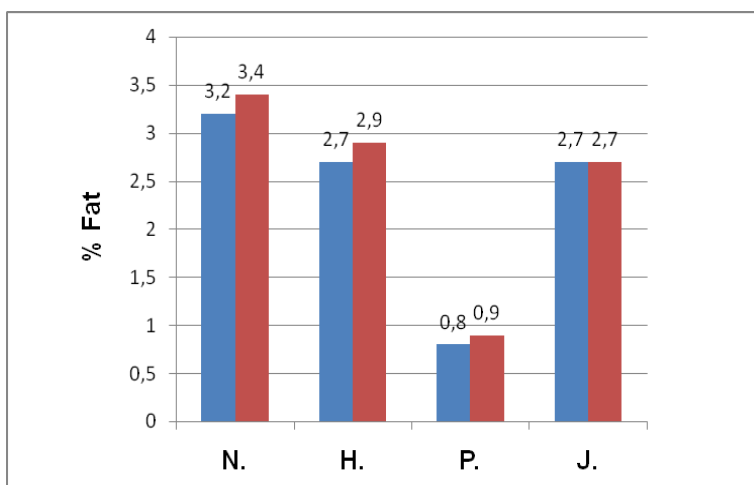


Fig. 3 Variation of the fat content of the analyzed samples in comparison with the declared values (■ determined values ■ declared values)

The water content and total ash of the analyzed samples are presented in table 2. The highest amount of water was established to be found in J. yogurt with a value of 79.97% (ash 19.27%). Following are in the descending order H., N. and P.

Table 2

Water content (%) and total ash (%) of yogurt

Yogurt sample	Water, %	Total ash, %
N.	75.66	23.47
H.	79.73	19.58
P.	74.71	24.88
J.	79.97	19.27

Rheological measurements were performed to obtain information on the structural properties of yogurts. The determinations indicated that yogurts follows the elastic and viscous modules without variations.

The largest sale of gels is at H. yogurt indicated the best described evolution. The thixotropy curve for P. yogurt is a special one, the yoghurts break and return to their original form (fig. 4).

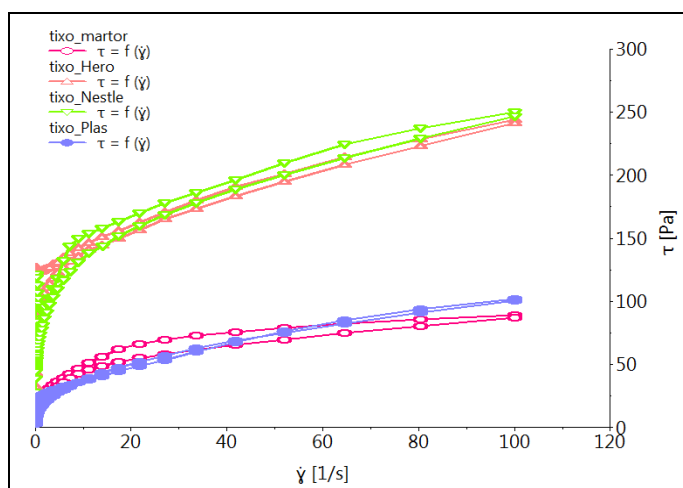


Fig. 4 Thixotropy curves of peach yogurts

CONCLUSIONS

This work shows that the chemical characteristics of commercial children peach yogurts have a variance among assortment. Regarding the quality parameters, for all analyzed samples higher quantities of sodium chloride than those recorded on the product label were obtained. Regarding the fat content, the values obtained for the fat content show that for the entire yogurt samples were obtained lower values than the declared ones.

As a result of the color evaluation, the total color difference (TCD) increased with the concentration of peach puree in the samples, and the values vary between 7.2 and 19. The values obtained for the total acidity are between 105 and 150 °T, respectively 3.84 and 4.17 pH units. In the case of acidity as well as of the pH values, a decrease of them is observed with the increase of the quantity of peaches purees from yogurts.

The highest amount of water was found in J. yogurt with a value of 79.97% corresponding to the smallest amount of ash of 19.27%, followed by H. yogurt (79.73% H₂O and 19.58% ash), N. yogurt (75.66% H₂O and 23.47% ash) and P. yogurt (74.71% H₂O and 24.88% ash).

Rheological measurements showed that all samples behave like yogurt, breaking and returning to their original form.

Due to the high consumption rate of dairy products, such as yogurt, fortification of these products can reduce or effectively prevent diseases associated with nutritional deficiencies.

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