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Technological research on obtaining a new product:Yoghurt with added walnuts and strawberries jam

Doina - Georgeta Andronoiu*, Elisabeta Botez, Gabriel - Dănuţ Mocanu, Oana Nistor, Alexandra Nichiforescu

Universitatea „Dunărea de Jos", Facultatea Ştiinţa şi Ingineria Alimentelor, Str. Domnească, nr. 111, 800201, Tel. + 40 336 130 177, Fax + 40 236 460 165, Galaţi, România

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Abstract

The main purpose of the study was to determine an optimal technological variant for obtaining a new product, yoghurt with added walnuts and strawberries jam. Designing the product derived from several considerations: diversification of yoghurts on the Romanian market, adapting the nutrients of yoghurt to the needs of some consumers, by improving milk fat with vegetal fat from walnuts, enriching the yoghurt with antioxidants from strawberry jam.

There have been manufactured two variants of product and a blank sample. The analyses regarded physico-chemical properties (total solids, acidity, minerals content, fat content, viscosity), sensorial properties and stability. The obtained data were statistically analysed. All the analysed parameters accomplished to the limits stipulated by standards.

Keywords: yoghurt, walnuts, strawberry jam

1. Introduction

Yoghurt is one of the most popular foods on the Romanian market, due to both nutritional and sensorial aspects [2]. Yoghurt consumption achieves several benefits for human healthy: protection against gastrointestinal upsets, enhanced digestion of lactose by maldigesters, decreased risk of cancer, lower blood cholesterol, improved immune response and help the body assimilate protein, calcium and iron [4-6,8].

Yoghurt producers are interested in diversification of their products by adding different fruits, cereals, flavours, etc. Fruits improve nutritional and sensorial properties of yoghurt. In yoghurt there have been added many fruits, in different forms and proportions. For this study there were used strawberries because of their flavour and high content of phenolic constituents, potassium and vitamin C [9].

Jam (47 parts by weight of fruit ingredient to each 55 parts by weight of sweeteners) is the most suitable form of strawberry to be added in yoghurt. The walnuts were added in order to obtain a certain textural sensation as well as to improve the quality of yoghurt's fat: walnuts are a rich source of monounsaturated fat (2,5g/oz) and polyunsaturated fat (13,4g/oz) [5].

The purpose of the study was the obtaining, characterisation and stability determination of a new product that combine the nutrients from milk, walnuts and strawberries with the benefits of lactic fermentation.

2.Material and Method

Yoghurt was manufactured following the technological scheme presented in figure 1. The blank sample contained only milk, milk powder and inoculum. It was encoded BLS.

Corresponding author: *e-mail:* Georgeta.Andronoiu@ugal.ro

One of the variants included milk, milk powder, inoculum, strawberries jam and walnuts (the sample without stabiliser) and was encoded WAS. The other variant included the ingredients presented for the previous variant but a stabiliser was added (the sample with stabiliser, encoded WIS).

For yoghurt manufacturing there were used pasteurised whole milk, milk powder, strawberries jam and walnuts from the market. The stabiliser was a mixture of gums and pectin. The inoculum was obtained from DVS culture (ABT5 from Christian Hansen) incubated in whole milk for 6 hours at 45°C. It was choose the inoculum instead of powder culture due to the reduced milk quantity. The final product was manually packaged in polyethylene cups, covered with aluminium foil and stored at 8°C, in a refrigerator, for 18 days.

The methods used to determine physico-chemical properties (total solids, minerals content, fat content, total nitrogen content) are in accordance with the Romanian analysing standards.

The acidity and syneresis were determined for the fresh samples and after 2, 4, 6, 8, 10, 12, 14, 16 and 18 days of storage.

Syneresis was determined using a method described by Amatayakul et all in 2006 [1]: 5 g of product were transferred in a tube and stabilised at 4 °C for 2 hours. Than the tube was centrifugated 5 minutes at 2500 rpm (rotations per minute).

The expulsed whey was weighted and the syneresis was determined as percentage ratio between whey mass and uncentrifugated gel mass.

Dynamic viscosity was determined at 8 ºC using a Brookfield DV–E viscosymeter, equiped with a LV 2 spindler [7].

All the analyses mentioned above were determined three times and the results presented are the average between them.For sensorial analysis there were used 10 trained panellists aged between 20 and 30. They were asked to score sensorial properties of the samples (aspect, sineresys, creminess, flavour, aftertaste, mouthfeel, sour taste and sweet taste) between 0 and 5.In order to determine the homogenity of sensorial data there was used Anova unifactorial statistical method [3].

3.Results and discussions

The physico-chemical properties of the samples are those that imprint the nutritive value of the products. They are presented in Table 1. All the analysed parameters increased with addition of walnuts and strawberries jam. Total solids content for WAS and WIS was with 8,33% higher than for BLS. Fat content and total nitrogen content were higher for WAS and WIS than for BLS due to the contribution of walnuts which are rich in fats and proteins. It can be observed that there are no significant differences between WAS and WIS, meaning that the stabiliser did not influenced the products properties.

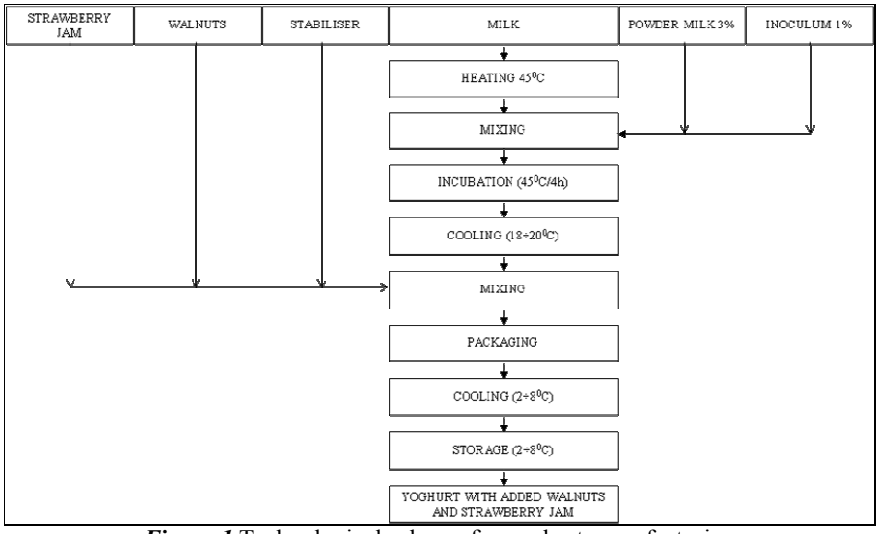

Figure 1.Technological scheme for yoghurt manufacturing

Table 1. Physico-chemical properties of the samples

Sample	Total solids content, %	Minerals content, %	Fat content, %	Total nitrogen content, %
BLS	12	0,7	3,5	3,3
WAS	12,9	1	3,9	3,7
WIS	13	1	3,9	3,8

Acidity is determined mostly by lactic acid resulted from fermentation of the lactose. Lactic acid is important both for yoghurt's taste and preservation. In figure 2 is presented the evolution of acidity from manufacturing until the end of the storage period.

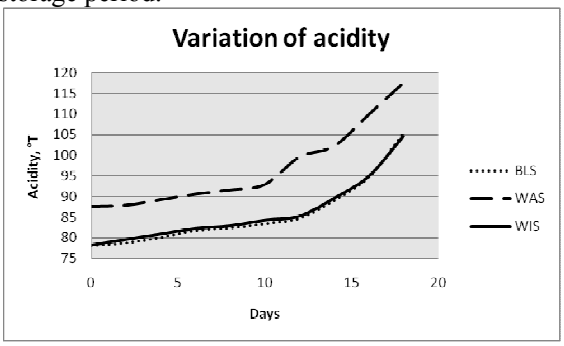

Figure 2. Variation of acidity from manufacturing until the end of storage period

Form figure 2 it can be observed that the higher acidity was reached by WAS due to the organic acids existing in strawberries jam.

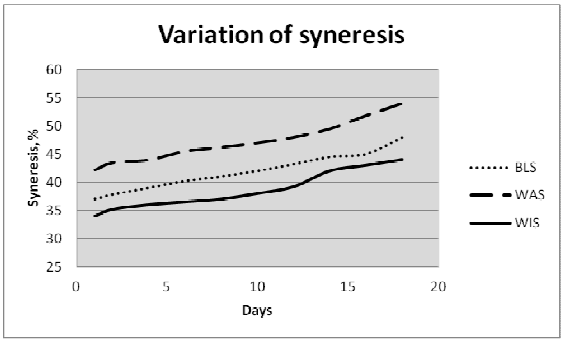

Figure 3. Variation of syneresis from manufacturing until the end of storage period

These acids are present in WIS too, but the alkaline compounds from the stabiliser dissimulate them. It can also been observed that the acidity of WAS increases slowly in the first 10 days and rapidly in the last 8 days. This evolution is similar for BLA and WIS in first 11 days and 7 days, respectively. This means that the stability of the product is assured 10 days for WAS and 11 days for WIS.

Good quality yoghurt should be thick and smooth with no signs of syneresis. Set yoghurt with a high level of syneresis on the surface may be regarded as a low quality product, even though this is a natural phenomenon [1]. Figure 3 shows the variation of syneresis in the 18 days of storage. There can be observed that the quantity of expulsed whey increased with the increasing of the storage period for all the samples. WAS registered the highest level of syneresis due to the highest level of acidity [10]. This correlation between acidity and syneresis was not respected in case of WIS and BLS due to the presence of the stabiliser that bind whey to proteic matrix.

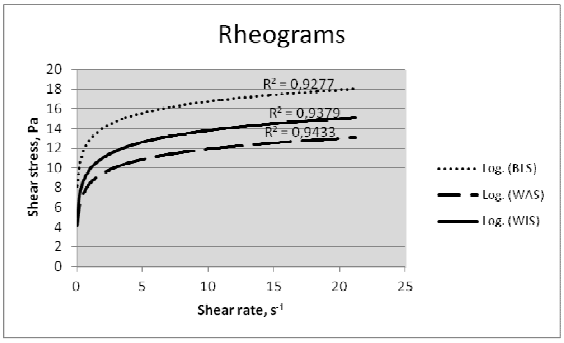

Figure 4. Variation of shear stress as a function of shear rate

The rheological behaviour of yoghurts is very important both from technological (transport and packaging conditions) and sensorial point of view (there is a correlation between creaminess and viscosity. In figure 4 are represented the rheograms for the three samples.

In figure 4 can be observed a pseudoplastic behaviour for BLS as well as for WAS and WIS, meaning that the added strawberry jam and wallnuts did not modify radically the rheological behaviour of yoghurt. At the same values of shear rate, shear stress registered higher values for BLS. The stabiliser increased the shear stress at constant shear rate.

The sensorial analysis revealed better results for WIS, as can be observed in figure 5.

Sensorial data were statistically analised using Anova unifactorial method. From the eight analised sensorial atributes two registered significant differences (aftertaste and mouthfeel) but these were compensated by the rest of six atributes. Because significant differences in sensory analysis were obtained only for two of the eight features, that differences between the analyzed samples are not significant and also tasters opinions do not vary greatly. Experimental version evaluated with the best sensory characteristics was WIS.

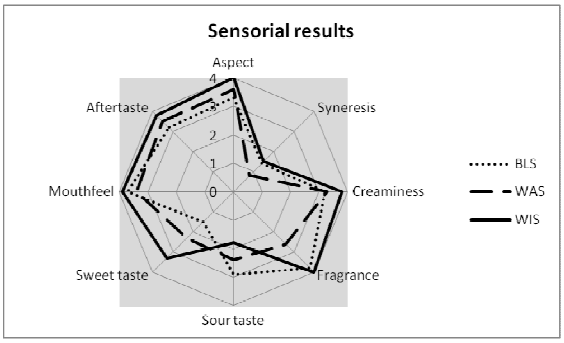

Figure 5. Results of sensorial analysis

Conclusions

Yoghurt with added walnuts and strawberries jam is a new product that can be manufactured and successfully marketed due to its improved properties that impressed positively the consumers.

Acknowledgements

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