Performance Evaluation Milk Cheese, Depending on Season

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Abstract
Transformation of milk in Telemea cheese is a complex process based on proteins concentration with a variable percent of fat and mineral substances and elimination of lactose and water in important quantity. The transformation of milk in different assortments of cheese is an important argument for developing of this production (stability in storage, long time conservation, easy transportation and human diet diversification).The research was effectuated in 5 processing Telemea cheese unit, in 2 seasons, summer and winter. Were made 15 determinations for each unit and period and dates obtained were interpreted by statistical methods.
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Keywords: cheese, conservation, fat, mineral substances, proteins.

1. Introduction

Milk transformation in cheese is a very complex process which is represented by protein concentration with variable fraction of fat and mineral substances and elimination an important water quantity and lactose, too.

2. Materials and methods

The specific consumption is influenced by milk chemical composition (fat and protein content), technological process (dry substances loss), as well as desiccated degree of the cheese during the maturation and storage processes.
The specific consumption value is optimal if at the 8.5% unfit dry substance content and normal acidity, the protein level of milk is between 3.3% and 3.4%. [1,2]
The made efficiency and specific consumption can be calculated with following relations:
$\mathbf{R = 100 \times C_b/C_L}$

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$\mathbf{C_{sp} = C_L/C_b}$
Where:
C_b = cheese quantity realized (Kg);
C_L = milk quantity used in technological process (l);
It can use following formula which take in account the chemical composition of milk:

$\mathbf{C_{sp} = [G_{sub}(100 - A) \times C \times 0,01] – G_z/ (P \times G_{LN}) – G_Z}$
Where:
G_{sub} = fat content from dry substances in cheese (%);
A = cheese water content (%);
C = correction coefficient (1,036 for firm and half-firm cheese and 1,0 for lax cheese)
G_Z = whey fat content (%);
G_{LN} = fat content from pasteurized milk (%);
P = coefficient for fat loss;

$\mathbf{P = 100 – p/100}$,
Where:
p = 4,5 for firm and half-firm cheese;
p = 8 for lax cheese;
p = 6 for Telemea cheese;
$\mathbf{C_{sp} = [1,0056 \times (G_{ST} \times 1,0284)/ G_L - G_Z] \times G_Z}$,

Where:
G_{ST} = fat content in dry substance (%);
1,0056 = produce loss coefficient;
G_L = milk fat quantity (%);
G_Z = whey fat quantity (%);
For obtain 1 kg of Telemea cheese from cow milk are necessary 6.2-7 l milk, with 3.0-3.4% fat content and 5.6-6.1 l, with 3.5-4.2% fat content. For sheep Telemea cheese are necessary 3.3-3.9 l milk for 1 kg cheese.

The quantity of raw material is different by season and fat milk content. Milk with 7.5% fat content has an average consumption o 3.52 kg to fresh cheese and 3.67 kg for maturate cheese. [2,3,4]

3. Results and discussion

In table 1 is presented the signification testing of the observed differences between analyzed points in the summer, for efficiency parameter.

Table 1. Signification testing of the observed differences between analyzed points in the summer, for efficiency parameter

Comparison of samples points	Student value calculated	Student value table			
		$t_{0.05}$	$t_{0.01}$	$t_{0.001}$	$t_{0.2}$
P1-P2	1.0145^{NS}	2.048	2.763	3.674	1.313
P1-P3	0.4446^{NS}				
P1-P4	0.6962^{NS}				
P1-P5	0.3809^{NS}				
P2-P3	1.1941^{NS}				
P2-P4	1.2961^{NS}				
P2-P5	1.1679^{NS}				
P3-P4	0.2982^{NS}				
P3-P5	0.0551^{NS}				
P4-P5	0.3404^{NS}				

Table 2. Signification testing of the observed differences between analyzed points in the summer, for efficiency parameter

Comparison of samples points	Student value calculated	Student value table			
		$t_{0.05}$	$t_{0.01}$	$t_{0.001}$	$t_{0.2}$
P1-P2	0.0276^{NS}	2.048	2.763	3.674	1.313
P1-P3	1.3624*				
P1-P4	0.0688^{NS}				
P1-P5	0.7297^{NS}				
P2-P3	1.4531*				
P2-P4	0.0974^{NS}				
P2-P5	0.8388^{NS}				
P3-P4	1.2722^{NS}				
P3-P5	2.0209*				
P4-P5	0.5603^{NS}				

Table 3. Signification testing of the observed differences in analyzed points between seasons, for efficiency parameter

Puncte comparate	Valoarea calculată a testului Student			Valoarea tabelară a testului Student			
	C_L	C_B	ŋ	$t_{0.05}$	$t_{0.01}$	$t_{0.001}$	$t_{0.2}$
P1-P1	1.3977	3.8740***	9.5424***	2.048	2.763	3.674	1.313
P2-P2	0.5218	3.8757***	4.4031***				
P3-P3	1.5722	2.0792*	7.7125***				
P4-P4	1.3275	4.2720***	7.6602***				
P5-P5	0.6157	3.8222***	9.9750***				

From table 3 we can conclude that:
Exist the significat differences between all working points for efficiency parameter. So: for combination P1-P1 the Student test calculated value is 9.5424; for combination P2-P2 the Student test calculated value is 4.4031; for combination P3-P3 the Student test calculated value is 7.7125; for combination P4-P4 the Student test calculated value is 7.6602; for combination P1-P1 the Student test calculated value is 9.9750.

4. Conclusions

Concerning the efficiency, the differences observed between analyzed points appeared because the fat content of raw milk is various or flow process has technological losses or not respecting the steps or technological parameters.
Exist the significat differences between all working points for efficiency parameter.
Those differences can be explained by fat content milk various from a season to another, feed system, breed, stable system, milking period, etc.

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