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FACULTY OF AGRONOMY ČAČAK

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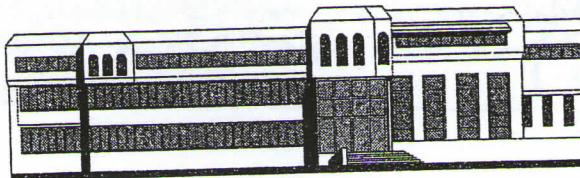
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Sensory analysis of traditional and industrial white cheese

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Abstract: Cheese is the most various group of dairy products and is, apparently, the most academically interesting and challenging. This study was conducted to determine some sensory characteristics (flavor, texture, appearance, color and acceptability) of white brined cheese, made from sheep's milk in Macedonia regions which has been produced on traditional and industrial level. The high value of the flavor and odor were recorded in the industrial cheese 4.42 and 4.22 respectively, while the lowest value of the flavor and odor 3.25 and 3.36 were recorded in traditional cheese. Finally, the results showed that cheeses made from sheep's milk on the industrial way had the best quality among all cheese samples.

Key words: white brined cheese, sheep, sensory analysis, traditional, industrial

Introduction

Although the origin of cheese making is lost in unrecorded history, there is evidence to suggest that cheese was made as far back as 7000 BC. The advance of scientific knowledge has prompted a better understanding of the raw material, milk, and the cheese making and ripening process.

Cheese is the generic name for a group of fermented milk-based food products, delivered in an extensive variety of flavors and forms all through the world (Fox, F.P., et al., 2000). The cheese itself is regarded as a nearly complete source of valuable nutrients, especially conjugated linoleic acid, calcium, phosphorus and high - quality protein (Fox, P. and McSweeney P, 2004; Ercan D., 2009; Waleed A. M., 2013). Cheese is a biochemically dynamic product and undergoes significant changes during ripening (Fox, F.P., et al., 2000), they may be grouped into primary (lipolysis, proteolysis and the metabolism of residual lactose and of lactate and citrate) or secondary (metabolism of fatty acids and of

amino acids) biochemical changes (McSweeney P., 2004). Macedonian white brined cheese might be characterized as a soft (50 - 60 %) moisture, high fat cheese (25-30%), with protein content (12-21%) and high salty (3-5%) with a pH range of 4.20 – 5.05 (Mojsova S., 2013).

Sensory science has proven success in research and development and quality assurance in the dairy industries. Understanding the development and taste variations that occur during manufacturing processes is an important tool in defining consumers' expectations of taste. Sensory attributes can be described as appearance, aroma and texture characteristics (Fox, F.P., et al., 2000). Sensory evaluation is also needed to determine the influence of sensory characteristics on the eating quality of cheese and its consumer acceptability. The eating quality of cheese, or a consumer's liking for cheese, is an integrated response. The stimuli are the sensory characteristics, perceived before and during consumption (Fox, F.P., et al., 2000). Quality cheese involves different types of characteristics, including: sensory, physical, cooking, compositional/nutritional, chemical and safety criteria (Othman S., 2011).

The aim of this study was to determine the sensory properties of white brined cheese, manufactured from full-fat sheep's milk, made in traditional and industrial way of production.

Material and methods

Macedonian white brined cheese was manufactured from sheep's milk. Cheeses can be made using pasteurized and raw milk. The industrial samples were produced from pasteurization milk, by adding rennet in addition to the starter cultures to coagulate the milk. Traditional cheeses are produced from raw milk without the addition of any starter culture (Figure 1).

The assessment of sensorial characteristics of four types of cheese has been done. Two cheese samples were obtained from the dairy market and the other two samples were taken from individual producers of traditional cheeses. The sensory analysis of traditional cheese samples was carried out after 90th day of the ripening period. The following experiment was prepared as part of the Faculty of biotechnical sciences, by 36 panelists. The panelists, who were involved, were faculty members, staff and students, between the age of 22 to 60. Panel members were selected based on willingness to participate, but a training session before the testing was carried out.

The cheese samples were cut into (2.5 x 2.5 x 2.5 cm) pieces and were placed on plastic plates. The cheese samples were presented in a random order and assigned product codes with three-digit numbers randomly, to keep samples anonymous to panelists. A glass of water was provided for rinsing mouth between samples. The assessors were asked to evaluate appearance, color, odor,

flavor and texture attributes on two traditional and two industrial cheese samples. The evaluation method was based on a quantitative descriptive ranking method with the 5 point scale (1 = worst, 5 = the best) to evaluate cheese samples. The final score was calculated by multiplying with a coefficient of significance which represents the contribution of individual parameters in the maximum sensory profile (color 1, flavor 9, appearance 3, odor 5, and texture 2 of maximum sensory profile). Sensory analysis was conducted in 3 replicate trials and samples were evaluated in duplicate by each panelist.

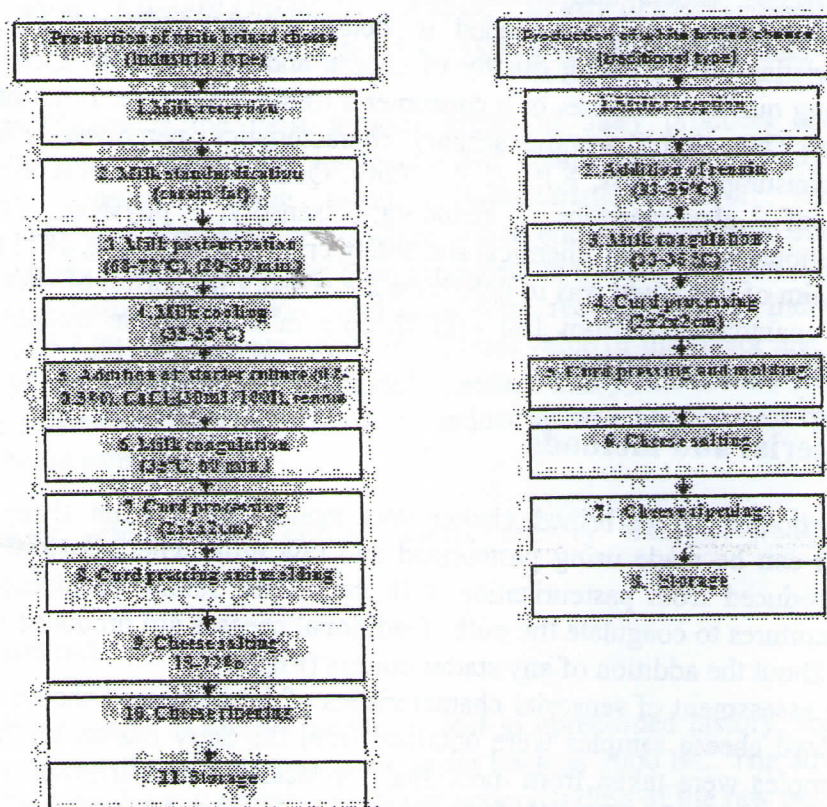


Figure 1 Technological scheme of industrial and traditional cheese

Results and discussion

In the following table present the obtained results about sensory evaluation of the traditional and industrial cheese samples, using a quantitative descriptive ranking method with 5 point scale. According to the sensory evaluation results we can conclude that industrial cheese sample assigned with number 323 (C) shown best score (4.39). Concerning to the traditional cheese samples (543(A)

and 631(B)), the average score of 3.82 and 3.83 have been recorded. The lowest score (3.6) which was obtained by sensory panel, was a cheese sample with code 423 (D). There was a significant difference ($p < 0.01$) between traditional and industrial cheeses on the flavor and odor. The high value of the flavor and odor were recorded in the industrial cheese 4.42 and 4.22 respectively, while the lowest value of the flavor and odor 3.25 and 3.36 were recorded in traditional cheese. These differences probably reflect processing condition used in the manufacture these cheeses (Othman S., 2011). Also, there were no significance differences ($p < 0.05$) on the appearance, texture, color and overall acceptance of the cheese.

Table 1. Determination of sensory characteristics of traditional and industrial cheese

	Traditional cheese		Industrial cheese	
	543 (A)	631 (B)	323 (C)	423 (D)
Color	4.19	4.22	4.53	3.97
Flavor	3.36 ^{c,d}	3.25 ^{d,c}	4.42 ^a	3.47 ^b
Appearance	4.08	4.22	4.42	3.47
Odor	3.36 ^b	3.42 ^c	4.22 ^a	3.81 ^a
Texture	4.08	4.08	4.39	3.28
\bar{x}	3.82	3.83	4.39	3.6
% of maximum quality	70.44%	71.39%	87.92%	71.89%

*Means within the same column with different superscripts differ significantly ($P < 0.01$)

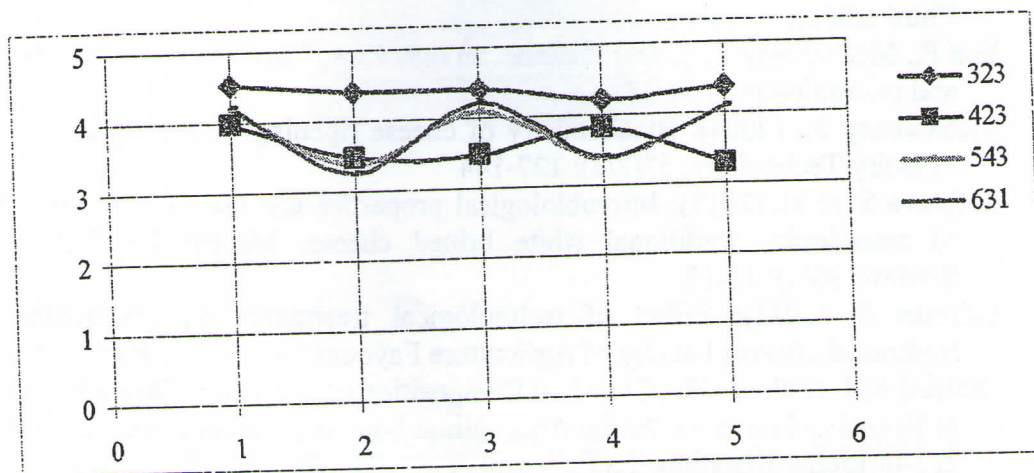


Figure 1. Sensory analysis of industrial and traditional cheese

Appearance characteristics as color and visual texture of cheese are assessed visually, usually prior to consuming the cheese, or when preparing the cheese for consumption by cutting or spreading (Fox F.P., et al., 2000). Cheese texture is important as a quality indicator that consumer use to accept or to reject a product (Othman S., 2011). Sensory evaluation results of our experiment are in good agreement with the above mention authors' statement.

Conclusion

On the basis of the acquired marks of the sensor evaluation, we can conclude that variant C and D have 87,92% and 71,89% of maximum quality and better sensory properties compared to variant A (70,44%) and B (71,39%). There were significance difference ($p < 0.01$) between traditional and industrial cheeses on the flavor and odor. The high value of the flavor and odor were recorded in the industrial cheese 4.42 and 4.22 respectively, while the lowest value of the flavor and odor 3.25 and 3.36 were recorded in traditional cheese. No significant differences ($p < 0.05$) on the appearance, texture, color and overall acceptance of the cheese were determined.

References

- Erkan D. (2009): Quality characteristics of traditional sepet cheese. Graduate School of Engineering and Sciences of Izmir Institute of Technology, master thesis.
- FAO (Food and Agriculture Organization of the United Nations) (1990): The technology of traditional milk products in developing countries. FAO Animal Production and Health Paper 85. FAO, Rome, Italy: 333.
- Fox F.P. et al. (2000): Cheese Chemistry, Physics and Microbiology. Volume 1. Third edition.
- Fox P., McSweeney P. (2004): Cheese: an overview, Cheese: chemistry, physics and microbiology, 1: 1-18
- McSweeney P., (2004): Biochemistry of cheese ripening. International Journal of Dairy Technology, 57(2/3): 127-144
- Mojsova S. et al. (2013): Microbiological properties and chemical composition of macedonian traditional white brined cheese. Macedonian Veterinary Review, 36(1): 13-18
- Othman S. (2011): Effect of technological treatments on the quality of traditional cheeses Faculty of Agriculture Fayoum University, doctoral thesis.
- Waleed AM. et al. (2013): Chemical Composition of the White Cheese Produced at Household Level in Dueim Area, White Nile State, Sudan. Journal of Food & Nutritional Disorders, 2:(2): 1-5.