INVESTIGATIONS INTEGRATED IN THE SHEEP MILK- FETA CHEESE FIELD, IN A UNIT REGISTERED FOR DIRECT SALE

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INTRODUCTION

Traditional cheeses are characterized by the fact that are specific to a certain geographical area, to a certain culture perpetuated through centuries. In the category of these products is included the feta cheese, which plays an important role in the alimentation of the Romanian people.

Feta cheese is a sort of cheese preserved in pickle. The cheese’s name differs from region to region. It is produced in the east of Europe, Balcans and Middle East. Among the most familiar names are: feta, akawi, halloumi, which are well known in the whole world. Normally, the producing process is a traditional one, being obtained from sheep or goat milk [Tamime, 2006].

In Romania, the quantity of feta cheese sold in the first semester of 2007, represents almost the fifth part of the total quantity of cheese sold [Nielsen, 2007]. It is believed that in the next period (2008-2010) the consumption of feta cheese will grow, taking into consideration two main reasons. The first one is related to the reorientation of the Romanian consumer regarding traditional products, more healthy, cheeses being considered proper aliments for a balanced alimentation. The second main reason is related to the still low consumption of cheeses in Romania (2 kg/person) [Ionica, 2007].

The certification of European population’s safety, in the context of new adaptations in alimentary science and legislation and also the implication of quality systems in food’s safety, imposes a new vision integrated on product field.

This research represents an investigation regarding the observance of minimal, structural and hygienic conditions, taking into consideration aspects of originality, obtaining procedure, identification and analysis, in a unit registered for direct sale of traditional cheeses, obtained from sheep milk.

The purpose of this research is to elaborate a working guide for small producers who also have to be capable to work in accordance to European laws.

The main objectives are:
- The identification and analysis of the demand for traditional products
- The evaluation of compositional and hygienic quality of the sheep milk used for the production of the traditional cheese
- The study of the compositional and hygienic quality of the cheese
- Aspects regarding working practices in the integrated unit studied
MATERIALS AND METHODS

We examined samples from a certain unit with 600 sheep, found in Apahida, Cluj county, unit which is registered for direct sale. The samples gathered first contained sheep milk and afterwards feta cheese in different maturation stages (24 hours, 72 hours, 6 days). We gathered the milk samples twice a month, from April-August 2007 (30 samples). The feta cheese samples were collected monthly, from April-May 2008 (9 samples).

**Exams on milk samples:**
- physical and chemical exams (temperature, density, freezing point, added water, fat, fat in dry substance, protein somatic cells)
- microbiological exam

**Exams on feta cheese:**
- physical and chemical exams (protein, fat, salt, pH, azote)
- microbiological exams (*E. coli, Staphylococcus aureus*)

The methods used are standardized ones. The obtained results are presented in figures 1-3.

![Graph showing the evolution of physical quality parameters regarding uncooked sheep milk (April-August 2007)](image)

- *% samples with values > maximal value (10°C)*
- **% samples with values < minimal value (1.033 g/ml)*
- ***% samples with values > maximal value (-0.520°C)*
- ****% samples with values < maximal value (1%)
Studies regarding the compositional and hygienic quality of feta cheese

The obtained results were based on the accentuation of the evolution of specific parameters, in different maturation stages (24 h, 48 h and 6 days).
Physical and chemical parameters
The determinations made in order to establish the protein percentage in feta cheese indicate a small variation among the samples collected in the same maturation stage, but we observed that the protein percentage grows along with the advancement of the maturation process (values of 15.1-15.27 at 24 h, 14.98-15.11 at 48 h and 16.92-17.43 at 6 days of maturation, values in accordance with the standard).

Fig. 4 The evolution of the protein percentage in feta cheese in accordance with the maturation process (April-May 2008)

The pH of the cheese suffers alterations along with the maturation. Initially the pH was 6.2 in the first hours of maturation, then 5.8 and 5.7 at 48 hours and 6 days of maturation. Therefore, the pH has a tendency to decrease, which is a good fact, because if the pH is smaller some microorganisms can no further develop and the final product will be one of a higher quality.

Fig. 5 The evolution of pH of feta cheese in accordance with the maturation period (April-May 2008)
For the determination of the azote, we followed protein breaking, influenced by the clot enzyme. If the proteins are fragmented, feta cheese is easier to digest. We would also like to mention the hygienic role because of the decrease of the pH, which enables future development of some microorganisms. The azote values are medium at the beginning, but grow to 11.33 (6 days of maturation).

**Microbiological parameters**

We determined *S.aureus* in feta cheese taking into consideration the important role of enterotoxines.

The obtained results are $5.5 \times 10^5 \text{ufc/g} (=55000)$ at the first determination and $5.0 \times 10^4 \text{ufc/g} (=50000)$ at the second determination, which are normal values. After the third determination the values are higher and are not anymore in accordance with standards. Therefore, it would have been necessary to investigate the presence of the enterotoxine produced by *Staphylococcus* in the gathered samples but unfortunately we could not afford to do such analysis. We would like to mention that, taking into consideration previous studies, the enterotoxin wasn’t identified, being necessary a higher quantity of it in order to allow scientist to prove its’ existence. Also the evolution of the *Staphylococcus* germs is not in accordance with the maturation period.

**CONCLUSIONS**

This study had as a purpose the realistic evaluation of the production units specialized on traditional products, in a specific geographical area, taking into consideration aspects of originality, identification and analysis of structural, compositional and hygienic parameters.

- Traditional Romanian cheeses have a cultural and patrimonial value;
- Scientific research in this field is necessary and allows the development of production activities in less developed regions;
- The economical and social aspects and also the risks for human health reflect a need for change in the Romanian rural environment;
- The quantity of fat has a tendency to grow, in direct correlation with the lactation period and the number of somatic cell tends to decrease;
- Temperature and density tend to grow, in direct correlation with the evolution of the temperature of the environment;
- The number of germs is over the limits (970000 NTG mg/ml)
- The protein percentage grows along with the maturation process from 15.2 to 17.2;
- The azote values are also high, from 8mg/100g to 11.13/100g and the pH decreases to 5.7 which has a positive effect;
- The quantity of salt found in feta cheese is in growth, showing a direct correlation with the maturation process, with values of 2.5 and 7.8;
- The number of pathogenic germs is low in the first phase( 850, 53000) and then grows to 12000 and 65000, and finally it decreases along with the maturation (2300, 37000);
- Points to be improved: the cleaning of the udder before milking, the superficial hair cut of the sheep which represents a contamination source, the use of one use filters and the hygiene of containers and working instruments.
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