Changes in Physico-chemical Characteristics of Beaten Cheese During Manufacture

Angela Nikolovska*, Ljubica Trajkoska, Biljana Trajkovska and Ljupce Kocoski

University "St. Kliment Ohridski", Faculty of biotechnical science, Bitola, North Macedonia

Introduction

•Beaten (bieno) cheese is an authentic product for our area, whose qualitative and sensory characteristics vary depending on whether it is obtained in an industrial or traditional way (Talevski, 2012).

•The salty taste of the cheese comes from the **dry salting** of the cheese and **salting in brine** (Guinee and Fox 2004).

•In addition to obtaining the expected taste, salting affects the regulation of water content, microbiological processes and a number of other physico-chemical processes that take place during maturation of the cheese (Johnson et al. 2009).

•In general, structural features (texture, cavities) are the result of the cheese maturation process, which involves a series of microbiological and biochemical changes (Pagthinathan and Nafeese 2015).

•The biochemical changes of the organic components of cheeses give it specific organoleptic and aromatic properties, characteristic of qualitative differences of individual types of cheeses (Presilski, 2004

Materials and Methods

•The subjects of analysis of our research were samples of beaten cheese obtained in an industrial way of production that was taken from a dairy in the Pelagonia region.

•Samples for analysis were taken every three days after cheese maturation. The first sample was taken on day 5 (dry salting), day 8 (dry salting), day 11 (brinesalting),day 14 (brine salting) and day 17 (brine salting) from production.

•The cheese samples (50 g) were taken from the inside of the pie, placed in plastic cups and transported to the laboratory where the tests were performed.

• The pH value was determined by a stabbed pH meter (model MD120FK Mettler-Toledo, Greifensee, Switzerland), while titration acidity by the Soxhlet-Henkel method.

•The percentage representation of NaCl was determined by the Mohr method. MJ33 Mettler Toledo was used to determine the percentage of moisture and dry matter.

Results and Discussion

•The quantitative changes that occurred in the examined parameters during the dry salting (5 days - 8 days) and the salting in brine (11 days - 17 days) are shown in **Table 1**.

Sampling time for analysis	Active acidity (pH)	Titration acidity (^{0}SH)	NaCl (%)	Moisture (%)	Dry matter (%)
5thday	8.07	50	9.02	34.97	65.03
8thday	7.70	54	9.21	34.08	65.92
11thday	6.80	56	10.20	31.78	68.22
14thday	6.75	60	10.68	28.93	71.07
17thday	6.13	64	11.30	27.09	72.91

Table 1 - Table view of the obtained results from the examined parameters during the maturation of the traditional beaten cheese during the first 17 days

•During ripening, the active acidity (pH) in the tested cheese samples decreases continuously

•titration acidity is continuously increasing

•The increase in active acidity in the middle of the ripening process in beaten cheese is often correlated with the added starter culture during production

•The continuous increase of the percentage of NaCl (Table 1) from 9.02% on the 5th day of the analysis to 11.30% on the 17th day is a result of the dry salting (day5-8) and the salting in brine (day11-17).
•Additionally, the increase in the percentage of NaCl in cheese is followed by a decrease in moisture content as a result of the salting mechanism (Presilski, 2004)

•In general, the percentage of dry matter is one of the most important factors influencing the course of ripening, i.e., according to research by Dubrova Mateva et al. (2008) in cheese, which has a higher percentage of moisture, the ripening process takes place with faster intensity.

•According to our results (Table 1) and the results of other authors who have worked on the same problems, we can conclude that the course of the maturation process is conditioned by pH, titration acidity, percentage of NaCl, moisture and dry matter, i.e. changes in their values (decrease or increase of the same), as well as other physical-chemical parameters that were not the subject of this research.

Conclusions

•The results obtained from this study indicate that during ripening process of beaten cheese quantitative changes occur in physicochemical parameters (**pH, titration acidity, percentage of NaCl, moisture and dry matter**).

•Microbiological and biochemical changes in the cheese result **in the development of the flavor and texture**. As a result of a number of factors, the course and period of maturation of industrially obtained beaten cheese is different.

•Most often it reduces the active, and increases the titration acidity, percentage of NaCl, and dry matter, which is followed by a decrease in moisture. Further studies may be useful to determinate the changes that occur during ripening process.

GEA International, Geo Eco-Eco Agro Conference 28-31 May 2020, Podgorica, Montenegro