

FRESH DAIRY, APPETIZER TYPE: SENSORIAL AND RHEOLOGICAL ASPECTS♦

Elisabeta Botez, Liliana Gîtin, Doina–Georgeta Andronoiu*,
Gabriel-Dănuț Mocanu

*Dunărea de Jos University; Food Science and Engineering Faculty;
111 Domnească Street, 800201, Galati, Romania*

*Corresponding author: Georgeta.Andronoiu@ugal.ro

Received: 05/05/2008

Accepted after revision: 09/06/2008

Abstract: Cheese is the most complex and dynamic food product. By mixing fresh cheese with flavors or salt and other spices it could be obtained fresh dairy appetizer type.

Supplements used for the study were: dill, bunch onion, red pepper thinly minced (supplements were included in the coagulum).

Fresh cow cheese was analyzed by physical-chemical, rheological and sensorial point of view. The rheological analysis of the appetizer type cheese that was produced aimed at establishing the variation of the dynamic viscosity depending on the shear rate, as well as the variation of the shear stress depending on the shear rate. The variation of these parameters determined the rheological behavior of the appetizer type cheese.

During the sensorial analysis of the fresh cow cheese and supplements were taken into consideration the following characteristics: taste, odor, color, consistency and appearance.

Key words: *appetizer type cheese, shear rate, shear stress.*

♦ Paper presented at the fifth edition of: “Colloque Franco-Roumain de Chimie Appliquée – COFrRoCA 2008”, 25 – 29 June 2008, Bacău, Romania.

INTRODUCTION

Milk and dairy products, due to their chemical composition as well as to their assimilation rate are important in the human diet, as they are one of the most accessible sources of animal proteins. Cheese is the most complex and dynamic food product. Each piece may be considered a bioreactor where numerous and complex reactions take place, leading to a product with the specific sensorial traits. Turning milk into different types of cheese is a complex process which consists in concentrating proteins together with a variable fraction of fat and mineral substances, removing an important amount of water and lactose. Fresh cheese is produced by coagulation milk under the exclusive action of lactic bacteria, or by the associated action of lactic bacteria and a coagulating enzyme. They are characterized by a soft consistency and a slightly sour taste due to lactic fermentation [1]. Fresh cheese is produced in various ways, grouping in:

- fat contents: very fat, fat, semi-fat and low-fat cheese;
- supplements: sweet dessert cheese and appetizer cheese (with seasoning) [2].

Fresh cow cheese is a mass consumption product, very much appreciated for its dietetic values. It can be obtained from skimmed or whole milk, according to the desired type: superior quality (very fat cheese), fat or dietetic cheese.

One of the most appreciated fresh cheese types is the fresh cow cheese with supplements, appetizer type. By mixing fresh cheese with flavors or salt and other spices it could obtain fresh dairy appetizer type.

EXPERIMENTAL

In order to obtain appetizer type fresh cheese, the following ingredients have been used:

- *Milli* whole cow milk made by “Friesland Romania”, Tg. Mureş branch, 3.5% fat content [3];
- Salt;
- Technological additives (rennet and CaCl_2);
- Supplements: dill, bunch onion, red pepper thinly minced.

In order to obtain the two types of fresh cheese we used two DVS cultures of lactic bacteria produced by Chr. Hansen: a thermophilic one, Y-370 (symbol “TC”) and a mesophilic one, CHN-22 (symbol “MC”) and 2 L of milk for each of them. Both cultures have been obtained by the primary lyophilic culture, 5 g of lyophilic culture in 1 L of milk, with the thermostat set to optimal temperature.

The milk was warmed up to 28 °C. This temperature has been chosen because it was not used row milk (the staple milk was already pasteurized). Than there were added 13 mL of MC, respectively TC, 0.2 g of CaCl_2 and 7 mL of rennet. The milk was coagulated at 28 °C for 17 h. The coagulum obtained was pressed under its own weight in order to eliminate the whey. In this way the pressing was gentle, avoiding wastage (we have used a little quantity of staple milk). The following values for specific consumption where obtained: 2.14 for TC cheese and 1.83 for MC cheese. The resulting cheese was divided into 3 equal shares, after which supplements were mixed (dill, bunch onion and red pepper). The samples were refrigerated for 1 h.

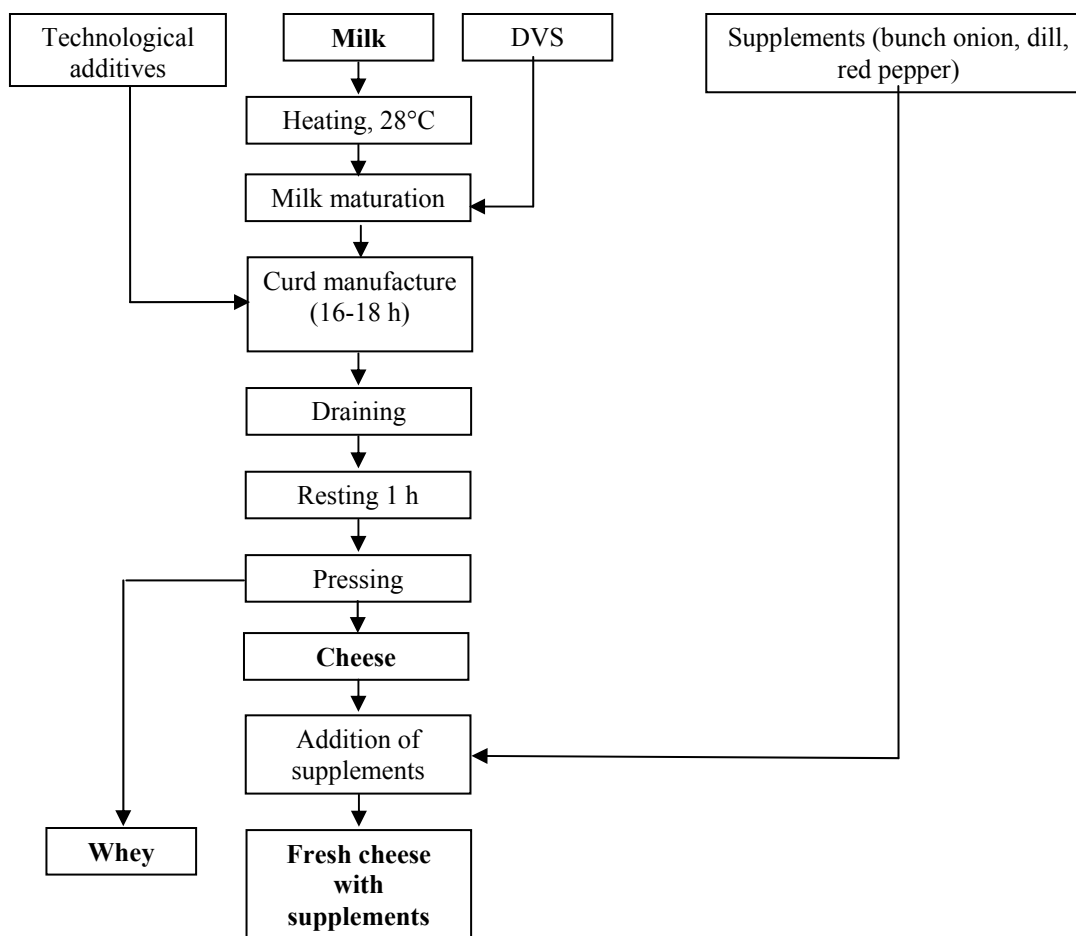


Figure 1. *Technological flowchart for fresh cheese*

The chemical and physical analyses were done according to standard procedures [4]:

- dry substance by removing water in a drying stove;
- protein content by Kjeldahl method;
- mineral salts content by calcinations;
- fat content by butyrometric method.

The sensorial analysis of the cheese was carried out by a group of 10 students in the 4th year of studies, from the Faculty of Food Science and Engineering.

During the sensorial analysis of the fresh cow cheese with supplements were taken into consideration the following characteristics: taste and odor, color, consistence and appearance. An appreciation system with low number of points was adopted for dividing the products in the following categories: very good, good, satisfactory, non-satisfactory [5].

The rheological analyses were carried out with a Rheotest device.

The rheological analysis of the fresh type cheese that was produced aimed at establishing the variation of the dynamic viscosity depending on the share rate, as well as the variation of the shear stress depending on the shear rate. The variation of these parameters helped at establishing the rheological behavior of the appetizer type cheese. As far as the cheese with addition of bunch onion is concerned, no rheological determinations were possible because of the supplement texture.

RESULTS AND DISCUSSIONS

The physical and chemical parameters of milk are shown in Table 1.

Table 1. *Physical and chemical parameters of milk*

Milk parameters	Value
Dry Substance [%]	11.03
Proteins [%]	3.57
Mineral salts [%]	0.64
Fat [%]	3.50

The sensorial analyses of cheese with red pepper proved a better value of taste and odor for CT cheese (2.4 for CT cheese comparing with 1.8 for CM cheese). CM cheese obtained more points for consistence (0.8) than CT cheese (0.4) (Figure 2). As a result of the sensorial analyses CM cheese was qualified as “satisfactory”, while CT cheese was qualified as “good”.

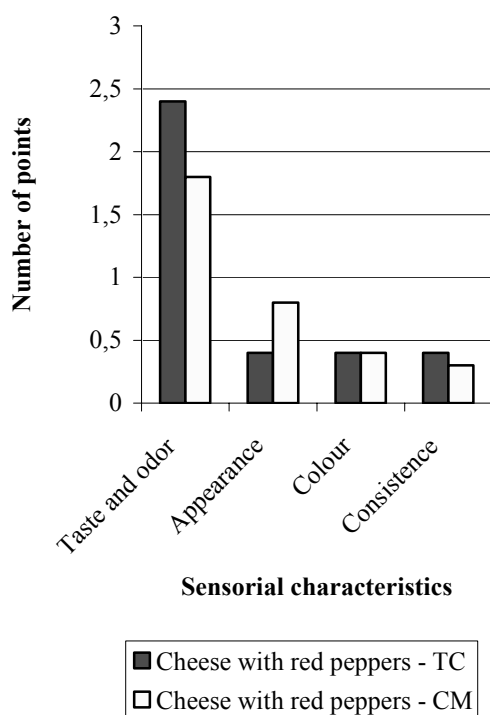


Figure 2. *Sensorial characteristics concerning the fresh cheese with addition of red peppers*

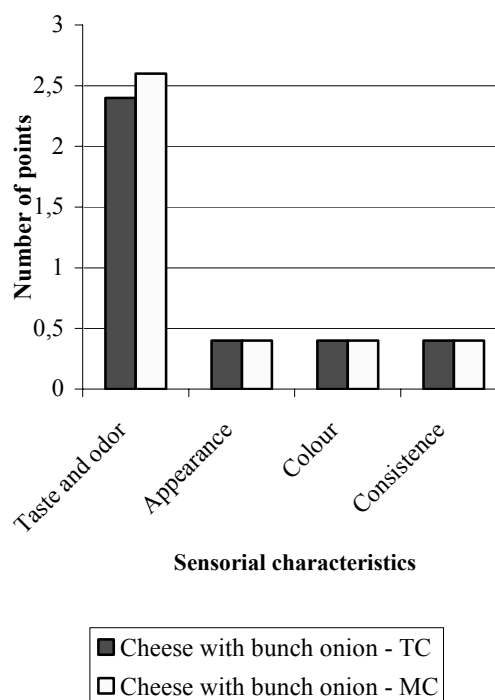


Figure 3. *Sensorial characteristics concerning the fresh cheese with addition of bunch onion*

The results of the sensorial analyses concerning the cheese with bunch onion were approximately the same in the two cases (CT and CM): each of the characteristics Appearance, Consistence and Color get 0.4 points, excepting the characteristic Taste

and odor, which get 2.4 points for CT cheese and 2.6 points for CM cheese (Figure 3). Each of the two sorts of cheese was qualified as “good”.

Concerning the cheese with addition of dill, CM cheese was qualified as “good” as well as CT cheese. The main difference between the two sorts refers to the appearance, which get a double number of points for CM cheese (0.8) comparing with CT cheese (only 0.4) (Figure 4).

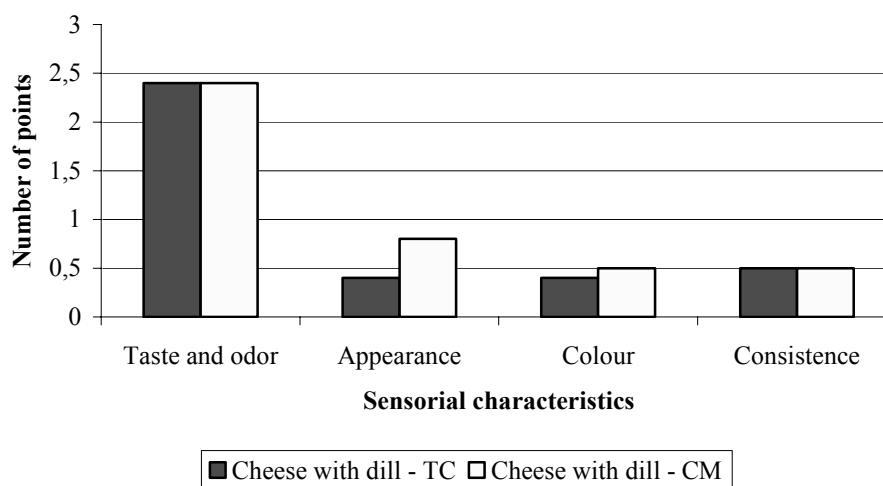


Figure 4. *Sensorial characteristics concerning the fresh cheese with addition of dill*

The decrease of the dynamic viscosity depending on the shear rate is sudden during the first two determinations up to values of the shear rate of 10 s^{-1} . Up to this value, the variation of the dynamic viscosity depending on the shear rate is much slower and can be considered a linear variation. It can be noticed a slight deviation from the above mentioned behavior in the case of the cheese with red pepper obtained with a MC (Figures 5 and 6).

CONCLUSIONS

As far as the sensorial analysis is concerned it can be noticed that the cow cheese with addition of red peppers and a MC culture displayed the poorest qualities (taste and odor, color, consistence, appearance) and therefore was qualified as satisfactory. The other types of cheese with additions of dill and spring onions, as well as TC red peppers, were appreciated as “good”.

The variation of the dynamic viscosity depending on the shear rate displays a tixotropic behavior of the cheese [6].

Rheology can be used as a quality control tool in processing, as it has been closely correlated with the overall texture, sensory attributes of the food products and microstructural changes during processing.

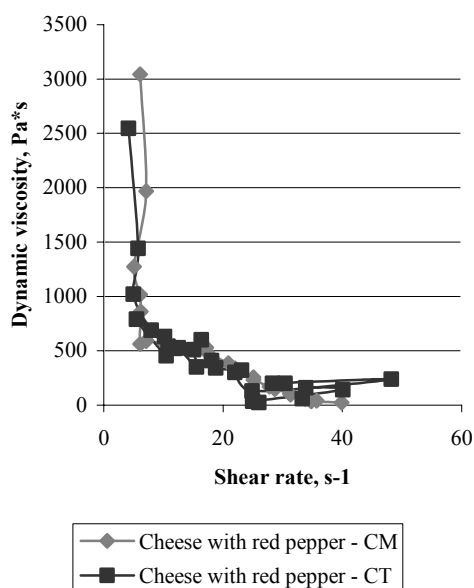


Figure 5. Variation of the dynamic viscosity depending on the shear rate concerning the cheese with addition of red pepper

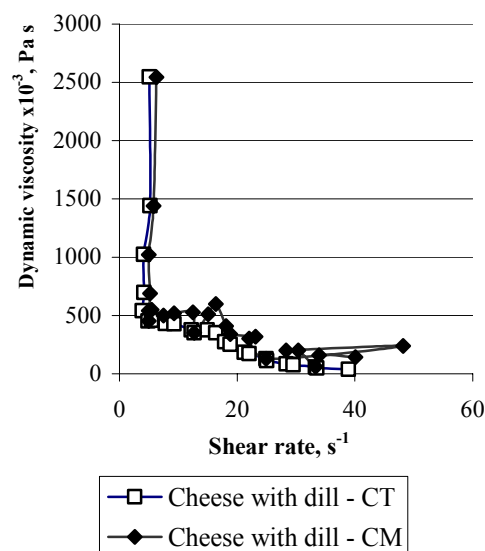


Figure 6. Variation of the dynamic viscosity depending on the shear rate concerning the cheese with addition of dill

REFERENCES

1. Chintescu, G., Toma, Al.: *Fabricarea brânzeturilor*, Ed. Făgăraș, **2001**;
2. Costin, G.M. (ed.): *Știința și ingineria fabricării brânzeturilor*, Ed Academica, Galați, **2003**;
3. Ashkan Madadloua: Effect of cream homogenization on textural characteristics of low-fat Iranian White cheese, *International Dairy Journal*, **2007**, 17, 547–554;
4. Stanciu, V.: Stabilirea unui standard pentru determinarea conținutului de azot, propriu unui laborator dotat cu echipamente moderne de analiză, *Buletin de Informare pentru Industria Laptelui din România*, **2005**, 20 (2);
5. Iordachescu, G., Bulancea M, *Textura produselor alimentare*, Ed. Aius, **2006**;
6. Tetrapak, *Dairy handbook*, **2002**.