

## RESEARCH ARTICLE

**The influence of the size and consistency of fresh cottage cheese grains on the technological and sensory properties of culinary preparations****CALMÂȘ VALENTINA, dr.conf.univ. & SVETLANA FEDORCIUCOVA, dr., conf.univ.***Department Trade, Tourism and Catering, Academy of Economic Studies of Moldova, Republic of Moldova, Kishinev**Department Trade, Tourism and Catering, Academy of Economic Studies of Moldova, Republic of Moldova, Kishinev***ABSTRACT**

*Fresh cottage cheese is a dairy product with high nutritional value and important functional properties for the food industry and public catering sector. The purpose of this paper is to analyze the influence of curd grain size and consistency on the behavior of fresh cottage cheese during culinary processing and on the quality of finished products. The research was carried out on five assortments of fresh cottage cheese marketed in Chisinau municipality. Sensory, physicochemical and technological analyses were performed in order to evaluate the product behavior during processing. The results highlighted that grain size, consistency and acidity significantly influence texture, homogenization capacity and thermal behavior of the final products. Cottage cheese with fine texture and homogeneous consistency showed the best technological characteristics for pastry and dessert products.*

**Keywords:** *fresh cottage cheese, grain size, acidity, culinary products, quality.*

**ARTICLE INFO****Received:** [10/07/2026]**Accepted:** [22/07/2026]**Published:** [25/08/2026]**Issue Period:** July – August 2026 (Bi-Monthly)**DOI:** <https://doi.org/10.56293/IJMSSSR.2026.6322>**Copyright:** © 2026 The Author(s). Published by IJMSSSR. This is an Open Access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) License.**INTRODUCTION**

Fresh cottage cheese is a dairy product rich in nutrients: proteins with high biological value, low-melting milk fats easily assimilated by the human body, vitamins (especially fat-soluble ones), mineral elements, lactose, enzymes, etc. [2,3].

According to FAO (2013) (Food and Agriculture Organization of the United Nations), WHO (World Health Organization) and EFSA (European Food Safety Authority) nutritional recommendations, the consumption of dairy products should ensure the necessary intake of protein and calcium [8,12,13]. In this context, a portion of approximately 150 - 200 g of cottage cheese can significantly contribute to covering the daily requirement [12,13].

This product can be consumed as such or used as a raw material to obtain a very varied assortment of culinary products such as: pies, dumplings, cheese cakes, pancakes, pudding, donuts, soufflés, biscuits, glazed cheeses, Easter cake with cottage cheese and other traditional Moldovan dishes based on cottage cheese (ex., *mule* – mini sweet cheese pancakes, *syreniki* – mini cheesecakes), etc. In order to obtain these products with excellent sensory qualities and hygienic safety, cottage cheese must meet the quality requirements prescribed in the relevant normative documents [1,8]. These properties, especially those related to structure and texture, play an essential role in determining the quality of the finished products. An important aspect is the size of the grains and the consistency of the cottage cheese, which can vary from fine and crumbly shapes to dense and rubbery structures. These characteristics influence the way it is incorporated into compositions, the behavior during heat treatment and the final texture of the preparations.

In practice, the choice of the type of cottage cheese is often made empirically, without a clear analysis of the impact of these parameters on the final result. For this reason, research is needed to highlight the relationship between the organoleptic and physico-textural characteristics of the cheese and its performance in different culinary applications.

**The purpose** of this work was: to analyze the influence of the size and consistency of fresh cottage cheese grains on its behavior in the process of preparing culinary products and on the quality of finished products.

To achieve this goal, the following objectives were defined:

- determining the organoleptic quality of cottage cheese by the scoring method;
- determining some physico-chemical indices;
- verifying the information presented on the product label;
- identifying the optimal type of fresh cottage cheese for different products.

The object of study was five types of fresh cow's cheese, including: three local varieties (*Incomlac*,

*Căsuța mea* and *Sana*) and two - imported from Ukraine (*Latti* and *Ferma*), sold on the consumer market of Chișinău.

## METHODOLOGY

Standardized and non-standardized research methods were used in the research, namely:

- physical-textural analysis: observation and measurement of grain size; evaluation of consistency by manual sifting;
- processing tests: preparation of products under identical conditions; observation of behavior during mixing, sifting, shaping, baking;
- analysis of the final product: evaluation of texture (fine, coarse, compact, etc.); degree of homogenization; behavior when cutting and serving;
- sensory analysis - by the scoring method, using a 100-point scale for the following indices: taste - 30 points; smell - 20 points; consistency and structure - 30 points; appearance and color - 20 points. According to this method, cheese that accumulates 90-100 points is considered of very good quality, 80-89 - good quality, 70-79 - satisfactory quality and less than 70 points - non-compliant;
- determination of cheese moisture - by the classical oven drying method to constant mass;
- determination of titrimetric acidity - by the titration method with 0,1N NaOH solution in the presence of phenolphthalein indicator;
- determination of pH - by the potentiometric method with a combined electrode.

## RESULTS AND DISCUSSION

Fresh cottage cheese, being a product with high humidity (up to 80%), is a perishable product and is prone to microbial contamination and physico-chemical alteration. For pastry products (pies, rolls, meatballs,

pancakes, pudding, etc.), the humidity of cottage cheese is also very important from a technological point of view, because it influences both the texture of the filling and the behavior of the dough. The optimal humidity range is considered to be 65-75%. If the humidity is below 65%, the cheese is too dry, the filling becomes crumbly and the final product may come out dry. Above 75-78% it is too wet, the filling becomes watery, there is a risk of “soaking” the dough, it may flow or separate whey during baking. For each type of product, the optimal humidity of cottage cheese differs slightly, because it directly influences the texture and stability of the filling. Thus, for pies (in puff or yeast dough) 70-75% humidity is recommended, for cheesecakes: 68-72%, dumplings: 65-70%, pancakes: 72-78%, pudding: 75-80%.

Analyzing the experimental data on humidity in Table 1, we can mention that all samples fall within the normal limits.

**Table 1. Results of the physicochemical analysis of different varieties of fresh cottage cheese**

| Indicator       | Norm               | Assortments of fresh cottage cheese |            |       |      |       |
|-----------------|--------------------|-------------------------------------|------------|-------|------|-------|
|                 |                    | Incomlac                            | Căsuța Mea | Latti | SANA | Ferma |
| Humidity (%)    | max. 80            | 75                                  | 77         | 65    | 73   | 75    |
| Aciditate (°T)  | 160–240            | 110                                 | 95         | 175   | 140  | 140   |
| pH              | 4,4–4,8            | 4,4                                 | 4,8        | 4,4   | 4,5  | 4,5   |
| Grain size (mm) | 2–6<br>recommended | 7–35                                | 5–25       | 2–15  | 2–15 | 2–15  |

Source: developed by the authors based on their own research

Acidity is one of the most important quality indices of cheese and directly influences the taste, texture and behavior in baked goods [3,4,7]. It is expressed either as pH (usually for fresh cheese the value is between 4.4-4.8; this indicator is not standardized) or as titrimetric acidity.

Titrimetric acidity is a standardized indicator in several countries. Thus, according to national standards in Romania, the titrimetric acidity for semi-fat and full-fat cheese is 190 - 200°T. In Ukraine, this indicator is not specified depending on the fat content and is 170-250°T [10]. In Russia and Belarus, for fresh cottage cheese of 7-9% fat, the acidity must be 170-220°T, and in the Republic of Moldova this index is not mentioned depending on the fat content and is 160 - 240°T [11,1]. In EU countries this index is not regulated [9,8].

If the acidity of the cheese is lower than normal, this means that the product has not fermented properly. In a low-acid environment, saprophytic microorganisms, as well as conditionally and strictly pathogenic bacteria (for example: *E. coli*, *Staphylococcus aureus*, *Salmonella*, *Listeria*) can multiply more easily.

Cottage cheese with titrimetric acidity between 160-190°T has a more stable shelf life from a biological point of view. The lactic acid resulting from lactic fermentation inhibits the development of harmful microflora. Acidity in the range of 100-160°T is considered a moderate to low value for fresh cottage cheese. Low acidity can be the result of mixed fermentation, a process that combines the action of coagulant enzymes (rennet or pepsin) with that of lactic acid bacteria in the sourdough. In this process, the enzyme has the role of precipitating proteins in parallel with the acidifying action of the sourdough, resulting in a curd with a “sweet” taste and a lower acidity than in the case of purely acidic coagulation. Also, acidity can remain at a low level in the case of fermentation exclusively with lactic acid bacteria, although this type of coagulation is usually based on a more pronounced acidification.

Low acidity can be caused by technological factors, such as using an insufficient amount of lactic acid bacteria or cooling the cheese immediately after production, before the whey has drained completely. The use of excess coagulant enzymes is a major technological error, which affects both the sensory properties and the behavior of the cheese during processing. The main risks are the following:

- appearance of a bitter taste;
- modification of the consistency and quality of the curd. The resulting cheese mass no longer has the standard elasticity and fineness, it may become too dense or, on the contrary, may favor a structure that does not retain moisture correctly;
- formation of large and hard grains. These are more resistant to the mechanical processes of kneading and pasting, leading to a grainy or rubbery final texture, which is not suitable for fine cheesecake or pudding fillings;
- difficulties in eliminating the whey;
- compromising the technological value. These generate "numerous defects" that can lead to the product being declared of inadequate quality.

In the absence of adequate acidity, the natural barrier that prevents the development of harmful microflora is weak or non-existent. Coliform bacteria cause major defects, such as: fermented taste and a spongy appearance of the curd. The finished product will have a foamy structure and an unpleasant odor.

The technological recommendation, based on such criteria as: texture, taste, baking behavior for cheese pastries, is for titrimetric acidity 140-170°T.

The examination of the samples found that two cheese samples (Incomlac and Căsuța mea) do not comply, and the other three (Latti, Sana, Ferma) comply with the technological requirements and recommendations for pastry products (if we follow the recommendations and standards of other countries, which allow the lower limit of titrimetric acidity lower than the regulatory documents in our country). According to the Technical Regulation for Dairy Products of the Republic of Moldova, only the Latti cheese sample (produced in Ukraine) complies with the norm regarding titrimetric acidity.

Cheese intended for creams and desserts goes through additional stages of fine grinding on rollers or through a sieve to obtain a homogeneous structure. For cheese used in pies or cheesecakes, the grain size matters a lot for the texture and baking behavior. The recommended size is 2-6 mm - the ideal range for pastries, but the most commonly used in practice is 3-4 mm. It was found that if the grain size is below 2 mm, then the cheese is too fine/pastey, and the filling may be too soft and "flowing". If the grains are over 6-7 mm in size - they are too large, the filling becomes uneven and more difficult to shape. Thus, for pies, slightly granulated cheese with a size of 3-5 mm is recommended, and for cheesecakes - with a finer and creamier texture and a size of 2-4 mm. A clear label would help the consumer know whether the cheese purchased has already undergone this refinement of texture or if it is a "table cheese", which requires intensive manual processing before being put into the dough.

The idea of specifying the product's destination on the label for fresh consumption or for culinary products is supported by the complexity of the pastification process, which is an industrial stage that is difficult to reproduce identically at home. For cheesecakes, pancakes and puddings, the cheese must have a structure that can "bind" with the rest of the ingredients (sugar, eggs, fruit, vanilla, etc.).

Pastification, sometimes accompanied by kneading, allows for a very fine and homogeneous structure to be obtained, eliminating the risk that the filling will remain "grainy" or have a sandy structure [3,4,6].

The cheese grains with dimensions of 35 mm (from Căsuța mea) and 25 mm (from Latti) constituting 20-30% of the total cheese sample are a clear indication that the cheese is not only not crumbled, but that the

protein structure of the curd is different. The "rubbery" texture plus large granules arises from the combination of several technological factors, for example:

- a firmer rennet-type curd: the casein network becomes elastic and compact and as a result the granules stretch easily and break hard [5];
- higher heating of the curd: this leads to the contraction of the proteins, the elimination of the whey from the inside, the granules becoming denser, more gummy and elastic;
- late cutting: the curd is allowed to harden well before cutting, then it is coarsely cut and large pieces, already compacted internally, result. Thus, "firm gelatin lumps" appear that do not crumble easily;
- uneven dehydration: the outside of the granule becomes drier and firmer, while the inside remains moist and as a result an elastic shell is obtained on the surface and a soft core, difficult to crush evenly.

We can assume that by using this technology the manufacturer aims for the following advantages:

- higher yield (less whey losses);
- easier handling (does not crumble during transportation);
- slightly longer shelf life (more stable structure).

But there are also disadvantages: the fine texture of the cheese and its expected technological behavior in pastry recipes are "sacrificed". Another important characteristic of fresh cottage cheese for assessing technological properties in obtaining culinary preparations is analysis. The sensory characteristics of cheese influence the behavior of the raw material during processing, the quality of the filling, the stability of the product and consumer acceptability. A correct sensory evaluation allows obtaining culinary products with superior organoleptic and technological properties. The sensory analysis was carried out according to the scoring method (100 points). The results obtained are presented in Table 2.

**Table 2. Results of sensory analysis of fresh cheese by the scoring method**

| Organoleptic indicators   | Scoring scale | Assortments of fresh cottage cheese |            |       |       |       |
|---------------------------|---------------|-------------------------------------|------------|-------|-------|-------|
|                           |               | Incomlac                            | Căsuța Mea | Latti | SANA  | Ferma |
| Appearance and color      | 0–20          | 19,63                               | 19,88      | 20,0  | 19,5  | 20,0  |
| Consistency and structure | 0–30          | 28,75                               | 27,63      | 15,13 | 22,13 | 29,0  |
| Smell                     | 0–20          | 19,5                                | 19,5       | 19,80 | 19,75 | 20,0  |
| Taste                     | 0–30          | 29,38                               | 28,0       | 27,0  | 29,95 | 28,0  |
| Total score               | 100           | 97,3                                | 95,0       | 81,9  | 90,6  | 97,0  |

Source: developed by the authors based on their own research

The results of the sensory analysis show that the samples "Incomlac" and "Ferma" accumulated the highest score, being appreciated as very good quality products. The sample "Latti" recorded the lowest score due to its uneven consistency and rubbery structure.

After analyzing the quality indices of fresh cottage cheese, their behavior in the technological process of obtaining some culinary preparations was verified. The results regarding the technological behavior of the cheese samples in culinary preparations are presented in Table 3.

**Table 3. Technological behavior of cheese samples in culinary preparations**

| Assortments of fresh cottage cheese | Main features                                                              | Types of culinary products                                   |                                                  |                                                   |
|-------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------|
|                                     |                                                                            | "Brânzoaice /Syrniki" – mini cheesecakes*                    | Pudding and" mule"*                              | Cottage cheese pies                               |
| Incomlac                            | Umiditate optimă, consistență fină, aciditate joasă, boabe mari neuniforme | Umplutură relativ omogenă după pasare; risc redus de curgere | Necesită pasare suplimentară pentru textură fină | Comportare bună după mărunțire                    |
| Căsuța Mea                          | Umiditate ridicată, consistență densă, boabe foarte mari                   | Umplutură dificil de modelat; posibilă textură grunjoasă     | Mai puțin potrivită pentru budinci fine          | Potrivită doar după prelucrare mecanică intensivă |
| Latti                               | Aciditate optimă, consistență cauciucată, boabe mari                       | Omogenizare dificilă; elasticitate excesivă                  | Textură compactă și mai puțin aerată             | Comportare tehnologică satisfăcătoare             |
| SANA                                | Umiditate și consistență echilibrate, boabe medii                          | Umplutură stabilă și uniformă                                | Potrivită pentru produse cremoase                | Rezultate bune la coacere                         |
| Ferma                               | Structură fină, consistență omogenă, umiditate optimă                      | Cele mai bune caracteristici tehnologice                     | Textură fină și omogenă                          | Comportare foarte bună                            |

\*Traditional Moldovan dishes based on cottage cheese

Source: developed by the authors based on their own research

The data in this table demonstrate that samples with a fine structure and small or medium grains have a better homogenization capacity in compositions and allow the production of products with a uniform texture and superior sensory appearance. On the other hand, samples with large grains and a rubbery consistency require additional sifting and mixing operations.

The results obtained regarding the sensory assessment of the finished products by the scoring method are presented in Table 4-6.

**Table 4. Sensory assessment of finished cheese products using the scoring method according to fresh cow cheese varieties**

| Assortments of fresh cottage cheese | Appearance and color (20 p.) | Consistency and structure (30 p.) | Smell (20 p.) | Taste (30 p.) | Total |
|-------------------------------------|------------------------------|-----------------------------------|---------------|---------------|-------|
| Incomlac                            | 19                           | 26                                | 19            | 28            | 92    |
| Căsuța Mea                          | 18                           | 22                                | 19            | 26            | 85    |
| Latti                               | 17                           | 20                                | 19            | 25            | 81    |
| SANA                                | 19                           | 27                                | 19            | 29            | 94    |
| Ferma                               | 20                           | 29                                | 20            | 29            | 98    |

Source: developed by the authors based on their own research

**Table 5. Sensory assessment of finished products of the Puddings and Mules type by the scoring method according to fresh cottage cheese varieties**

| Assortments of fresh cottage cheese | Appearance and color (20 p.) | Consistency and structure (30 p.) | Smell (20 p.) | Taste (30 p.) | Total |
|-------------------------------------|------------------------------|-----------------------------------|---------------|---------------|-------|
| Incomlac                            | 18                           | 24                                | 19            | 27            | 88    |
| Căsuța Mea                          | 17                           | 20                                | 18            | 25            | 80    |
| Latti                               | 16                           | 18                                | 18            | 24            | 76    |
| SANA                                | 19                           | 27                                | 19            | 28            | 93    |
| Ferma                               | 20                           | 30                                | 20            | 30            | 100   |

Source: developed by the authors based on their own research

**Table 6. Sensory assessment of finished products of the Cheese Pie type using the scoring method according to fresh cottage cheese varieties**

| Assortments of fresh cottage cheese | Appearance and color (20 p.) | Consistency and structure (30 p.) | Smell (20 p.) | Taste (30 p.) | Total |
|-------------------------------------|------------------------------|-----------------------------------|---------------|---------------|-------|
| Incomlac                            | 19                           | 27                                | 19            | 28            | 93    |
| Căsuța Mea                          | 18                           | 24                                | 18            | 26            | 86    |
| Latti                               | 17                           | 22                                | 18            | 25            | 82    |
| SANA                                | 19                           | 28                                | 19            | 29            | 95    |
| Ferma                               | 20                           | 29                                | 20            | 30            | 99    |

Source: developed by the authors based on their own research

The sensory analysis of the finished products highlights that the “Ferma” and “SANA” samples present the best technological and sensory properties for obtaining pastry products and cheese-based desserts. The “Latti” sample obtained lower scores due to its dense consistency and rubbery texture, which affects the homogenization and fineness of the finished products. The Incomlac and Căsuța mea cheese samples represent average results.

## CONCLUSION

- Sensory evaluation using the 100-point scoring method revealed that the 9% fat cottage cheeses “Incomlac” and “Căsuța Mea” were classified as “very good quality”, “SANA” as “good quality”, and “Latti” as “satisfactory quality.”
- The assessment of physicochemical parameters showed the following: moisture content and pH values complied with the established requirements for all samples. Titratable acidity was within the standard limits only for the “Latti” sample, whereas the remaining samples exhibited values considerably below the specified limits. Grain size was heterogeneous, with large curd lumps and a rubbery consistency observed in the “Căsuța Mea” and “Latti” samples.
- The grain size and consistency of fresh cottage cheese significantly influence its behavior during technological processing and the quality of the finished products.
- Cottage cheese characterized by small curd grains and a finer consistency demonstrated better homogenization capacity in formulations, resulting in products with a uniform texture and attractive appearance. In contrast, cottage cheese with medium or large grains and a dense or rubbery consistency led to products with a less favorable sensory texture.
- It was observed that the type of final product influences the requirements for the raw material, namely fresh cottage cheese. For puddings, cheesecakes, pancakes a fine and creamy cottage cheese is preferable, whereas for pies and cheese pastries, greater structural variations may be

tolerated, provided that the cheese is pre-processed (e.g., sieved or mashed) according to the recipe requirements.

- The obtained results confirm the initial hypothesis and highlight the importance of selecting an appropriate type of cottage cheese according to the desired characteristics of the final product and the technological process.

## Bibliography

1. Government of the Republic of Moldova. (2019). *Decision No. 158 of March 7, 2019, on the Approval of Quality Requirements for Milk and Dairy Products*. Chisinau, Moldova. [in Romanian].
2. Banu, C. (Ed.). (2009). *Treatise on Food Industry*. Bucharest: ASAB Publishing House. ISBN 978-973-7725-67-7. [in Romanian].
3. Costin, G. M. (2005). *Milk and Dairy Products Technology*. Iași: Academica Publishing House. [in Romanian].
4. Fox, P. F., Guinee, T. P., Cogan, T. M., & McSweeney, P. L. H. (2017). *Fundamentals of Cheese Science* (2nd ed.). New York: Springer.
5. Guinee, T. P., & Pudja, P. D. (1993). The effect of milk protein standardization on the manufacture, composition and maturation of cheese. *International Dairy Journal*, 3(2), 117–128.
6. Scott, R., Robinson, R. K., & Wilbey, R. A. (1998). *Cheese Making Practice* (3rd ed.). Gaithersburg, MD: Aspen Publishers.
7. Walstra, P., Wouters, J. T. M., & Geurts, T. J. (2006). *Dairy Science and Technology* (2nd ed.). Boca Raton, FL: CRC Press.
8. Codex Alimentarius Commission. (2018). *Codex Standard for Cottage Cheese (CODEX STAN 273-1968, Rev.)*. Rome: FAO/WHO.
9. Food and Agriculture Organization of the United Nations (FAO). (2013). *Milk and Dairy Products in Human Nutrition*. Rome: FAO.
10. Ministry of Agrarian Policy of Ukraine. (2006). *DSTU 4554:2006. Sour Milk Cheese. Specifications*. Kyiv, Ukraine. [in Ukrainian].
11. Interstate Council for Standardization, Metrology and Certification. (2013). *GOST 31453-2013. Cottage Cheese. Specifications*. Moscow, Russia. [in Russian].
12. European Food Safety Authority (EFSA). (2012). Scientific opinion on dietary reference values for protein. *EFSA Journal*, 10(2), 2557. <https://doi.org/10.2903/j.efsa.2012.2557>
13. European Food Safety Authority (EFSA). (2015). Scientific opinion on dietary reference values for calcium. *EFSA Journal*, 13(5), 4101. <https://doi.org/10.2903/j.efsa.2015.4101>