

## **STUDIES REGARDING THE INFLUENCE OF SOME TECHNOLOGICAL PARAMETER ON THE EFFICIENT OBTAINING OF BRINE CHEESE WITH WHEY PROTEIN**

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### **Abstract**

*The brine cheese with inclusion of whey protein is a part of the category of cheese in brine. This type of cheese has a big food value by reason of the high content of lactalbumin, an easy digestible substance. In the conditions of a stressful economic and social life, the introduction of foods with high nutritious elements and quality is an actual requirement of the consumers. In the same context are being part the researches from this study, in the domain of cheese, that follow the influence of technological parameters about the obtaining efficiency of whey protein including brine cheese.*

**Keywords:** *brine cheese, whey protein, temperature, acidity, efficiency*

### **Introduction**

Brine cheese - known with the name of „cheese of Braila” or „white cheese”, is a product made initial in countries from the Balkans, whence she expanded afterward in many countries. In our country is made in all zones and in the course of whole year, being one of the most demanded types of cheese on the market (Codoban, 2006).

In the beginning, brine cheese was prepared merely from sheep milk, but afterward the production of white cheese from cow milk and buffalo milk or in blend has begun (Chintescu, 1980, 1988).

The technology of brine cheese is different from the other types of cheese through the module of process of curd and through the aging and the preservation of the product, which is done in wooden barrels filled with brine (Nout 1994, Azzouz 2000). The system of preservation in brine assures a long duration of preservation (up to a year) and is an important characteristic from the qualitative and

economical point of view regarding this assortment of cheese (Morsi, 1993).

Pursuant the endowment of production with good performance equipments and the improvement of the manufacture technology, brine cheese from cow milk can be manufactured after the classic method, the original method or with inclusion of albumin. Is all known that in the case of classic method, the whey protein (lactalbumin and lactoglobulin) are lost cause, in most part, they are passing in the whey (Lortal, 2005). For partial avoiding this drawback, cause of the experiments effectuated in investigatory institutes, was established the manufacture technology of brine cheese with including of albumin that follows the milk pasteurization at high temperatures of 85-87°C and maintaining for 10-15 minutes the temperature for the precipitation and retention in the cheese of lactalbumin (Caloianu, 2001).

## **Experimental**

For the accomplishment of experimental program are used six milk samples from different sources, situated close to Bacau

Initially, physico-chemical analyses of milk, staple, for each sample, are made in the laboratory of an illustrative milk processing department from Bacau.

The following analyses were made:

- acidity, °T (as per STAS 6353-85)
- content of fat, % (as per STAS 6352/2-87)
- density, g/cm<sup>3</sup> (as per STAS 6347-73)
- proteic substances (as per STAS 6355-89)
- dry substance (as per STAS 6344-88)
- lactose, % - Lactoscop method
- cryoscopic point – Lactoscop method

For the samples of cheese obtained were made the following analyses:

- content of NaCl, g/100g product ( as per STAS 6354-84)
- content of fat, % (as per STAS 6352/2-87)
- content of water, % (as per STAS 6344-88)
- dry substance, % (as per STAS 6344-88)

## Results and Discussions

The results of the values obtained from physico-chemical analyses of the milk - raw material samples, are presented in table 1:

**Table 1.** Values obtained from physico-chemical analyses of the milk - raw material samples

Parameter/ Sample	Acidity (°T)	Content of fat (%)	Density (g/cm <sup>3</sup> )	Proteic substances (%)	Dry substance (%)	Lactose (%)	Cryoscopic point
Ruginoasa	18	3.44	1.0305	3.22	12.29	4.90	515
Scorteni	18	3.45	1.0300	3.25	12.50	5.15	510
Faureni	18	3.56	1.0295	3.25	12.61	5.15	507
Oituz	18	3.50	1.0299	3.24	12.43	4.95	511
Lipova	18	3.69	1.0290	3.33	12.69	4.85	520
Secuieni	18	3.73	1.0290	3.22	12.80	4.80	519

In Table 1, the values for the most samples are as per STAS 2413-61.

For the realization of experimental program the next parameters were varied: temperature of pasteurization and the acidity. Through this variation of parameters, the modification of the efficiency of obtaining brine cheese with whey protein and quality was followed.

The milk volume taken in work was maintained constant at 3000 liters.

The efficiency was calculated using the formula (Zoltan 1963):

$$R = \frac{C_b}{C_i} \cdot 100, \%$$

In this relation  $C_b$  represents the quantity of cheese obtained (kg) and  $C_i$  is the quantity of milk introduced (liter)

In table 2 are presented values obtained from physico-chemical analyses of cheese samples with whey protein. From the Table 2 we can see that the values are very close for the content of fat parameter, the exception being the sample 3 with a value of 16.5. Also the samples number 4 and 5 has slightly over values for the water content.

*Studies Regarding the Influence of some Technological Parameter on the Efficient Obtaining of Brine Cheese with Whey Protein*

**Table 2.** Physico-chemical values of cheese samples with whey protein

Sample	Parameters				
	NaCl, (%)	Content of fat, (%)	Water, (%)	Dry substance (%)	Fat/Dry substance, (%)
1	3.30	15.5	50.48	49.52	31.30
2	3.79	14.00	64.33	35.67	39.24
3	3.26	16.50	51.98	48.02	34.36
4	3.63	13.50	55.15	44.85	30.10
5	3.77	15.00	48.74	51.26	29.26
6	3.45	14.00	50.18	49.82	28.10

The efficiency of obtaining brine cheese with whey protein taking into account the variation of temperature, respectively of acidity are presented in tables 3, respectively 4.

**Table 3.** Efficiency of obtaining the brine cheese with whey protein with the variation of pasteurization temperature

Sample	Temperature, (°C)	Milk volume, (l)	Quantity of cheese, (kg)	Efficiency, (%)
1	83	3000	446	14.86
2	84	3000	460	15.33
3	85	3000	474	15.80
4	86	3000	478	15.93
5	87	3000	482	16.06
6	88	3000	477	15.90

From Table 3 we observe an increasing in a progressing mode of the efficiency till the temperature reach 87°C, followed with an decreasing when the temperature reach 88°C.

From Table 4 we observe an increasing in a progressing mode of the efficiency till the acidity is 25°T, followed with a light decreasing. This variation can be explained by the advance precipitation of proteic

structures and their passing in whey, cause of the small size of molecules.

**Table 4.** Efficiency of obtaining the brine cheese with whey protein with acidity variation

Sample	Temperature, (°C)	Acidity, (°T)	Milk volume, (l)	Quantity of cheese, (kg)	Efficiency, (%)
1	87	22	3000	460	15.33
2	87	23	3000	475	15.83
3	87	24	3000	485	16.16
4	87	25	3000	492	16.40
5	87	26	3000	480	16.00
6	87	27	3000	473	15.76

### Conclusions

From experimental date obtained we can draw the conclusions:

- augmenting the temperature of pasteurization and acidity influences favorably the efficiency of brine cheese obtained, and the inclusion of whey protein.
- the manufacture process of brine cheese with inclusion of whey protein has the following advantages:
  - the diminuation of specific consumption with 8-10%
  - the nourishing value of product is higher cause of lactalbumin embedment in the cheese mass
  - a better preservation of product without deffects of fermentation in the aging and storage time
- acidity have a favorable influence on the coagulation process, the precipitation of proteins being better with acidity increasing.

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*Studies Regarding the Influence of some Technological Parameter on the Efficient Obtaining of Brine Cheese with Whey Protein*

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