



Factors Affecting the Profitability of Milk Processing Businesses

Enkeleda Lamçe^{a*}, Shurki Maxhuni^b, Arber Sh. Maxhuni^c

^a*High School of Machinery "Shtjefen Gjeçovi" Prishtinë Kosova*

^b*University "Ukshin Hoti" 20000 Prizren Kosova*

^c*American University of Prishtina*

Abstract

The dairy industry seems to have convinced the food industry that whey is a miracle product. The list of supposed benefits it gives to food is as long as your arm. Some of the benefits may be real. *Whey* is the liquid remaining after milk has been curdled and strained. It is a by-product of the manufacture of cheese or casein and has several commercial uses. To produce cheese, rennet or an edible acid is added to heated milk. This makes the milk coagulate or curdle, separating the milk solids (curds) from the liquid whey. Sweet whey is the byproduct of rennet-coagulated cheese and acid whey (also called sour whey) is the byproduct of acid-coagulated cheese. Sweet whey has a pH greater than or equal to 5.6, acid whey has a pH less than or equal to 5.1. Whey is also a great way to add sweetness to a product without having to list sugar as an ingredient as whey contains up to 75% lactose. And it sounds healthy. This study is a very important economic study of such a field, to disclose economic parameters Profit Sector.

This study is done to research the examinations for production of mozzarella cheese, after research and analyses of physical-chemical peculiar feature of whey from coagulum. We have followed the processes from drying of whey from coagulum analyzer physical-chemical peculiar feature. We carried out three experiments. For every experiment, we took three patterns and analyzed the physical – chemical. The calculation was appraised statistically. This research has to be made in order to adopt the production kind production in this way possible to examination of whey from coagulum to production cheese from cow's milk in milk industry in Kosova.

Key words: Milk; coagulum; whey; cheese; Mozzarella.

* Corresponding author.

1. Introduction

Whey is the watery part of milk that is separated from the coagulable part or curd especially in the process of making cheese and that is rich in lactose, minerals, and vitamins and contains lactalbumin and traces of fat [1]. Whey protein is one of the two proteins found in milk, with the other being Casein Protein. When a coagulant (usually renin) is added to milk, the curds (casein) and whey separate. Whey protein is the water-soluble part of milk. Whey is used as a protein supplement. It is very useful for hitting targeted daily protein goals. Whey is absorbed faster than other forms of protein, which means it also increases muscle protein synthesis used to break a fasted state [3&5]. Whey also delivers a large amount of the amino acid L-cysteine, which can alleviate deficiencies that occur during aging and diabetes, as well as other conditions. While whey has also been claimed to increase fat loss, this is a function of protein, rather than the whey itself. This means that the whey itself does not reduce fat, but taking in more protein often aids with fat loss efforts [2]. Whey protein (derived from whey) is often sold as a nutritional supplement. Such supplements are especially popular in the sport of bodybuilding. In Switzerland, where cheese production is an important industry, whey is used as the basis for a carbonated soft drink called Rivella. In Israel, dairy farmers supplement cows with whey to ensure a steady supply of proteins and calcium. It is not vegan, but veggies can eat it and also people who are lactose intolerant. I am not sure about milk allergies to.6. Sweet whey is manufactured during the making of rennet types of hard cheese like cheddar or Swiss cheese. Acid whey (also known as sour whey) is obtained during the making of acid types of cheese such as cottage cheese. Whey is a by-product of cheese production; it is one of the components which separates from milk after curdled, when rennet (often a by-product of veal production, which is in turn often fed on whey) or an edible acidic substance is added. Whey is used to produce ricotta and brown cheeses and many other products for human consumption. It is also an additive in many processed foods, including breads, crackers and commercial pastry and in animal feed [8]. Whey protein is the name for a collection of globular proteins that can be isolated from massive whey. It is typically a mixture of globin stagers β -lactoglobuli (~65%), α -lactalbumin (~25%), and serum albumin (~8%), which are soluble in their native culture forms, independent of pH. Whey has the highest Biological Value (BV) of any known protein. Whey protein has an even higher bioavailability than egg white protein, which is considered the "gold standard" of protein, and has a bioavailability rating of 100. Bioavailability refers to how quickly a substance will be digested and absorbed through the cilia in the small intestine and thus into the blood stream. It has steroids in it too. But the clever dairymen figured out that whey could be used as a food additive to give foods some of the properties of milk, but without milk's cost. Besides, any profit they made from the whey was a bonus. When the water is removed from the whey, what we are left with is proteins, minerals and lactose. A lot of lactose - up to 75%. The dairy industry seems to have convinced the food industry that whey is a miracle product. The list of supposed benefits it gives to food is as long as your arm. Some of the benefits may be real [7]. **Whey** is the liquid remaining after milk has been curdled and strained. It is a by-product of the manufacture of cheese or casein and has several commercial uses. To produce cheese, rennet or an edible acid is added to heated milk. This makes the milk coagulate or curdle, separating the milk solids (curds) from the liquid whey. *Sweet whey* is manufactured during the making of rennet types of hard cheese like cheddar or Swiss cheese. *Acid whey* (also known as "sour whey") is a by-product produced during the making of acid types of dairy products such as cottage or strained yogurt [9]. Sweet whey is the byproduct of rennet-coagulated cheese

and acid whey (also called sour whey) is the byproduct of acid-coagulated cheese. Sweet whey has a pH greater than or equal to 5.6, acid whey has a pH less than or equal to 5.1 [3]. This study is done to research the examinations for production of mozzarella cheese, after research and analyses of physical-chemical peculiar feature of whey from coagulum. We have followed the processes from drying of whey from coagulum analyzer physical-chemical peculiar feature. We carried out three experiments. For every experiment, we took three patterns and analyzed the physical – chemical. The calculation was appraised statistically. This research has to be made in order to adopt the production kind of cheese to the producing conditions and the requirements of Kosovo's trade markets and to make the production in this way possible to examination of whey from coagulum to production cheese Mozzarella from cow's milk in milk industry in Kosova.

2. Work Material

2.1. Whey

For the production of Mozzarella Cheese we have used milk of the following breeds: autochthon cow Busha, Frisian, Montafon, Simmental, Holstein, in the dairy of the region of Fushë Kosova and Prizren. We carried out three experiments for each milk-kind. For every experiment, we took three patterns of Whey from coagulum and analyzed the physical – chemical. Three experiments were done with 5000 liters of cow's milk, with raw non-pasteurized and non standardized row milk, milk with 3.6% fat. The calculation was appraised statistically.



Figure 1

Whey in glass.

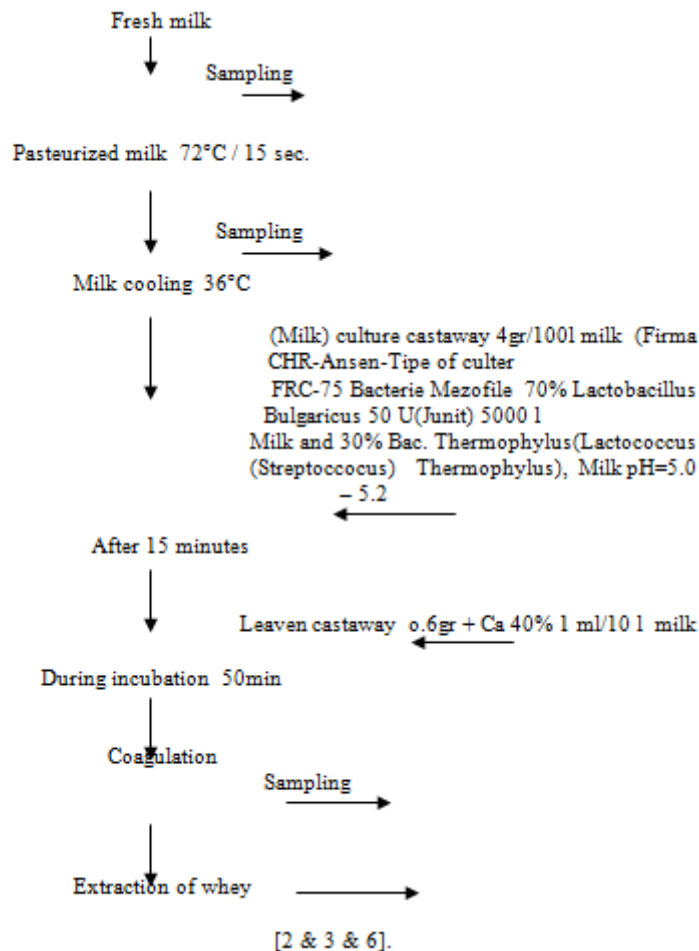
2.2. Work methods

IT'S used fresh milk to produce cheeps of mozzarella-unpasteurized cows with these parameters. For physical-chemical peculiar feature of milk and mozzarella samples were used these methods:

1. For definition of pH value were used the ph-meter ISOLAB pH -111.
2. Soxhelt-Henkels method were used to define sour taste.

3. For Physical – chemical is utilized LACTOSCAN – D -90.
4. For definition of Nitrogen (N) were used the Kelda’s method.
5. For definition of fat percentage % were use the method of Gerber.
6. for definition of dry matters until drying up of constant mass.
7. Dry quantity of mass without fat has been done in calculated way.
8. Percentage of fat at dry mass has been done in calculated way.
9. Water quantity has been done in calculated way.
10. For definition of saline’s (NaCl) were done according to the IDF standards.
11. Ash% was done according to the IDF standards [4].

Diagram for Whey production



3. Experimental results

Table 1: Physic chemical Average percentage of fat in Whey coagulum from standardized milk (3.2%)

| | |
|--|-------------|
| Parametres | |
| pH | 5.6 |
| Aciditet °SH | 6.9 |
| Temp. Sample | 28 |
| Fat % | 0.39 |
| SNF % (Solids – not – fat = proteins, lactose, minerals, acids, enzymes, vitamins) | 6.8 |
| Density | 1.02217 |
| Protein% | 0.74 |
| Lactose% | 4.9 |
| Water % | 93.20 |
| Solids % | 0.47 |
| Freezing Point | - 0.215 |

Table 2: Physic chemical Average percentage of fat in Whey coagulum from non standardized (3.6%) cow's milk

| | |
|--|-------------|
| Parametres | |
| pH | 6.25 |
| Aciditet °SH | 5.2 |
| Temp. Sample | 26 |
| Fat % | 0.84 |
| SNF % (Solids – not – fat = proteins, lactose, minerals, acids, enzymes, vitamins) | 7.17 |
| Density | 1.02408 |
| Protein% | 2.77 |
| Lactose% | 3.52 |
| Water % | 92.29 |
| Solids % | 0.58 |
| Freezing Point | - 0.324 |
| Conductometria mS/cm | 6.03 |



Figure 2

Cheese with whey.

4. Results and Discussion

- This study is a very important economic study of such a field to disclose economic parameters Profit Sector.
- Three experiments were done with 5,000 liters of cow's milk, with raw non-pasteurized and non standardized row milk, milk with 3,6% fat.
- Based on exploratory data for production of Mozzarella cheese from un-standardized milk of cows, by this we can conclude that: Fresh milk must be in the standard with number of microorganisms and with fat.
- Is very important percentage of fat in whey as the indicator of yield for the curd to production the cheese mozzarella?
- For the maturity of the curd coagulant the pH of whey must be 5,9 – 6,6. For the maturity of the curd coagulant the pH must have the value 5,0.
- Fat percentage differentiation in between the non-standardized (3.6%) and standardized (3,2%) of cow's milk is: 0,4%.
- But, fat percentage differentiation in between the non-standardized (0,39 %) and standardized (0,84 %) of cow's milk in whey is: 0.36%.
- The SNF - (Solids – not – fat = proteins, lactose, minerals) in cow's whey from standardized milk is 6.8%, but from non standardized milk is higher 7.17%.
- The Protein in cow's whey from standardized milk is 0,74%, but from non standardized milk is higher 2,77%.
- The Lactose in cow's whey from standardized milk is 4,9%, but from non standardized milk is higher 3,52%.
- The Solids in cow's whey from standardized milk is 0,47%, but from non standardized milk is higher 0,58%.
- Percentage loss of fat in whey of un-standardized cow's milk during the production process of mozzarella is 0,4% / 1 kg cheese.
- Meanwhile, percentage of fat in whey depends from standardized kind of milk.
- Though the results of this particular examination are quite good, we would recommend a temperature raise of 2°C, from 85 °C to 87 °C for a 2-3 minutes period of the pasteurization in order to fully ensure the pasteurization of the curd coagulum.
- This will Thou that; any percentage of milk fat than the 3,2% used for the production of cheese, will exceed the whey! Not as a result of the discovery of any new method to acquire the percentage of fat than milk whey not with us last.
- Well, so far not discovered any new method, which had to absorb the whole percentage of fat from fresh milk for cheese production.
- To this should be made a standardization of milk anyway, for the manufacture of cheese; because in economic terms cheesecake every enterprise, there will be economic losses without the use of standardized milk.

References

- [1] Anonym, 1995, Dairy processing handbook, Publisher Tetra Pak Processing System AB, Printer LP Grafiska AB, S-22186 Lund, Sweden.
- [2] Coralba,G., 1982, 389pp., La fabbricazione del caciocavallo in Lombardia, “L’industria del latte”, nr.14; u Manuali di tecnologia casearia, “Edagricolo”, Bologna.
- [3] Cheese Rheology and Texture. Sundaram Gunasekaran, M.Mehmet Ak, CRC PRESS, Boca Raton London New York Washington D.C. 2003.
- [4] IDF Standard 17 A, 1972.
- [5] Luquet,F.M., 1990, 637pp., Laits et produits laitiers, Vache, Brebis, Chevre 2.Les produit laitiers, Transformation et technologies, Technique et Documentation - Lavoisier, 11, rue Lavoisier – 75384 Paris Cedex 08.
- [6] Mozzarella di Bufala.org ,Italian version Copyright 2006.
- [7] Dr.Sc.Shuri Maxhuni, Impact of Types of Milk In Production Cheese Kashkaval Publisher: LAP LAMBERT Academic Publishing, May 22, 2013.
- [8] Manual for milk processing, Land O’Lakes, 2003.
- [9] Wikipedia, 27 February 2016.