



Amino Acids in Cheese Kaçkaval Produced from Combined Milk (2: 1 Cows & Sheep Milk) in Milk Industry “Bylmeti” in Fushe Kosova

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Abstract:

The role of milk in nature is to ensure food and immunological protection of the young mammals. Milk processing in Kaçkaval cheese takes very important place in productivity of dairy, in the same time takes very important role in domestic economy as well as nutritive for human kind.

The task of this paper is to determine the influence of type of milk (cow and sheep, and a mixture of these two types of milk (ratio between the milks 2:1) on the properties of cheese kaçkaval, then determine how to produce the milk used type of change affects the amino acids properties of cheese during ripening.

This study is done to research the ingredients of amino acids of Kaçkaval cheese, (these type of cheese is classified to semi hard group of cheeses), daily fresh cheese (One day), 15 to 30 days maturing, produced from combined cows and sheep milk, from fresh milk. There were made 45th of analyses with amino analyser to searching ingredients of amino acids.

Keywords: Milk; Proteins; Amino-Acids; Cheese; Kaçkaval.

Preface

Milk is the only food for mammals, the baby in the first period to give milk containing lifetime. Material energy and building materials needed for the baby's growth. Contains antibodies that protect the baby from infections mammal. Milk is a complete food and cheaper to man - SAMPURNA AHAAR- complete feed. (9).

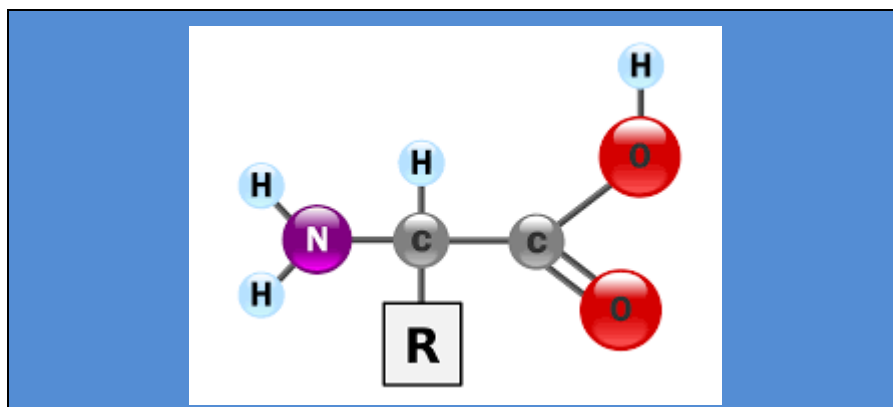
Milk has been a source of food of people since prehistoric times now. The milk animals (cows, sheep's, goats, buffalos), which we know today have been cultivated from the wild animals, which have been living through the millennia at various altitudes and latitudes and have been exposed to natural conditions, sometimes being inclement and severe. (10).

Milk is considered as a complete and ideal food and it contains most of the proximate principles of a well balanced diet. Milk of various mammals is used for food but cow's milk is being used throughout out the world for feeding infants and as a supplement to the diets of the children and adults. The other animal's milk used is buffalo, goat, sheep, and camels. This nutrient packed drink is given to patient even during critical stage. Various milk products such as curd, butter milk, ghee, cheese, pannier, khoya, rabri etc are used commonly in our food preparations. This time tested nutritious drink is been criticized by few vocal people to the extent that milk is equated to poison. (1&6&8).

Long ago people started propitiate animals, their milk used for feeding, and later for processing into dairy products. Thus, the first data on the production of cheese came from Egypt 2500 years before the Jesus and butter 500 years before the Jesus. Generally, it is believed, that milk is the "perfect food". The reason for this is in general known biochemists milk composition, its biological and physiological availability of nutrition in its ingredients man body. Milk produced by the mammary glands, the only food newborn offspring similar type in the first few months of life. Man has adjusted milk production personally needs so that one of the basic food products throughout its life. And not only milk, but about products that are made from milk. Nowadays more than 2000 cheese varieties have been produced worldwide. (3).

Fermented foods are among the oldest processed foods and have formed a traditional part of the diet in almost all countries for millennia. Proteins are giant molecules built up of smaller unit called amino acids. The amino acids belong to a group of chemical compounds which can enmity hydronium Ions in alkaline solutions and absorb hydronium ions in acid solutions. Such compounds are called amphotery electrolytes or ampholytes. Milk processing in Kaçkavall cheese takes very important place in productivity of dairy, in the same time takes very important role in domestic economy as well as nutritive for human kind. (9).

Amino Acid Structure



The task of this paper is to determine the influence of type of milk (cow and sheep, and a mixture of these two types of milk (ratio between the milks 2:1) on the properties of cheese kaçkaval, then determine how to produce the milk used type of change affects the amino acids properties of cheese during ripening.

This study is done to research the ingredients of amino acids of Kaçkaval cheese, (these types of cheese is classified to semi hard group of cheeses), daily fresh cheese, 15 to 30 days maturing, produced from combined cows and sheep milk (2: 1), from raw milk. There were made 45th of analyses with amino analyser to searching ingredients of amino acids.

Materials and Method

It's used fresh milk to produce cheese of Kaçkaval - unpasteurized cows and sheep's with these parameters. For physical-chemical peculiar feature of milk and Kaçkaval samples were used these methods:

Organo-leptic of cheese.

Soxhelt-Henkels method was used to define sour taste ^0SH .

For definition of pH value were used the pH-meter, Miskra, Kranj, Type MA 5730.

For definition of milk density g/cm^3 were used Laktodezimetre.

For definition of fat percentage % were use the method of Gerber.

For definition of dry matters until drying up of constant mass.

Dry quantity of mass without fat has been done in calculated way.

Percentage of fat at dry mass has been done in calculated way.

Water quantity has been done in calculated way.

For definition of general Nitrogen (N), were used the Kelda's method.

For definition of saline's (NaCl) were done according to the IDF standards.

Beside, equipments and devices which are provided with regulations to define the physical-chemical peculiar feature of milk and cheese were used as well the below mentioned.

Technological line for production of Kaçkaval cheese, consist from: two fold bath with capacity of 5000 l (Nederland's bath equipped with equipment for benefit ion of coagulant-dough mass-curd).

Coagulant baking line – "Maxhar" Budapest, Hungarian.

Frames, Shelves.

To research the 15 of amino acids in cheese kaçkavall: one (1), fifteenth (15) and thirty (30) days, produced from sheep milk, is utilized:

- aminoanalajzeri Kla - 5, Beakman, micro 420. **(2&3&8)**.

In our research work we have used international standard methods (IDF) for analyzing the parameters of combinations milk to production cheese kaçkaval, with methods mentioned above. In this work research we have made three experiments were done with 5000 liters by combinations milk (between Cows and sheep milk 2:1) fresh non-pasteurized milk (with 3.6% fat).

Production of cheese goes through different phases that are common to allot of cheese sorts. There are also other ways of treatment, which are specific to certain varieties.

Cheese milk is pretreated, possibly premiered after addition of a bacterial culture appropriate to the type of cheese, and mixed with rennet. The enzyme activity of the rennet causes the milk to coagulum. This mass is cut with special cutting tools into small cubes (1x1 cm) of the desired size – above all to enable share-out the whey. During the rest of the curd making process the bacteria grow and form lactic acid, and the curd grains are subjected to mechanical treatment with stirring tools, while at the same time the curd is heat up according to prearranged programmed. The combined effect of these actions – growth of bacteria, mechanical treatment and heat treatment – results in sunrises, i.e. separation of whey from the curd. The finished curd is placed in cheese moulds of metal, wood or plastics, which determines the shape of the finished cheese. **(4&5)**.

The cheese is pressed, either by its own weight or more commonly by applying pressure to the moulds. Treatment during curd making and pressing determines the characteristics of the cheese.

To produce Kaçkaval type of hard cheese, unpasteurized sheep fresh milk was used. To produce this kind of cheese in industrial way it was used 5000 liters of milk. It was made three (3) producing experiments of this cheese kind and taken three (3) samples of kaçkaval for experiment (every seventh baked cheese roundel was taken as a sample). For jellification-milk coagulation were used yeast, Astro, from Nova Pazova, where 2 kg. of yeast in temperature of 30° will jellification-coagulate 100 l. of milk in 40^{ly} minutes. From every cheese product were taken in parallel two sampling (viz 2 x 3= 6 samples) which was analyzed:

Physical-chemical peculiarity, in time term of one (1) daylong, fifteen days (15) and (30) thirty days. After 40-ty minutes milk coagulates. Coagulant will be cut up in 1x1 cm. As coagulation kaçkaval was produced by cow's milk and experimented in Dutch vat with capacity from 500 liters, with 3.16% & 3.88% of fat – 2:1 advantage in dairy cows. Milk is boiled in temperature of 33° c, well intermixing afterwards adding ferment-yeast (100 gr. of yeast will be dissolved in three litters of watt goes down to the bottom of the vat, then the whey goes away through rubber pipe.

Cheese Kaçkaval



Coagulated part will be intermixed for 15-in minutes and heated in temperature of 42° c with warm water where in this temperature will be mixed for 40-ty minutes. Afterwards whey will be separated and fresh coagulum curd remains in the vat. Curd-coagulum will be cut up in bulks fro 15-30 cm where is baked in surroundings temperature (usually at 24⁰ C) about 16 hours.

Cheese is baked in briny water (with 15%) in 75⁰c, after coagulant goes through the grind machine and forming of this mass under the pressure-pressing and filling up the shapes. Cheese remains in surroundings temperature in the shape (usually at 25⁰ C) about 24 hours (in the meantime the shapes with the cheese should be whirled). After reendowing the cheese from the shapes they stay to be dried up for one day in the same surroundings temperature (in the same room), after that they are delivered to waiting room for dry salting that takes two weeks (where each day the cheese is whirl about). The cheese is baked for thirty days in temperature up to 20⁰c, as well as on moisture up to 85%. The cheese is maintained in the store (the cheese is whirl about, salted and cleaned). (7&8).

Table 1: Physical and Chemical Composition of Milk for Cheese Production Combined (2: 1 Cows & Sheep Milk) Kaçkaval							
Sample	pH	⁰ SH	Density Kg/m ³	Fat %	General dry substances	General dried substances without fat	Water
1	5,86	11	1,0250	3,5	10,50	7	89,50
2	6,33	8	1,0270	3,6	10,50	6,90	89,50
3	5,83	12	1,0280	3,7	9,88	6,18	90,12
X	6,01	10,33	1,0266	3,6	10,29	6,69	89,71

The Process of Production Cheese Kaçkaval , We have Presented by Diagram (2 & 8 &10)

Diag.1: Processing Diagram of Kaçkaval Cheese



Table.2: Amino-Acids in Fresh Cheese One Day in gr. in 100 gr./Cheese from Cows & Sheep Milk

Amino-Acids	One day (gr/100gr cheese)
Asparagine	1,32
Glutamine	4,18
Serine	1,05
Histidine	0,54
Glicine	0,32
Threonine	0,67
Arginine	0,73
Alanine	0,57
Tirozin	1,15
Methionine	0,49
Valine	1,21
Phenylalanine	1,03
Isoleucine	0,95
Leucine	1,87
Lysine	1,40
X	17,49

Table.3: Amino-Acids in Fresh Cheese Fifteen days in gr. (in 100 gr./cheese from Cows & Sheep milk)

Amino-Acids	15 days (gr/100 gr cheese)
Asparagine	1,54
Glutamine	4,91
Serine	1,22
Histidine	0,67
Glicine	0,38
Threonine	0,84
Arginine	0,88
Alanine	0,66
Tirozin	1,30
Methionine	0,60
Valine	1,40
Phenylalanine	1,23
Isoleucine	1,13
Leucine	2,40
Lysine	1,69
X	20,92

Table.4: Amino-Acids in Fresh Cheese Thirty days in gr. (In 100 gr./cheese from Cows & Sheep Milk)

Amino-Acids	30 days (gr/100 gr cheese)
Asparagine	1,86
Glutamine	5,61
Serine	1,41
Histidine	0,79
Glicine	0,47
Threonine	0,96
Arginine	0,96
Alanine	0,78
Tirozin	1,49
Methionine	0,68
Valine	1,77
Phenylalanine	1,44
Isoleucine	1,36
Leucine	2,85
Lysine	2,27
X	24,76

Results and Discussion

Three experiments were done with 5000 liters of two types of milk (ratio between the cows and sheep 2:1) raw non-pasteurized milk with 3.6% fat.

The samples of milk and cheese produced in industrial way by traditional technology were taken to be analyzed from cow's and sheep's milk; amino-acids peculiar analysis has been done for fresh cheese lasting from one (1) day, fifteen (15) days and thirty (30) days.

In addition, the analyses were made 45 analyses for percentage % of amino acids in cheese. The samples of every seventh roundel have taken to analyze. Near than 100 analyses were done to research the percentage of amino acids in this kind of cheese.

- a). One Day Cheese:** The average of amino acids is 17.49 gr/100gr /cheese.
- a.1.). The mostly percentage of amino acids in one days is Glutamine 4,18 gr/100gr, Leucine with 1.87 gr/100gr after Lyzine 1.40 gr/100gr and Asparagine 1.32 gr/100gr, Serine 1.05 gr/100gr, Phenylalanine 1.03 gr/100gr and Izoleucine 0.95 gr/100gr. Other amino acids don't have so much difference in percentage between 0.32 -0.73 gr/100gr.
- b) Fifteen Days Cheese:** The average of amino acids is 20.92 gr/100gr /cheese.
- b.1.). Amino-acids in cheese fifteen (15) day in gr. In 100 gr. /cheese produced from cows & sheep milk are all in growth percentage. The smaller growth of percentage of amino acids is by all amino acids. Generally a growth of amino acids is 3.43 gr/100gr /cheese.
- d) Thirty Days Cheese:** The average of amino acids is 24.76 gr/100gr /cheese.
- d.1.). Amino-acids in cheese thirty (30) days in gr. In 100 gr/cheese produced from cows & sheep milk are all in growth percentage.

A generally growth of amino acids is 3.84 gr/100gr /cheese from one day to thirty days.

Conclusion

So, by increasing the number of days to maturation cheese is increasing and the percentage of amino acids in cheese kaçkaval. All parameters are of world standards, but mode and technology of this cheese makes possible less expense than needed liters to one (1) kg/cheese.

Temperature optimal for preserving this cheese is $20^{\circ}\text{C} - 22^{\circ}\text{C}$. But this cheese support the temperature to 25 degrees Celsius.

During the production of cheese, very important role takes the sort and the quality of milk. As percentage of fat in milk changes so the percentage of fat in cheese changes also percentage of amino acids in cheese.

It is ascertained that during baking-drying of cheese in the store, from the first day until the thirtieth day the physical-chemical parameters are raising, such as raising percentage of amino acids.

After thirty days of maturity of the cheese in the above-mentioned conditions, it may be in the market for consumption.

Furthermore, the gained results of such good production with good quality of cheese are showing that it has good economic importance for milk processing industry having in consideration of the market interest for this kind of cheese with such peculiarity.

Literatures:

- [1] Anonym, 1995, 431pp., 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] Fellows, P.J., 2000, 575pp, Food processing technology, Published in North and South America by CRC Press LLC 2000 Corporate Blvd, NW Boca Raton FL 33431 USA.
- [5] Luquet, F.M., 1990, 637pp., Laits et produits laitiers, Vache, Brebis, Chevre 2. Les produits laitiers, Transformation et technologies, Technique et Documentation - Lavoisier, 11, rue Lavoisier - 75384 Paris Cedex 08.
- [6] Petrić, A., 1984, 357pp., Konzumno i fermentirano mlijeko, Zagreb, Tisak: SOUR "VJESNIK" OOUR TIM, ZAGREB.
- [7] Wikimania 2008 Wikipedia, the free encyclopedia, early registration for Wikimania 2008. feedback@bawarchi.com, Mumtaz Khalid Ismail.
- [8] Dr.Sc.Shuri Maxhuni, Impact of Types of Milk In Production Cheese Kashkaval Publisher: LAP LAMBERT Academic Publishing, May 22, 2013
- [9] Dr.Sc.Shukri Maxhuni, Row milk. Publisher: LAP LAMBERT Academic Publishing, November 5, 2013
- [10] Manual for milk processing, Land O'Lakes, 2003.