

RESEARCHES CONCERNING THE PROTEOLITICAL MODIFICATIONS DURING THE FERMENTATION AND THE STORAGE OF DAIRY PRODUCT-SANA

**Rotar Mihaela- Ancuța *, Cristina Semeniuc*, S. Apostu *,
Ramona Suharoschi*, Crina Mureșan*, C. Laslo *,Camelia Guș*,
Monica Culea****

*USAMV Cluj-Napoca, Faculty of Agriculture, TPPA

**UBB Cluj-Napoca, Faculty of Physic

a_m_rotar@yahoo.com

Key words: fermented dairy, quality, amino–acids, dairy products processing

Abstract: In this study were followed biochemical modifications of dairy product-sana, during processing. The researches were focused on two main working directions:

- appreciation of raw milk quality;
- dairy product-sana amino–acids determination by gas chromatography method.

Introduction

Fermented dairy products are based on physical and chemical modifications of milk caused by the development of starter culture and his metabolic activity.

The nutritive value of these products is dependent on the availability and digestibility of nutritive constituent, also by the modification of these constituents induced by the lactic acid bacteria development and by them metabolic activity.

This nutritive value is improved by biochemical modifications which appear during fermentation and storage.

Experimental

One type of dairy product-sana was taken in study.

The samples were studied in three points of the technological process of fabrication which was considered essentials:

1. Milk prepared from souring with starter culture noted: S1
2. Dairy product-sana at the middle period of fermentation noted S2.
3. Dairy product-sana at the end of processing, noted: S3.

Analyze methods had followed two directions:

The appreciation of milk quality, meaning: the appreciation of milk integrity and freshness degree.

Appreciation of milk integrity (determination of fat content, proteins and lactose) was realized with Lactoscan and milk freshness was determined by measuring titrable acidity with Thorner method.

Determination of amino-acids through gas chromatography method coupled with the mass spectrophotometer (GC-MS) was realized using a capillary column fused silica Rtx-5MS, the mass spectrophotometer cuadrupolar Trace DSQ with sensibility of pg order (*Culea si col.*, 1986).

The method consists in: extraction, esterification and trifluoacetylation.

The results are expressed in tables and graphic representation.

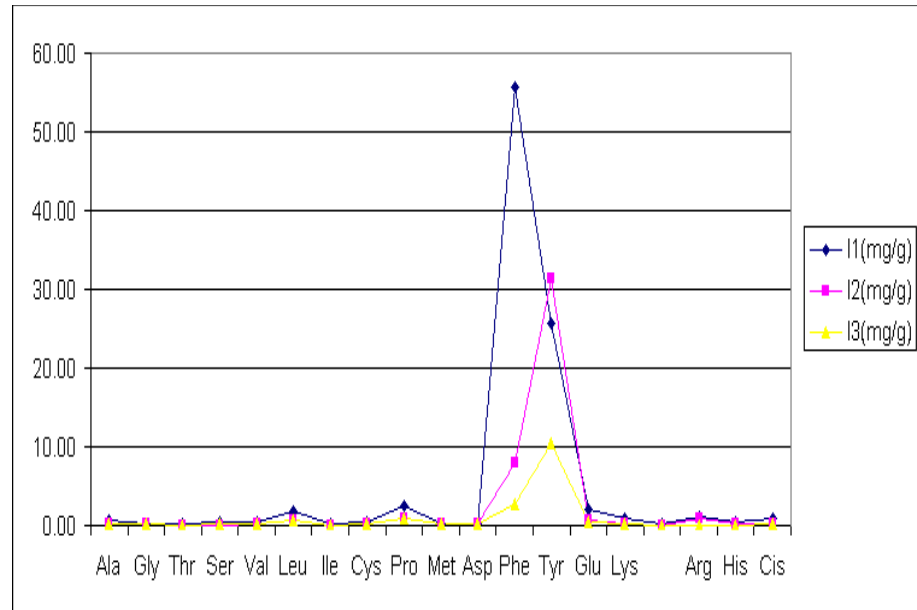
Table 1 The variation of protein, fat and lactose in dairy product-sana during processing

Sample	Fat	Protein	Lactose
	g%		
S1	3.67	3.22	4.81
S2	3.78	3.20	4.2
S3	4.06	3.10	3.80

Table 2 The variation amino-acids content in dairy product-sana during processing

AA	SANA		
Ala	0.62	0.30	0.33
Gly	0.14	0.18	0.14
Thr	0.30	0.09	0.11
Ser	0.53	0.08	0.15
Val	0.48	0.19	0.19
Leu	1.83	0.76	0.77
Ile	0.23	0.09	0.08
Cys	0.52	0.13	0.12
Pro	2.51	1.02	1.01
Met	0.12	0.17	0.19
Asp	0.32	0.18	0.17
Phe	55.78	8.06	2.81
Tyr	25.70	31.29	10.41
Glu	2.00	0.66	0.46
Lys	1.00	0.33	0.23
Arg	1.05	0.99	0.08
His	0.35	0.19	0.11

Fig 2. Dairy product-sana amino-acids profile (S₁, S₂, S₃)



Results and Discussions

During processing of dairy product-sana, small modifications were registered at fat content value: 3.67(S1) → 3.78 (S2) →4.06 (S3) which appears during incubation because of product evaporation and concentration. (Table 1)

A decrease of lactose content was observed: 4.81(S1) →4.20 (S2) →3.80 (S3), explained by the transformation of lactose in lactic acid pursuant to the microorganisms activity from the starter culture. (Table 1)

Total protein content registered a decrease, because of proteolysis: 3.22(S1) →3.20 (S2) →3.10 (S3). (Table 1)

Amino acids profile for cultured butter milk is presented in fig. 2. From 18 amino acids studied, only 4 amino-acids present significant values, meaning Leu, Phe, Ac. glutamic, Tyr to the final product.

Also, from all the amino-acids taken in study, 3 of them registered a significant decrease from raw milk to final product, meaning: Leu from 1.83 to 0.7, Pro from 2.51 to 1.01, Ac. glu from 2.51 to 1.01.

These amino-acids are used preferential by microorganisms; also the rest of amino-acids registered decrease, but they do not make part from lactic acid bacteria nutritional necessary.

Conclusions

Nine amino acids are generally regarded as essential for humans. They are: histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine.

During fermentation, proteins are hydrolyzed in soluble oligopeptides especially those which contains Phe, Tyr, Tre and Ser that are more absorbent from human digest tract, offering for the final product a high nutritive efficiency.

The cumulative effect of essential amino-acids from milk proteins and microbial cells proteins contribute to the biological value of the product.

References

- Apostu, S. (2006). Microbiologia produselor agroalimentare, Cluj- Napoca, Ed. Risoprint;
Guş, Camelia (1998). Controlul calităţii laptelui şi al produselor lactate, Cluj- Napoca, Ed. Risoprint;
Culea, Monica, Palibroda, N., Mercea, V. and Abraham, A.D. (1986) *Rev. Roum. Biochim.*23, (4), 273-277.