

ECOLOGICAL DAIRY PRODUCTS: HEALTHY OR JUST A TREND?

**Carmen Daniela PETCU, Emilia CIOBOTARU-PÎRVU,
Oana Diana OPREA, Oana Mărgărita GHIMPEȚEANU**

University of Agronomic Sciences and Veterinary Medicine of Bucharest, Faculty of Veterinary
Medicine, 105 Independenței Spl, District 5, 050097, Bucharest, Romania

Corresponding author email: carmen28petcu@gmail.com

Abstract

With the development of the food industry, the products have undergone different phases of diversification, so today we meet products that did not exist yesterday or simply were not known, referring, for example, to "BIO", "ECOLOGICAL" or "ORGANIC" products. These can be defined as products of animal or vegetable origin, obtained without the use of chemicals or genetically modified components, which have not been exposed to irradiation, and as a result of their production, the environment has not suffered. In this study, we analyzed samples of dairy products represented by drinking milk, sour-batter milk, kefir, fermented cream, yogurt and fruit yogurt. A comparison was made between conventional products and ecological products of the same type, in terms of ingredients, and their nutritional value. To identify the different features of conventional or ecological dairy products, physico-chemical parameters such as fat content, carbohydrates, proteins, salt or other added substances were analyzed. Regarding the verification of the ecological products labeling, in all the analyzed samples it was found that the ingredients used come from the ecological agriculture, therefore respecting the labeling requirements. At the same time, these products were analyzed organoleptically, observing the appearance, colour, consistency, smell and taste. Analyzing the obtained results, it was found that the ecological products show some changes in the chemical composition and nutritional values. The salt level of the dairy products analyzed, although it is described on the label as part of the natural salt of raw milk, in the case of ecological products, the value obtained is lower, compared to that of conventional products. Ecological fruit yoghurts have a higher content of piece of fruit compared to conventional yogurts. In conclusion, some ecological products have a higher nutritional value compared to conventional dairy products, without registering statistically significant changes.

Key words: ecological agriculture, bio-eco-organic, milk, nutritional value.

INTRODUCTION

Milk and dairy products meet the body's needs in energy and in substances with a plastic and biostimulatory role, positively influencing the health of consumers (Worsley et al., 2003; Usturoi M.G., 2007; Sala C.C., 2008; Claeys W.L. et al., 2013; Claeys W.L. et al., 2014; Ladokun O. et al., 2014; Visoescu I.D. et al., 2015; Nistor C.E. et al., 2019; Oprea O.D. et al., 2019).

Currently, nutrition puts its mark on the pathology of contemporary humans, as a result of the imbalance between the intake and the need for biologically active substances.

Nutrition is a factor with permanent action, which determines the development of metabolic processes, because food represents their source and their moderator (Tăpăloagă D. et al., 2017). Also, maintaining the body's

homeostasis depends on the nature of the diet, which influences the functions of the system, especially the enzymatic and hormonal factors. Until recently, the provision of sufficient quantities of food was the primary requirement, but today, special attention is paid to ensuring the integrity of foods and their nutritional value (Savu C. et al., 2002).

It has reached a stage where the concept of "food safety" is increasingly difficult to control and audit (Petcu C.D., 2006; Petcu C.D. et al., 2014), due to the increasing pollution of the atmosphere and due to the development of the industry that generates toxic gas emissions, which is affecting products in general, and food in particular.

The number of harmful elements in the environment has increased greatly and so did the number of preservatives or substitutes of taste or aroma used in the food industry.

Ecological agriculture is a production method that preserves soil structure and fertility, promotes a high standard of animal welfare and prohibits the use of substances such as: synthetic pesticides, herbicides, chemical fertilizers, genetically modified organisms or growth enhancers, such as antibiotics. Farmers use techniques that help maintain ecosystems and reduce pollution. Only a limited number of additives and technological aids can be used in the ecological processing of food products (European Regulation no. 848/2018; Gonciarov M. et al., 2014; Gonciarov M. et al., 2015; Gonciarov M., 2017; Tapaloaga D. et al., 2018).

Presently, in Romania, the trend of ecological products is expanding. In well developed countries, this is a concept already rooted in the lifestyle of the population. Despite the fact that the natural ingredients based products, without preservatives and dyes, are more expensive, the interest and the degree of information of Romanians has increased recently. Thus, in supermarkets or specialized stores, we can find a diverse range of ecological products.

ECOLOGICAL, ORGANIC, BIO are terms that have the same meaning (Figure 1), each being specific to another geographical area.

The term "**organic**" is used for food products in the Anglo-Saxon space (organic food, organic milk).

The term "**bio**" is used especially in the Franco-German space (agriculture biologique). The term "**eco**" or "**ecological**" is used in Romania, being the term accepted by the Ministry of Agriculture and Rural Development (www.madr.ro).



Figure 1. The relationship between the terms bio, ecological, organic and natural

The term "**natural**" or "**natural 100%**" applied on the label of some products is only a marketing strategy, which does not necessarily offer the guarantee of a quality product and certainly does not indicate an ecological

product. The legislation does not refer to the labeling and classification of products using the term "natural" (www.agrointel.ro).

Labeling of ecological products

In recent years, major advances have been made in terms of healthy food. The world has begun to get rid of unhealthy habits and place greater emphasis on the food quality and safety. This can be observed from the increased number of consumers interested to read the label and to check the packaging, this being the consequence of the ascertainment that most of the additives and chemicals used in the treatment of products can trigger pathological conditions (Petcu C., 2015).

The provisions regarding the labeling of products obtained from ecological agriculture, (Figure 2), established in Regulation (EC) no. 848/2018 regarding ecological production and labeling of ecological products are very precise and are intended to offer consumers complete confidence in ecological products, as products obtained and certified according to strict rules of production, processing, inspection and certification (Regulation (EC) No. 848/2018).

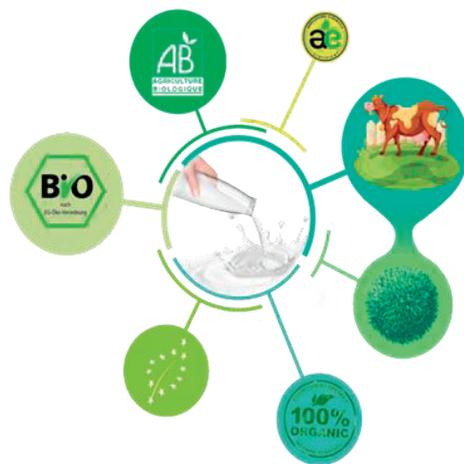


Figure 2. Logo used on the labels of ecological products

The Romanian ecological food products can be easily identified by the buyers because they have the "ae" logo on the label or packaging (Figure 3), which means product obtained in Romania from the ecological agriculture (www.madr.ro).



Figure 3. The logo of ecological agriculture (www.madr.ro)

The use of "ae" on the label is mandatory in the case of local products. However, to facilitate the identification of ecological products on the store shelves, the logo "ae" can also be applied to imported products, if they are also certified in Romania by an inspection and certification body accredited to us (www.tradiiisibiu.ro - Guide "Ecological products", 2012).

The logo "ae" (Ecological Agriculture), owned by M.A.D.R. (Ministry of Agriculture and Rural Development), guarantees that the product so labeled comes from ecological agriculture and is certified by an approved inspection and certification body. The rules for the use of the "ae" logo are included in Annex No. 1 at the Common Order for the modification and completion, at the Annex to the Order of the Minister of Agriculture, Forests and Rural Development no. 317/2006 and at the President of the National Consumer Protection Authority no. 190/2006 for the approval of the specific rules regarding the labeling of ecological food products (www.madr.ro).

The right to use the logo "ae" (Ecological Agriculture) on the products, labels and packaging of the ecological products belongs to the producers, processors and importers registered with the M.A.D.R. (www.madr.ro). The Community logo offers the recognition of ecological certified products throughout the European Union (Figure 4).



Figure 4. EU ecological logo for the certification of ecological products (www.madr.ro)

Consumers who buy products bearing the national logo as well as the Community logo can be confident that:

- at least 95% of the ingredients of the product were obtained according to the ecological production method;
- the product complies with the ecological production rules;
- the product bears the name of the manufacturer, processor or seller, as well as the name or code of the inspection and certification body;
- the label "ecological" is granted only to the producers inspected and certified by the inspection body;
- the inspection and certification bodies authorized by the Ministry of Agriculture may grant producers the right to use the ecological logo, if the results of the inspection carried out are in accordance (Gonciarov M., 2017).

MATERIALS AND METHODS

In order to identify the differences between ecological and conventional dairy products, physico-chemical parameters were analyzed such as: fat content (butirometric method or by using the Funke Gerber®LactoStar dairy analyzer), carbohydrates, proteins, salt (by using the Funke Gerber®LactoStar dairy analyzer) and other added substances. At the same time, these products were analyzed organoleptically, following the appearance, colour, consistency, smell and taste.

A number of 20 types of conventional and ecological dairy products were analyzed, represented by 1.5% fat drinking milk, 3.5% fat drinking milk, 3.7% fat drinking milk, 2% fat sour-batter milk, 3.5% fat kefir, 3.5% fat yogurt, 25% fat fermented cream, banana yogurt, strawberry yogurt and peach yogurt.

RESULTS AND DISCUSSIONS

The results obtained from the comparative analysis of conventional and ecological products were examined, finding that the ecological products show some changes in chemical composition and nutritional values. Although the salt level of the product is described on the label as being part of the natural salt of milk, in the case of the

ecological 1.5% fat drinking milk, this level is lower compared to conventional products (Table 1).

Table 1. Differences and similarities between conventional 1.5% fat drinking milk and ecological 1.5% fat drinking milk

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 1.5% fat drinking milk		Ecological 1.5% fat drinking milk	
Ingredients: semi-degreased, standardized, homogenized and pasteurized cow's milk.		Ingredients: semi-degreased, homogenized and pasteurized at high temperature cow's milk, from ecological production. Contains milk lactose.	
<u>Nutritional information/100 ml product</u>		<u>Nutritional information/100 ml product</u>	
Energetic value	185kJ/44 kcal	Energetic value	185kJ/44 kcal
Fats	1.5 g	Fats	1.5 g
of which saturated fatty acids	1 g	of which saturated fatty acids	0.9 g
Carbohydrates	4.5 g	Carbohydrates	4.5 g
of which sugars	4.5 g	of which sugars	4.5 g
Protein	3.1 g	Protein	3.1 g
Salt	0.1 g*	Protein	3.1 g
Calcium	118 mg (14.75%)	Salt	0.06 g*
		Calcium	125 mg (15.6%)**
*the natural salt of milk		*the natural salt of milk **from the daily reference nutritional value	
Storage temperature: +2...+4°C		Storage temperature: +2...+4°C	
			

Products with a high fat content are perceived by consumers as "creamy". Thus, ecological products with a higher fat content have an increased sensory score in terms of pleasing taste (Worsley A., 2003; McCarthy K.S. et al., 2017). Ecological 3.7% fat drinking milk is also recommended in children's nutrition, benefiting from a high intake of vitamins and minerals (Table 2).

Table 2. Differences and similarities between conventional 3.5% fat drinking milk and ecological 3.7% fat drinking milk

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 3.5% fat drinking milk		Ecological 3.7% fat drinking milk	
Ingredients: semi-degreased, homogenized and pasteurized at high temperature cow's milk. Contains milk lactose.		Ingredients: 99.83% organic whole milk, minerals (iron, zinc, iodine), vitamins (A, D ₃ , C, E, B ₁ , B ₆ , K ₁ , niacin, folic acid, biotin, pantothenic acid), natural flavors.	
<u>Nutritional information/100 ml product</u>		<u>Nutritional information/100 ml product</u>	
Energetic value	260kJ/62 kcal	Energetic value	273kJ/65 kcal
Fats	3.5 g	Fats	3.7 g
of which saturated fatty acids	2.1 g	of which saturated fatty acids	2.0 g
Carbohydrates	4.5 g	Carbohydrates	4.7 g
of which sugars	4.5 g	of which sugars	4.7 g
Protein	3.2 g	Protein	3.3 g
Salt	0.1 g*	Salt	0.1 g*
Calcium	125 mg (5.6%)**		
*the natural salt of milk **from the daily reference nutritional value		<u>Vitamins și minerale</u>	
		Calcium	120 mg
		*Phosphorus	90 mg
		Iron	1.4 mg
		Zinc	1.5 mg
		Iodine	8.5 µg
		*Magnesium	12 mg
		*Potassium	140 mg
		*Sodium chloride	85 mg
		Vitamin A	80 µg
		Vitamin D ₃	1.7 µg
		Vitamin C	5 mg
		Vitamin E	1 mg
		Vitamin B ₁	0.15 mg
		*Vitamin B ₂	0.14 mg
		Vitamin B ₆	0.2 mg
		*Vitamin B ₁₂	0.4 µg
		Vitamin K ₁	4.7 µg
		Niacin	1.8 mg
		Folic acid	20 µg
		Biotin	15 µg
		Pantothenic acid	0.6 mg
		*Vitamin and mineral content is due exclusively to their naturally occurring presence in cow's milk	
		Storage temperature: +2...+6°C	



Following the salt level in the ecological 2% fat sour-batter milk, compared to a conventional dairy product, a lower salt level is observed, although in both cases the salt content is described on the label, as being part of the natural salt of milk.

In contrast to the conventional product, the calcium content is also written on the label of the ecological product (Table 3).

Table 3. Differences and similarities between conventional and ecological 2% fat sour-batter milk

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 2% fat sour-batter milk		Ecological 2% fat sour-batter	
Ingredients: pasteurized cow's milk, milk proteins, selected lactic acid cultures.		Ingredients: high temperature pasteurized cow's milk from ecological production, selected lactic acid cultures.	
Nutritional information/100 g product		Nutritional information/100 g product	
Energetic value	190kJ/45 kcal	Energetic value	195kJ/46kcal
Fats	2 g	Fats	2 g
of which saturated fatty acids	1.2 g	of which saturated fatty acids	1.2 g
Carbohydrates	3.6 g	Carbohydrates	3.8 g
of which sugars	3.6 g	of which sugars	3.8 g
Protein	3.2 g	Protein	3.3 g
Salt	0.1 g	Salt	0.06 g
		Fiber	0 g
		Calcium	125 mg (15.6%)*
		*from the daily reference nutritional value	
Storage temperature: +2...+6°C		Storage temperature: +2...+6°C	
			

Following the evaluation of some assortments of kefir, it was concluded that there is no difference in their nutritional values. The only difference identified is given by the origin of the raw material, in the case of the ecological kefir, the milk comes from the ecological agriculture (Table 4).

Table 4. Differences and similarities between conventional and ecological kefir

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 3.5% fat kefir		Ecological 3.5% fat kefir	
Ingredients: high temperature pasteurized cow's milk, selected lactic acid cultures. Contains milk lactose.		Ingredients: high temperature pasteurized cow's milk from ecological production, selected lactic acid cultures. Contains milk lactose.	
Nutritional information/100 g product		Nutritional information/100 g product	
Energetic value	247kJ/59k cal	Energetic value	245kJ/59kcal
Fats	3.5 g	Fats	3.5 g
of which saturated fatty acids	2.1 g	of which saturated fatty acids	2.1 g
Carbohydrates	3.7 g	Carbohydrates	3.7 g
of which sugars	3.7 g	of which sugars	3.7 g
Protein	3.1 g	Protein	3.1 g
Salt	0.06 g*	Salt	0.06 g*
Calcium	125 mg (15.6%)**	Calcium	125 mg (15.6%)**
*the natural salt of milk		*the natural salt of milk	
**from the daily reference nutritional value		**from the daily reference nutritional value	
Storage temperature: +2...+6°C		Storage temperature: +2...+6°C	
			

By studying the differences between conventional and ecological 3.5% fat yogurt, it is found that in the case of ecological products a high level of carbohydrates and proteins is observed (Table 5).

Table 5. Differences and similarities between conventional and ecological 3.5% fat yogurt

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 3.5% fat yogurt		Ecological 3.5% fat yogurt	
Ingredients: pasteurized whole milk, yogurt starter cultures.		Ingredients: pasteurized cow's milk, selected yogurt starter cultures. Ingredients from ecological agriculture.	
Nutritional information/100 g product		Nutritional information/100 g product	
Energetic value	249 kJ/60 kcal	Energetic value	291 kJ/70 kcal
Fats	3.5 g	Fats	3.5 g
of which saturated fatty acids	2.3 g	of which saturated fatty acids	2.1 g
Carbohydrates	3.9 g	Carbohydrates	4.5 g
of which sugars	3.9 g	of which sugars	4.5 g
Protein	3.1 g	Protein	5 g
Salt	0.1 g	Salt	0.1 g
Calcium	120 mg (15%)*		
*from the daily reference nutritional value			
Storage temperature: +2...+6°C		Storage temperature: +2...+6°C	
			

Nutritionally, the carbohydrate level is lower in the case of conventional 25% fat fermented cream, and the protein level is lower in the case of the ecological 25% fat fermented cream (Table 6).

Table 6. Differences and similarities between conventional and ecological 25% fat fermented cream

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 25% fat fermented cream		Ecological 25% fat fermented cream	
Ingredients: pasteurized cream and selected lactic acid cultures.		Ingredients: high temperature pasteurized cream from cow's milk from ecological production, selected lactic acid cultures. Contains milk lactose.	
Nutritional information/100 g product		Nutritional information/100 g product	
Energetic value	1016 kJ/246 kcal	Energetic value	1020kJ/247 kcal
Fats	25 g	Fats	25 g
of which saturated fatty acids	15 g	of which saturated fatty acids	15 g
Carbohydrates	2.5 g	Carbohydrates	3.3 g
of which sugars	2.5 g	of which sugars	3.3 g
Protein	2.9 g	Protein	2.3 g
Salt	0.1 g	Salt	0.06 g*
		*the natural salt of milk	
Storage temperature: +2...+6°C		Storage temperature: +2...+6°C	
			

Yoghurts with added fruit were evaluated, comparing products with different fat content. The added fruit quantity was especially monitored, not performing the nutritional values comparison, as in the prior situations, because the results would not have been eloquent, with the samples being of different categories and with different declared fat content.

The amount of fruit added to the conventional product is 2%, while in the case of the ecological product, the banana content is 15%. In both situations, pectin (E440) is used as a stabilizer, and the results are presented in table 7.

Table 7. Differences and similarities between conventional and ecological banana yogurt

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 2.6% fat banana yogurt		Ecological 3.1% fat banana yogurt	
Ingredients: pasteurized whole milk, sugar, bananas 2% (with the addition of: sugar, juice and mashed banana concentrate, water, modified starch, flavour, stabilizer: pectin, acidifier: citric acid), milk proteins, selected yogurt starter cultures.		Ingredients: 85% organic yogurt - pasteurized cow's milk from ecological agriculture, selected yogurt starter cultures (<i>L. bulgaricus</i> , <i>S. thermophilus</i>); organic banana preparation 15% - organic sucrose, organic mashed banana 30%, organic Tapioca starch, concentrated organic lemon juice, natural flavours, stabilizer (pectin E440).	
<u>Nutritional information/100 g product</u>		<u>Nutritional information/100 g product</u>	
Energetic value	397 kJ/94 kcal	Energetic value	414 kJ/98 kcal
Fats	2.6 g	Fats	3.1 g
of which saturated fatty acids	1.7 g	of which saturated fatty acids	1.8 g
Carbohydrates	14.7 g	Carbohydrates	13.0 g
of which sugars	14.5 g	of which sugars	11.8 g
Protein	3 g	Protein	4.6 g
Salt	0.09 g*	Fiber	0.1 g
Calcium	103 mg (13%)**	Salt	0.1 g
*the natural salt of milk **from the daily reference nutritional value			
Storage temperature: +2...+8°C		Storage temperature: +2...+6°C	
			

Table 8. Differences and similarities between conventional and ecological strawberries yogurt

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional 1.9% fat strawberries yogurt		Ecological 3.1% fat strawberries yogurt	
Ingredients: pasteurized milk, partially skimmed milk, sugar, strawberries 2% (with the addition of: glucose-fructose syrup, dyes: carrot juice, red beet juice, beta-carotene, flavour), milk proteins, modified starch, thickening agent, pectin, selected yogurt starter cultures.		Ingredients: 85% ecological yogurt - pasteurized cow's milk from ecological agriculture, selected yogurt starter cultures (<i>L. bulgaricus</i> , <i>S. thermophilus</i>); organic strawberries preparation 15% - organic sucrose, organic mashed strawberries 30%, organic Tapioca starch, concentrated organic lemon juice, natural flavours, stabilizer (pectin E440).	
<u>Nutritional information/100 g product</u>		<u>Nutritional information/100 g product</u>	
Energetic value	342 kJ/81 kcal	Energetic value	414 kJ/98 kcal
Fats	1.9 g	Fats	3.1 g
of which saturated fatty acids	1.2 g	of which saturated fatty acids	1.8 g
Carbohydrates	13 g	Carbohydrates	12.8 g
of which sugars	12.1 g	of which sugars	11.9 g
Protein	3 g	Protein	4.6 g
Salt	0.09 g	Fiber	0.1 g
Calcium	120 mg (15%)*	Salt	0.1 g
***from the daily reference nutritional value			
Storage temperature: +2...+6°C		Storage temperature: +2...+6°C	
			

Analyzing conventional fruit yogurt, the amount of strawberries present in the product is 2%, while in the case of the ecological product, the strawberry content is 15% (Table 8).

In the case of conventional and ecological peach yogurt, there is not much difference in their fruit content, thus, the conventional product contains 23% fruit preparation and the ecological product contains 25% fruit preparation (Table 9).

Table 9. Differences and similarities between conventional Peach&Apricot yogurt and ecological Peach&Passion fruit yogurt

CONVENTIONAL PRODUCT		ECOLOGICAL PRODUCT	
Conventional creamy yogurt with pieces of peaches and apricots (23% fruits)		Ecological yogurt with pieces of peaches and passion fruit juice (25% fruits)	
Ingredients: yogurt, fruit preparation (36% peaches, sugar, 20% apricots, natural flavour), sugar.		Ingredients: yogurt, peach (12.5%), sugar, passion fruit juice (2.5%), corn starch, ingredients from ecological agriculture.	
Nutritional information/100 g product		Nutritional information/100 g product	
Energetic value	435 kJ/103 kcal	Energetic value	416 kJ/99 kcal
Fats	3.2 g	Fats	2.7 g
of which saturated fatty acids	2.2 g	of which saturated fatty acids	1.7 g
Carbohydrates	14.4 g	Carbohydrates	14 g
of which sugars	13.6 g	of which sugars	13 g
Protein	3.3 g	Protein	3.9 g
Salt	0.16 g	Salt	0.13 g
Storage temperature: +2...+6°C		Storage temperature: +4...+8°C	
			

CONCLUSIONS

For the analyzed samples, regarding the ecological products labeling verification, it was found that the ingredients used come from the ecological agriculture, having met the requirements regarding their labeling.

In the case of the comparative study between conventional and ecological products, it was observed that, although the salt is described on the packaging as being part of the natural salt of milk, in the case of ecological products its level is lower, a fact that most probably correlates with the food that animals raised in ecological systems receive.

The organoleptic examination of the 20 types of products analyzed showed that all products have normal characteristics, without

modification of an alternative nature or taste not specific to the assortment.

Analyzing fruit yogurt (banana yogurt and strawberry yogurt), it was found that ecological products have a higher percentage of fat, namely 3.1% fat, compared to conventional products, and the salt level is similar, registering insignificant variations. between product types.

Regarding the storage temperature, there were no major differences between the conventional and the ecological products, this being in the range +2 ... +8°C.

Some ecological dairy products, including drinking milk, 2% fat sour-batter milk and 3.5% fat yogurt have a higher nutritional value compared to conventional dairy products of the same type, without significant variation.

REFERENCES

- Gonciarov M., Neagu I., Tapaloaga D., (2014). Principles and standards of organic agriculture. *Journal of Biotechnology*, Vol. 185:S76 , ISSN 0168-1656.
- Gonciarov Magda, Neagu Iuliana, Ghimpeteanu Oana Margarita, Petcu Carmen Daniela, (2015). General principles and regulations on obtaining products from genetically modified organism, *Journal of Biotechnology*, vol 208, page S72.
- Gonciarov, M., (2017), *Elemente, noțiuni și norme necesare însușirii legislației sanitare veterinare*. București, RO: Editura Printech.
- McCarthy, K.S., Lopetcharat, K., Drake, M.A., (2017). Milk fat threshold determination and the effect of milk fat content on consumer preference for fluid milk. *Journal of Dairy Science*, 100(3):1702-1711.
- Nistor, C.E., Bacila, V., Avram, P., Usturoi, A., Avarvarei, B.V., (2019). Evaluation of raw milk quality gathered from north east area of Romania. *Scientific Papers. Series D. Animal Science*. Vol. LXII, No. 2, 289-295, ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750.
- Oprea, O.D., Petcu, C.D., Ciobotaru-Pirvu, E., (2019). A study concerning quality assessment and processing particularities in certain dairy products. International Conference "Agriculture for Life, Life for Agriculture", Bucharest, 6-8 of June 2019, *Scientific Works. Series C. Veterinary Medicine*. Vol. LXV (1), ISSN 2065-1295; ISSN 2343-9394 (CD-ROM); ISSN 2067-3663 (Online); ISSN-L 2065-1295, pag. 121-126.
- Petcu Carmen Daniela, (2006), *HACCP-Food safety guarantor*, Idea Design, București.
- Petcu Carmen Daniela, Cornelia Șulea, Mihaela Dumitrache, (2014), *Audit of Producers/Users of Compressed Air and other Industrial Gases used in*

- the Food Industry, Quality-Access to Success*, 15 (130).
- Petcu, C.D., (2015). *Ambalaje utilizate în industria alimentară*. Editura Granada, București.
- Savu, C., Petcu, C. D., (2002). *Igiena și controlul produselor de origine animală*. București, RO: Editura Semne.
- Tapaloaga D., Tapaloaga P.R., (2017). Study regarding animal organic farming in romania – current status and trends, *Scientific Papers. Series D. Animal Science*. Vol. LX, ISSN 2285-5750.
- Tapaloaga D., Tapaloaga P.R., (2018). From conventional to organic agriculture - romanian past and future perspectives. *Scientific Papers-Series D, Animal Science*, Volume: 61, Issue: 1, Pages: 239-244, ISSN: 2285-5750, eISSN: 2393-2260.
- Usturoi, M. G., (2007). *Tehnologia laptelui și a produselor derivate*. Iași, RO: Editura Alfa.
- Visoescu, I.D., Petcu, C.D., Tapaloaga D., (2015). Researches regarding the influence of packaging on the quality of some dairy products. *Journal of Biotechnology*, vol 208, Supplement Issue European Biotechnology Congress, Bucharest, page S19.
- Worsley, A., Bus A.E., (2003). Consumers sensory and nutritional perceptions of three types of milk. *Public Health Nutrition*, 6(2):201-208.
- ***Ordin nr. 317/2006 privind modificarea și completarea anexei la Ordinul ministrului agriculturii, alimentației și pădurilor și al președintelui Autorității Naționale pentru Protecția Consumatorilor nr. 417/110/2002 pentru aprobarea Regulilor specifice privind etichetarea produselor agroalimentare ecologice.
- ***Ordinul nr. 190/2006 privind modificarea și completarea anexei la Ordinul ministrului agriculturii, alimentației și pădurilor și al președintelui Autorității Naționale pentru Protecția Consumatorilor nr. 417/110/2002 pentru aprobarea Regulilor specifice privind etichetarea produselor agroalimentare ecologice.
- ***Regulamentul (UE) 848/2018 al Parlamentului European și al Consiliului din 30 mai 2018 privind producția ecologică și etichetarea produselor ecologice și de abrogare a Regulamentului (CE) nr. 834/2007 al Consiliului
- ***www.agrointel.ro
- ***www.madr.ro
- ***www.tradițiiisibiu.ro (Ghid “Produse ecologice”, 2012

EXPERIMENTAL MEDICINE

