

CZU 631.15 : 636.2 (478)

## MILK VALUE CHAIN ANALYSIS: THE CASE OF THE REPUBLIC OF MOLDOVA

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**Rezumat.** Competitivitatea unui produs poate fi evaluată utilizând analiza lanțului valoric care reprezintă totalitatea activităților necesare pentru a aduce un produs de la faza sa conceptuală la faza finală de folosire. Lanțul valoric include designul, producția, marketingul, distribuția și suportul de a duce produsul spre consumatorul final. Producția de lapte reprezintă un sector important al economiei naționale, fiind produs în mare parte în gospodăriile populației (95% din volumul total de lapte) și aproximativ cinci procente din volumul total de lapte este produs în întreprinderile agricole. Articolul are obiectivul de a prezenta o analiză a lanțului valoric al laptelui, principalele probleme cu care se confruntă producătorii de lapte la nivelul lanțului valoric, de a propune soluții în vederea sporirii competitivității laptelui. Pentru studiu s-au utilizat date statistice colectate de la Biroul Național de Statistică al Republicii Moldova și baze de date internaționale. Rezultatele investigațiilor oferă posibilitatea de a înțelege rolul fiecărui element al lanțului valoric al laptelui în sporirea competitivității acestuia.

**Cuvinte cheie:** Producție de lapte; Lanț valoric; Competitivitate, Întreprinderi agricole.

**Abstract.** The competitiveness of a product can be evaluated using the value chain analysis which represents the needed steps of the development cycle or process through which a product proceeds from its initial concept to production and final sale. The value chain includes the design, production, marketing, distribution and support to bring the product to its final consumer. Milk production sector is of great importance to the national economy. However, the milk is produced mostly in private households (95% from total volume of milk) and approximately five percent is produced in agricultural enterprises. The paper has the purpose to present the value chain analysis of milk, the major problems the milk producers face at the value chain level and to propose solutions in order to increase the competitiveness of milk production. For this study, data provided by the National Bureau of Statistics of the Republic of Moldova and international commercial databases, were used. The results of the research give the possibility to understand the role of each element of the milk value chain in increasing the competitiveness of this product.

**Key words:** Milk production; Value chain; Competitiveness; Agricultural enterprises.

### INTRODUCTION

Milk represents an important animal origin product, because it contains all substances needed for the normal growth and development of the organism. For example, the newborns calves live and develop normally consuming only milk long after they are born. One liter of cow milk contains 640-680 calories, which represents a high caloric value of this product compared to other food products, which being calculated in calories, is equal to 0.600 kg of beef; 0.750 kg of veal; 0.400 kg of pork; 8-9 eggs; 0.500 kg of fish (Golban, R. 2015). Analyzing the scientific literature, it was revealed that milk is also called the „white blood” or the „spring of health”, due to its important substances need for the biological development of the organism.

Milk production in the Republic of Moldova has a crucial importance for the economic growth of the country. In order to understand the creation of the added value in the process of milk production, it is very important to use both qualitative and quantitative approaches in analyzing the value chain.

The value chain analysis was introduced by Michael Porter as an instrument of identifying the sources of competitive advantage in order to analyze the competitiveness of a product. The value chain method represents a graphic presentation of its constituent elements: from raw materials to final products (Porter, M. 1998; Golban, A. 2013; Belostecinic, G. 1999).

The basic objective of this scientific research is to analyze the elements of the milk value chain, the problems the milk producers face at different levels of the value chain and to propose solutions in order to improve the relations between the actors of the milk value chain.

### MATERIALS AND METHODS

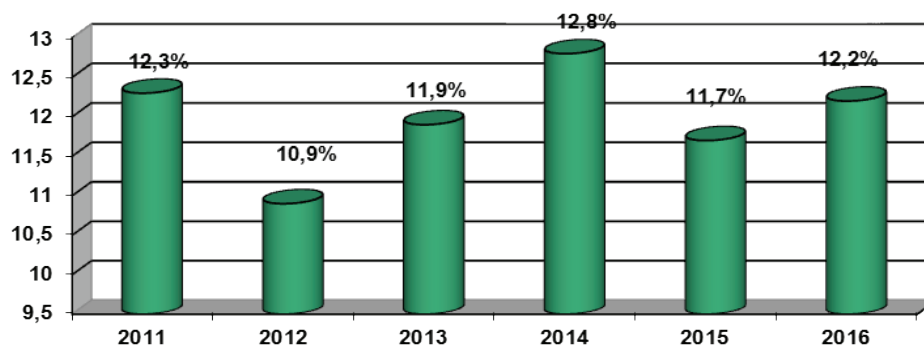
The scientific research is based on the data provided by the National Bureau of Statistics of the Republic of Moldova and international commercial databases. In order to perform this investigation, the following research methods were used: comparative analysis, logical analysis, analysis and synthesis,

induction, deduction, graphic method. The research is based on scientific and theoretical information on competitiveness taken from the economic literature.

## RESULTS AND DISCUSSIONS

The agricultural sector plays a strategic role in the process of economic development of the Republic of Moldova. The share of agriculture, forestry and fishery in GDP during 2011-2016 reveals that this sector contributes to GDP by 10-12 % (figure 1).

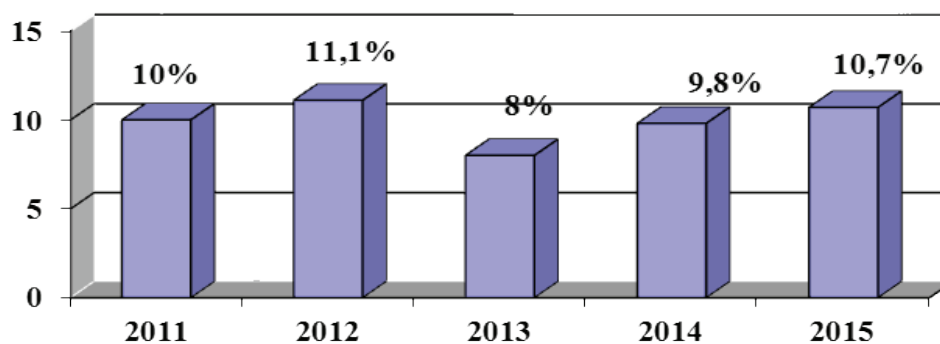
In 2016 the share of agriculture, forestry and fishery in GDP constituted 12,2 %, which represents an increase compared to 2015 by 0.5% (BNS, 2016).



**Figure 1.** The share of agriculture, fishery and forestry in GDP during 2011-2016

According to the data provided by the National Bureau of Statistics of Moldova, the structure of the agricultural production in all categories of producers consisted of the vegetal production – 58% and animal production – 42% (BNS, 2016).

The share of milk production in total agricultural production during the last three years recorded an increase from 8% in 2013 to 10.7% in 2015 (figure 2).



**Figure 2.** Evolution of the milk production share in total agricultural production during 2011-2016

Private milk-producing households recorded the highest amount of milk production – 95%, while the agricultural enterprises produce only 5% (figure 3).

In territorial aspect, the highest amount of milk production is recorded in the North Region, which in 2015 constituted 9874 tonnes of milk, being followed by the Autonomous Territorial Unit Gagauzia, where the milk production reached 5484 tonnes and Central Region occupied the third place with a total milk production of 5009 tonnes in 2015 (figure 4).

As we can see in figure 4, total milk production during 2013-2015 increased by 1276 tonnes: from 16012 tonnes in 2013 to 22874 tonnes in 2015 (BNS, 2015).

Analyzing figure 5, we can mention that cattle (cows) dynamics in all categories of producers during 2010-2016 decreased continuously from 161 thousand capita in 2010 down to 128 thousand capita in 2016 (BNS, 2016).

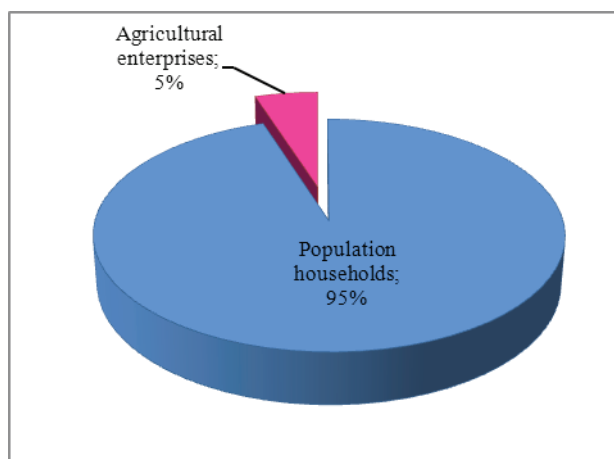


Figure 3. The structure of milk production by categories of agricultural producers, 2016

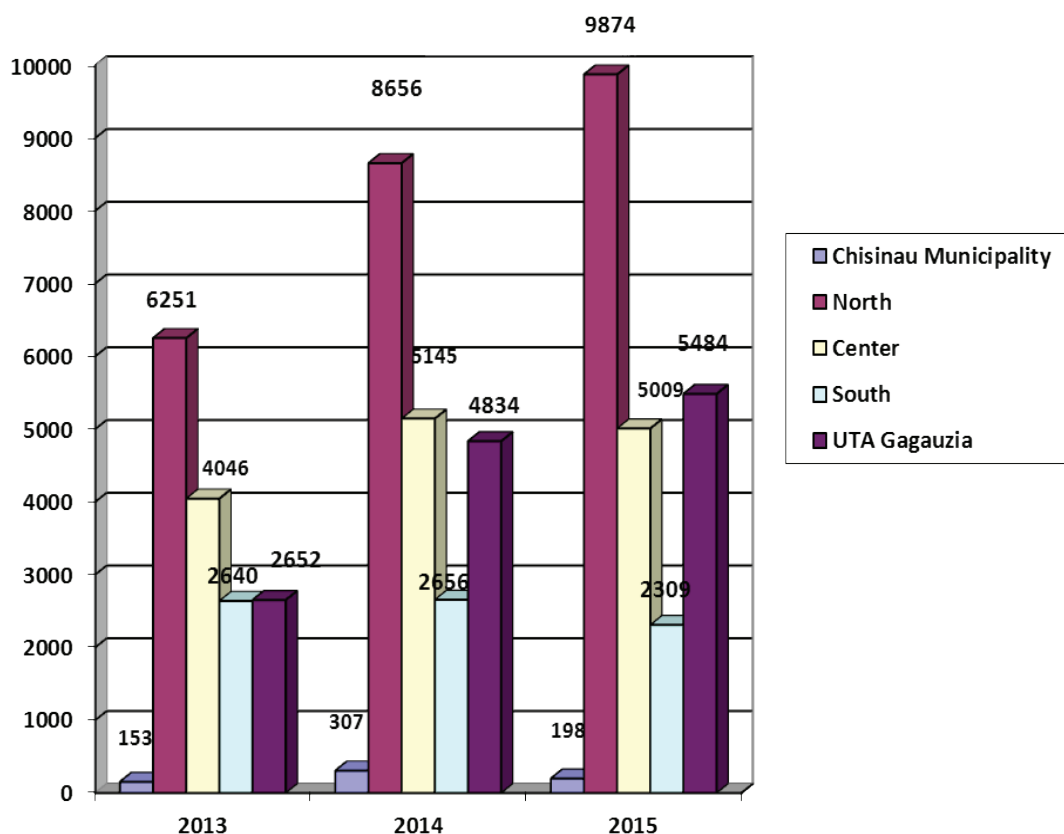
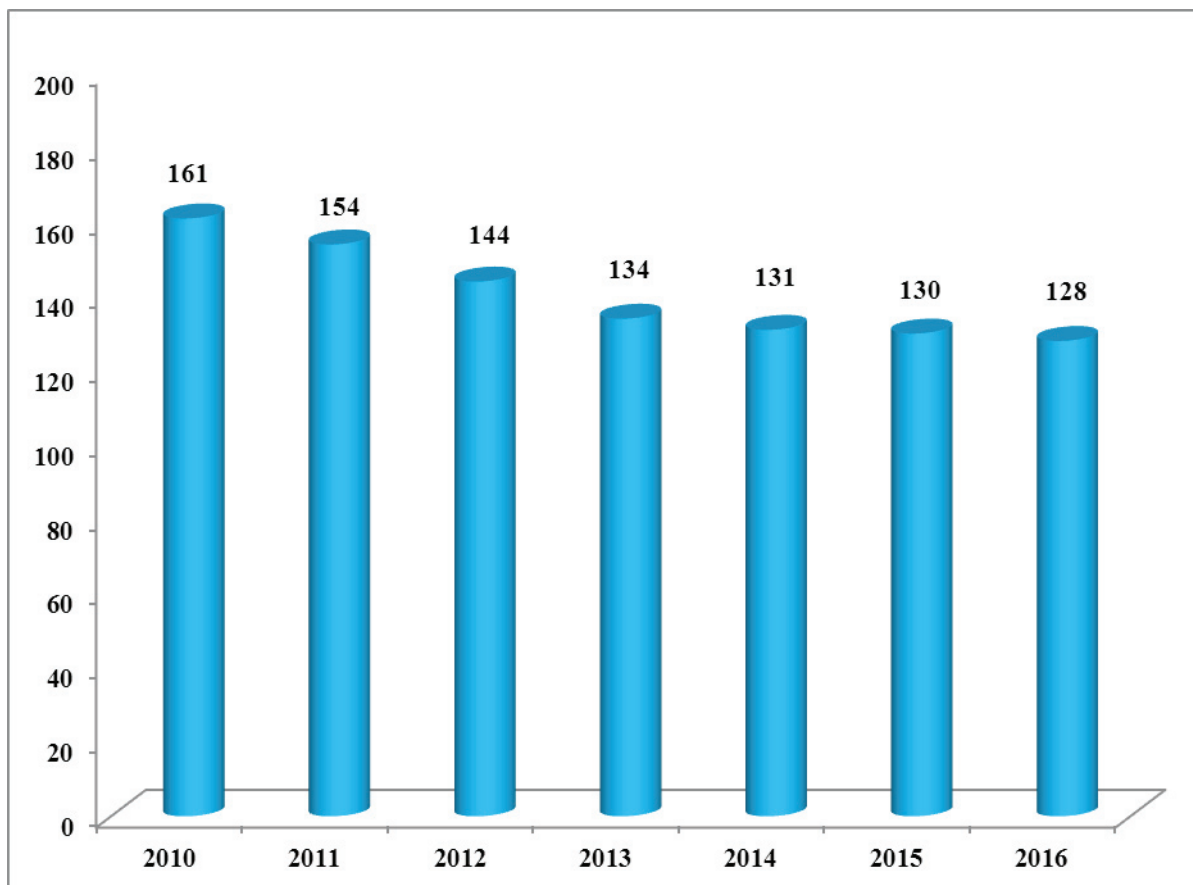


Figure 4. The evolution of milk production produced by agricultural enterprises and farms in territorial aspect during 2013-2015, tonnes

Analyzing the annual average milk yield calculated per one cow, we can say that in 2015 this indicator recorded negative values compared to 2014 (table 1). The highest value of the annual average milk yield calculated per one cow was rerecorded in ATU Gagauzia – 5305 kg, being followed by the Central Region – 3174 kg (the highest productivity per cow was registered in Calarasi – 5380 kg of milk, Ialoveni – 4009 kg of milk, Telenesti – 3682 kg of milk) and the North Region occupied the third place - 3109 kg (Ocnita – 6495 kg of milk per cow, Singerei – 5454 kg of milk per cow, Falesti – 6668 kg of milk per cow).



**Figure 5.** Dynamics of cattle (cows) in all categories of producers during 2010-2016, thousand capita

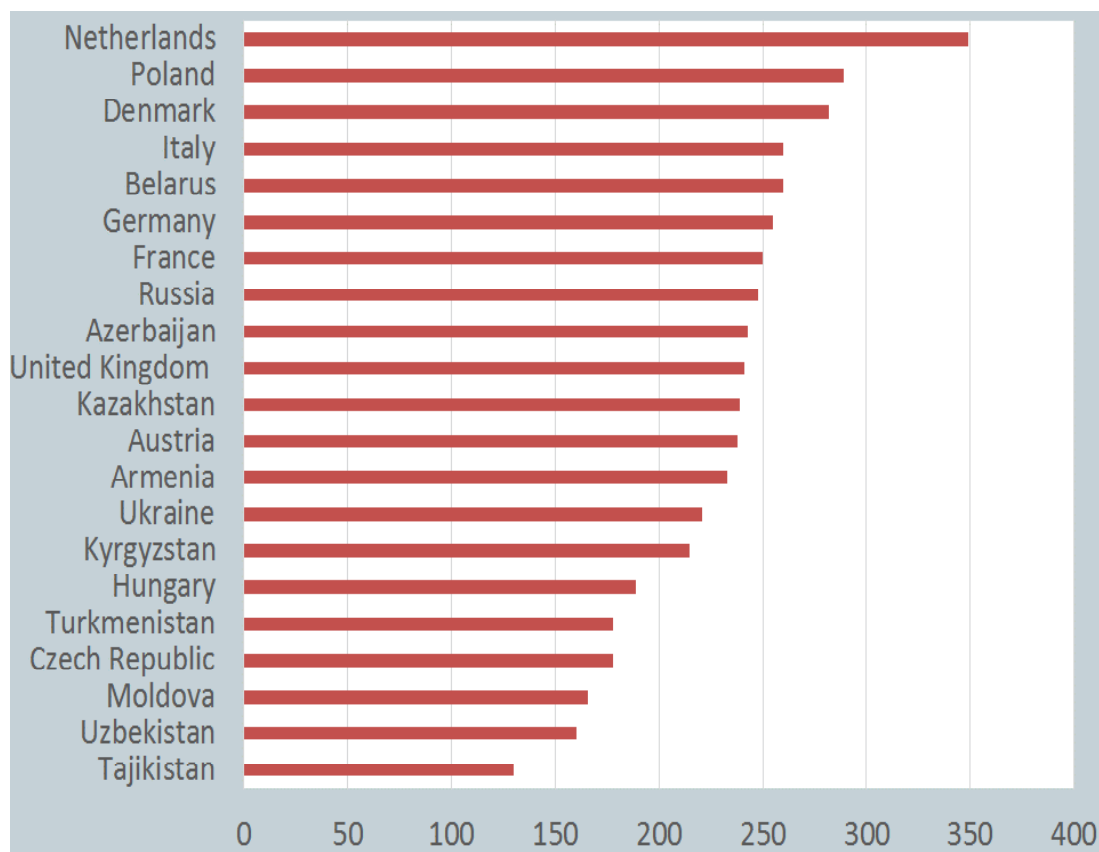
**Table 1.** Annual average milk yield calculated per one cow in territorial aspect, in the period 2013-2015, kg

Region	Years	2013	2014	2015	Deviation of 2015 compared to:	
					2013	2014
Chisinau Municipality		3104	2607	1325	-1779	-1282
North		3104	3387	3109	+5	-278
Center		3852	3451	3174	-678	-277
South		3412	3572	3367	-45	-205
ATU Gagauzia		4265	5571	5305	+1040	-266

The data presented in figure 6 indicate that the level of milk and dairy products consumption in the Republic of Moldova is low, being equal to 170 kg per capita per year. The countries that consume the most milk and dairy products are the following: Netherlands – 350 kg per capita per year being followed by Poland – 280 kg per capita per year, Denmark – 260 kg per capita per year (BNS, 2013).

Due to the fact that the level of milk and dairy products consumption in Republic of Moldova is low, this creates a market potential that could be exploited by competitive domestic or foreign companies.

According to a study performed by Magenta Consulting regarding the consumption of milk and dairy products (641 persons participated in the study), approximately  $\frac{3}{4}$  of Moldovans consume milk. The persons who excluded milk consumption from their diets are the Moldovans who have a monthly income less than 1000 MDL or those who live in cities (Magenta Consulting, 2015).



**Figure 6.** Consumption of milk and dairy products in milk equivalent in some European and Central Asian countries, kg per capita per year; the most recent observation available for the period 2009-2013

According to the performed questionnaire, the most-consumed dairy products by Moldovans are milk, cottage cheese, sour cream and kefir. Approximately one third of the votes of those who consume milk and dairy products were given to cheese, butter and yogurt.

Thus, all the dairy products mentioned above pass the path from the producer to the consumer through the value chain, the needed steps of the development cycle or process through which a product proceeds from its initial concept to production and final sale or from the producer to the final consumer.

The basic purpose of the value chain analysis is to understand the relations between the actors of the value chain, their economic and social advantages (Porter, M. 2008).

Milk and dairy products are hugely important in the economy of the Republic of Moldova economy. The competitiveness of milk and milk products can be evaluated using the value chain model.

The main competitors of milk and dairy products on Moldova's local market in 2016 were the following:

- Ukraine, the exports of which constituted 50.4% (2.7 mln USD) out of total imports of milk,
- Georgia, the exports of which constituted 26.3% out of total imports of milk (1.4 mln USD),
- Libya, the exports of which constituted 8% out of total imports of milk (0.4 mln USD) (BNS, 2016).

In May, 2016, Moldova's Government introduced restrictions to a large number of products originated from Ukraine, among which dairy products. Local legislation established a limit that was taxed at 10-20% for the surplus of imported dairy products from Ukraine. The decision was made on the initiative of local producers in order to protect the local market, being valid till the end of 2016.

The value chain of milk produced in the Republic of Moldova can be divided into two types:

- Processed ("chilled") milk value chain;

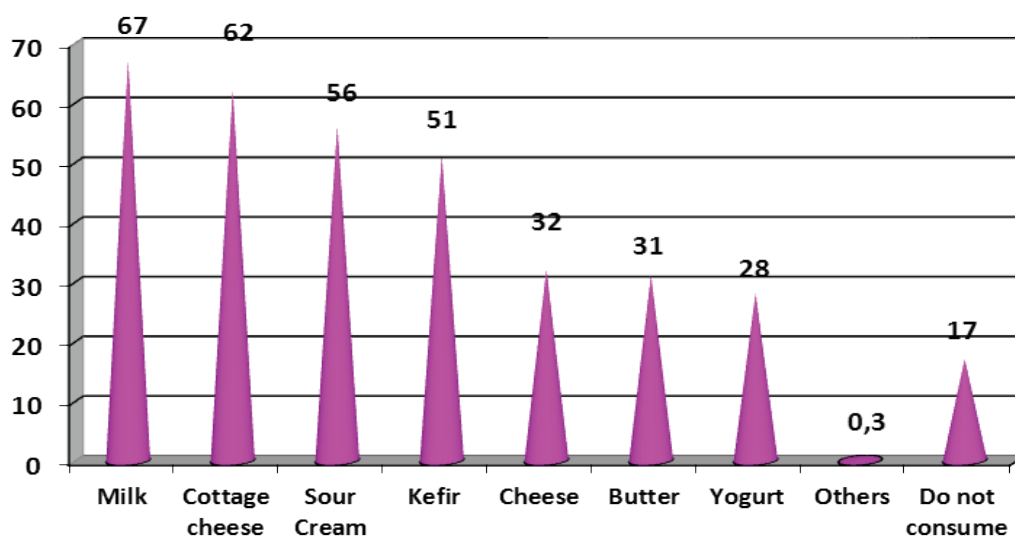
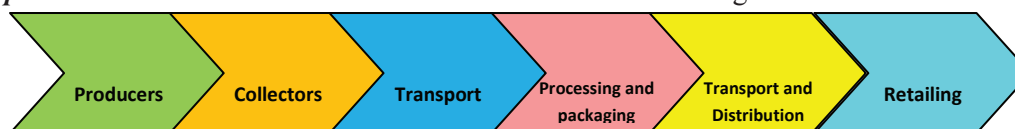


Figure 7. The TOP most popular dairy products preferred by Moldovans

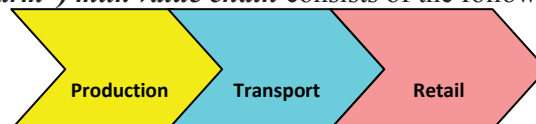
- Un-pasteurized (“warm”) milk value chain.

The **processed “chilled” milk value chain** consists of the following elements:



- The processed “chilled” milk value chain is characterized by the following peculiarities:
- Milk passes through the pasteurization process
- The level of milk fat is regulated
- Innovation systems are used at milk processing phases
- The offered products have a brand name
- The selling prices are higher because of the additional costs of processing

The **un-pasteurized (“warm”) milk value chain** consists of the following elements:



The un-pasteurized (“warm”) milk value chain is characterized by the following particularities:

- Milk is sold directly to consumers
- Milk is not pasteurized
- Milk is not certified, standardized
- Innovative systems are not used at milk processing
- Prices are lower
- Risk to public health because of raw drinking milk.

Based on the above analyzed milk value chains we can conclude that the un-pasteurized (“warm”) milk value chain is risky for the human health and should be controlled and regulated at the state level. At the same time, adequate conditions should be created in order to ensure that the biggest milk processing enterprises produce high quality milk. The activity of milk collectors is not well organized (Ignat, A. 2013). The collectors should be equipped with cooling technologies. They should be well trained in order to improve the quality of performed services.

Another big problem is that only a few milk processing companies have ISO certification, which represents a barrier in the export of milk to foreign markets (Golban A., Golban R. 2017).

In the context of the above mentioned problems, there should be taken measures in order to improve

the milk value chain especially by increasing the quality of milk and dairy products and also by improving the legislative framework such that local milk and dairy food producers enjoy direct access to foreign markets.

## CONCLUSIONS

The performed investigations on milk value chain gave us the possibility to formulate the following conclusions:

Milk production in the Republic of Moldova is extremely important to the economic growth of the country. The share of milk production of the total agricultural production during 2013-2015, recorded an increase from 8% to 10.7%;

Private milk-producing households recorded the highest amount of milk production – 95%, while the agricultural enterprises produce only 5%.

The level of milk and dairy products consumption in the Republic of Moldova is low, being equal to 170 kg per capita per year, while in Netherlands – 350 kg per capita per year, being followed by Poland – 280 kg per capita per year and Denmark – 260 kg per capita per year;

Based on the performed analysis, the most popular dairy products preferred by Moldovans are milk, cottage cheese, sour cream and kefir.

The un-pasteurized (“warm”) milk value chain is risky for the human health because the pasteurization process is not controlled and not regulated at the state level;

The activity of milk collectors is not well organized; therefore it is necessary to take measures in order to ensure them with cooling technologies and to organize different trainings for improving the quality of performed services.

Only a few milk processing companies have ISO certification, which represents a barrier in the export of milk and dairy products.

In order to increase the competitiveness of milk and dairy products, it is necessary to improve the legislative framework in order to increase the access of local milk and dairy producers on foreign markets.

## REFERENCES

1. BNS. Anuarele statistice ale Republicii Moldova pe anii 2011-2016.
2. BELOSTECINIC, G. (1999). Concurență, marketing, competitivitate. Chișinău. 140 p. ISBN 9975-75-053-2.
3. GOLBAN, A. (2013). Evaluarea metodelor de determinare a competitivității unităților agricole. In: *Lucrări științifice, UASM*. Vol. 37, pp. 244-247. ISBN 978-9975-64-252-1.
4. GOLBAN, A., GOLBAN R. (2017). Evolution of milk production in Republic of Moldova and the role of quality management in increasing the competitiveness of milk processing companies. In: *Scientific papers, UASVM Bucharest. Series Management, Economic Engineering in Agriculture and Rural Development*. 2017, vol. 17(2), pp. 129-135. ISSN 2284-7995.
5. GOLBAN, R. (2015). The study of the coliform bacteria isolation from milk. In: *Agricultura Moldovei*, nr. 3-4, pp. 32-35. ISSN 0582-5229.
6. GOLBAN, R. (2015). *Food microbiology. Course of lectures*. Chisinau: UASM. 142 p.
7. IGNAT, A. (2013). *Managementul producției de lactate din perspectiva cerințelor Uniunii Europene: autoref. tz. doct. în economie. Spec. 08.00.05 - Economie și management (în activitatea de antreprenariat)*. Chisinau. 35 p.
8. MAGENTA CONSULTING. *Moldovenii sunt ¾ de lapte*. Disponibil: <http://consulting.md/rom/statistici-si-publicatii/moldovenii-sunt-de-lapte>
9. PORTER, M. (1998). *The competitive advantage of nations*. 2nd ed. 896 p. ISBN 978-0-684-84147-2.
10. PORTER, M. (2008). *Despre concurență*. Trad. din lb. en. Dan Criste. București: Meteor Press. 432 p. ISBN 978-973-728-278-1.

Data prezentării articolului: 15.09.2017

Data acceptării articolului: 17.10.2017