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COMPETITIVENESS INCREASE OF MILK PRODUCTION IN UKRAINE

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Abstract

The current state of milk production in Ukraine has been analyzed and the main directions of products competitiveness increase have been determined. It has established that the highest level of competitiveness of milk production in Ukraine belongs to enterprises with number of cows 500 to 1500 and their annual productivity of over 6000 kg of milk. The main directions of milk production competitiveness increase in Ukraineare introduction of innovative technologies of milk production, further development of international markets and implementation of international quality standards in the process of production, processing and products marketing.

Keywords: *competitiveness, production, milk, agricultural enterprises, costs, market, estimation*

JEL Classification: *E23, Q56, Q57*

1 Introduction

Favorable agricultural and climatic conditions of Ukraine provide agricultural enterprises with a significant competitive advantage in milk production. However, the competitiveness of milk production is determined not only by agricultural and climatic conditions but also by the availability of technical, technological, economic and organizational conditions for the production and sale of products. The outdated material and technical base, underdeveloped branch infrastructure, the lack of flexible system of scientific, technical, production, material and technical, commercial cooperation both within the industry and with other branches of the country, determine the low level of milk production competitiveness.

The main problems that currently exist in animal husbandry and need to be solved are the following: reducing the number of cattle and production volumes; low quality of milk to be processed; a drop in the demand for dairy products in the domestic market and a decrease in their export; low milk production efficiency; imperfect system of breeding and reproduction of a herd and ineffective mechanism of its state support; low level of scientific support of innovative production technologies introduction; inconsistent state support to industry development, etc. Solving these problems requires the development and the implementation of effective program for milk production competitiveness increase, which would include a system of measures for production, marketing, organizational, financial-investment and information support.

2 Data and Methods

Competitiveness of products is determined by their competitive advantages. The concept of competitive advantage reflects those characteristics and properties of products that form a certain advantage for the enterprise over its direct competitors. The theoretical aspects of product competitiveness and competitive advantages were described in details in the publications of foreign scholars (Porter, 1985; Prahalad, 2005; Russell & Taylor, 2006). Issues of methods for agricultural products competitiveness assessment were presented in the works of Ukrainian scientists (Kvasha & Holomsha, 2006; Yankovyi, 2006) and others.

At the same time, the problems of intensification, concentration, specialization of production, milk and dairy products market conditions on the efficiency of milk production and selection of effective areas for competitiveness increase and formation of competitive advantages of agricultural commodity producers haven't been studied sufficiently.

Purpose of the article is to assess the current state of milk production in agricultural enterprises, to identify the factors that shape the products competitiveness, to justify the approaches to choosing effective ways to increase milk production competitiveness in Ukraine.

3 Results and Discussion

Increasing milk production competitiveness is a process that needs to be managed on the basis of strategic approach. To build an effective system for managing the products competitiveness, it is necessary to identify and analyze the whole system of factors of products competitiveness, their interconnection and interaction both in the production process, and in the domestic and foreign markets.

During 2000-2014, the volume of milk production in Ukraine in all categories of farms decreased by 18.0% from 12.7 million tons to 10.4 million tons (Table 1).

Table 1 **The main indicators of milk production in Ukraine, 2000-2016**

Indicator	Year						2016 (in %) till 2000
	2000	2012	2013	2014	2015	2016	
Number of cows, thousand heads	4958.3	2554.3	2508.8	2262.7	2166.6	2108.9	42.5
Including: in agricultur-alenterprises	1851.0	575.2	565.4	529.2	505.1	484.6	26.2
in households*	3107.3	1979.1	1943.4	1733.5	1661.5	1624.3	52.3
Milkproduction, thousandstons	12657.9	11377.6	11488.2	11132.8	10615.4	10381.5	82.0
Including: in agricultural enterprises	3668.7	2535.3	2582.5	2647.5	2669.2	2705.6	73.7
in households*	8989.2	8842.3	8905.7	8485.3	7946.2	7675.9	85.4
Sold milk by agricultural enterprises, thousand tons	2683.7	2277.7	2325.1	2505.7	2538.3	2507.9	93.4
Profitabilitylevel (+), losses (-) of milk production, %**	-6.0	2.3	13.6	11.0	12.7	18.6	x

*Households include family farms of 1-2 hectares of agricultural land and, depending on the circumstances, 1-3 cows
**Indicators are calculated for agricultural enterprises
Source: According to the State Statistics Committee of Ukraine.

During this period, the volumes of milk production in agricultural enterprises decreased by 26.3%. In the households the vast majority of milk is produced 73.9% of its total volume in 2016.

The main reason for milk production decrease in Ukraine is the reduction of cow numbers. According to the State Statistics Committee of Ukraine for the period of 2000-2016, the number of cows in Ukraine decreased by 57.5%, and in agricultural enterprises – by 73.8%.

The number of enterprises engaged in milk production decreased from 3741 to 1485 in 2010–2016. However, there is also a concentration of milk production. If only 44 enterprises had more than 1000 cows in 2010, then in 2016 – more than 70 enterprises.

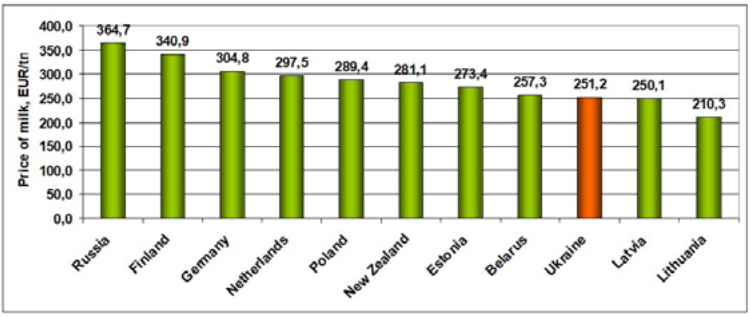
The level of milk marketability in Ukraine is quite low. If agricultural enterprises implement about 93% of the produced milk, then the economy of the population is only 23.0%.

The existing volumes of milk production over the last years in the range of 10.4 – 11.1 million tons provide the consumer demand of Ukraine's population in dairy products, on average, at 210-220 kg per person annually. During 2013-2016, the structure of dairy products has undergone significant changes caused by the declining of population purchasing power. The volume of cheese production was decreased by 32.3%, while the share of butter, cream, dry skim milk and casein was increased. The structure of export has also changed. Thus, the share of different sorts of cheese (from 10% to 6%), condensed milk, and dairy products has significantly decreased. However, sales of butter to the external markets have increased by 3.7 times, dry milk – by 2.2 times, technical casein – by 73%. At the same time, the import of dairy products has decreased because due to devaluation of hryvnia imported dairy products are becoming more expensive (Ilchuk & Konoval, 2016).

The devaluation of national currency in 2014 and the decline in demand for dairy products in the domestic market associated with a decrease in population purchasing power led to price reducing for dairy raw materials in dollars in Ukraine in the 2nd quarter of 2015 to 19 cents/kg (Average Monthly Prices of Milk in some Countries of the World, 2016). Milk production with significant number of enterprises has become unprofitable.

The stop of price falling for milk (in dollar equivalent) can be reached only by increasing the volume of its exports. The most promising markets are the markets of Asia and Africa, which are determined by high demand compared to European countries, where Ukrainian dairy products are not sufficiently competitive due to low quality of dairy raw materials, technological backwardness and low loading of the majority of milk processing enterprises. However, Ukrainian producers can compete with foreign producers in terms of the cost of milk production and its purchasing price (Figure 1).

Figure 1 **The average price of dairy raw materials in some countries of the world in 2016, Euro/t (in terms of milk fat content 4.0% and protein content 3.4%)**



Source: http://milkua.info/uk/world-milk-prices/index?page=1.

In order to increase the competitiveness of milk production in agricultural enterprises it is necessary to implement complex and systemic measures that will ensure increase of cow productivity, high efficiency of production and improvement of dairy products quality.

The development of directions for products competitiveness increase involves the development of concrete measures for competitiveness increase and determining the total expenses necessary for their implementation. When choosing effective areas for competitiveness increase, it is important to determine the impact of the implemented measures on the level of products competitiveness and on the formation of agricultural enterprise's competitive advantages.

An important factor in competitiveness increase of milk production is the concentration of livestock animals on farms and the high proportion of large enterprises in the structure of milk production (Table 2).

The concentration of production makes it possible to apply scientifically developed technologies for cattle keeping and feeding, to introduce effective, rational technical means for the complex mechanization of all production processes, to use highly productive breeds of animals.

Table 2 **Grouping of agricultural enterprises in Ukraine in terms of milk sales, 2016**

Indicator	Groups of enterprises according to the amount of sold milk, tons					Total
	till 500	500-3999	4000-7499	7500-10999	More than 11000	
Number of enterprises	636	650	93	31	27	1437.0
Number of cows, thousand heads	57.0	200.6	80.6	42.1	81.4	461.7
Number of cows per enterprise, heads	89.6	308.7	866.5	1357.8	3016.4	321.3
Milk production, thousand tons	163.7	1073.3	553.8	304.6	565.6	2661.0
Sold milk, thousand tons*	134.7	980.2	522.6	295.2	543.5	2476.2
Annual milk production per cow, kg	2874	5349	6872	7237	6945	5763.3
Production cost 1 ton ofmilk, UAH**	4222.2	4096.7	4241.9	4169.4	4164.2	4157.4
Production costs per cow, UAH	12136	21915	29267	30175	28920	23960
Total cos of 1 ton of milk, UAH	4577.6	4472.9	4634.6	4475.2	4991.0	4626.7
Sales price of 1 ton of milk, UAH***	4663.0	5291.6	5486.1	5787.7	5778.1	5464.5
Profit for 1 ton of milk, UAH	85.4	818.7	851.5	1312.5	787.1	837.8
Profit, totalmil. UAH	11.5	802.5	445.0	387.5	427.8	2111.5
Level of profitability, %	1.9	18.3	18.4	29.3	15.8	18.1

* Milk was sold in terms of fat content of 3.4%, protein – 3.0%.
** In 2016, the average rate of 1 Euro was 28.4 hryvnia.
*** The price of milk sales is tax-free.
Source: Calculated by the authors according to the statistical form № 50 – agr.

The data in Table 2 show that as the production concentration and milk sales in agricultural enterprises of Ukraine increased in 2016, the cow productivity and economic efficiency increase of milk production was taken place. During the study, it was found that the highest level of milk production competitiveness is observed in enterprises with the total number of cows 1000-1500 heads. They had the highest level of productivity and the selling price for 1 ton of milk, the amount of profit per 1 ton of milk. The sources of competitive advantage in these

enterprises are, first of all, the scale of production and the saving of feed costs by means of using by-products of plant growing and processing products.

An important factor in milk competitiveness increase in agricultural enterprises is milk production increase per cow. Despite the fact that during the period 2000-2014, the average annual milk production increased by almost 3.2 times, but it remains insufficiently high. Therefore, the main strategic direction of cattle breeding is raising the dairy herd productivity. Primarily, illnesses and barreners, insufficient feeding, drawbacks in production organization and breeding business cause low productivity of cows.

The competitive situation of the market has a significant impact on the competitiveness of milk production. The study of the dependence of demand, market capacity and volumes of dairy raw materials sales by agricultural enterprises in Ukraine was carried out using methods of economic and mathematical modeling. To construct mathematical models of demand and supply in the market for dairy raw materials the database of State Statistics Committee of Ukraine was formed on the basis of statistical reporting of agricultural enterprises, reported on form № 50 – agr. in 2013 and 2016 was used .

The mathematical function of the supply curve for dairy raw materials in 2013 was the following (formula (1)):

$$y = 2376{,}39 + 32{,}06^{x}, \quad (1)$$

where x – amount of supply, million tons;
y – producer price, UAH/t.

The coefficient of determination in this case was 0,793.
The mathematical function of the supply curve for dairy raw materials in 2016 was the following (formula (2)):

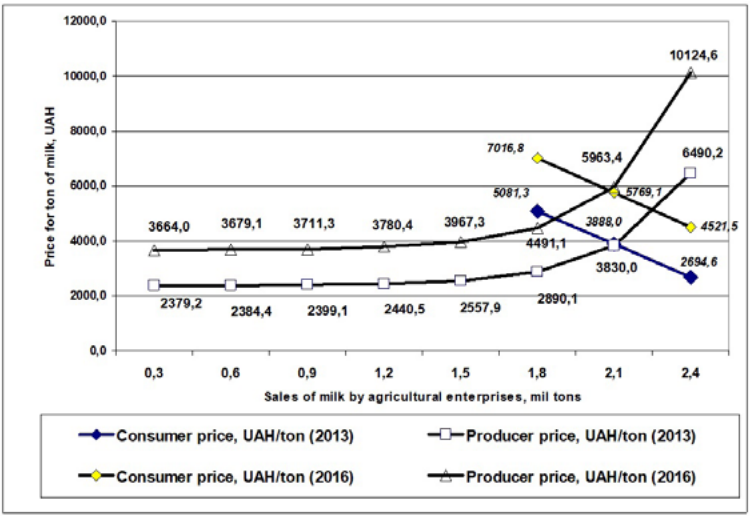
$$y = 3733{,}34 + 38{,}32^{x}, \quad (2)$$

The coefficient of determination in this case was 0,786.
The price of market equilibrium was established on the basis of making supply and demand curves (Figure 2).
To model the behavior of dairy enterprises, a linear function of general type was used:

$$Y = a - bp ,$$

where Y – volume of consumption of dairy raw materials, tons;
p – consumer price, UAN/ton.

Figure 2 **Formation of demand and supply volume of dairy raw materials of industrial production in Ukraine in 2013 and 2016**



Note: In 2013 the average rate of 1 Euro was 10.39 hryvnia, in 2016 – 28.4 hryvnia.
Source: Calculated by authors according to the statistical form № 50 – agr.

The demand line for dairy raw materials in 2013 was the following (formula (3)):

$$Y= 3,38 - 0,00034*p. \quad (3)$$

The demand line for dairy raw materials in 2016 was the following (formula (4)):

$$Y= 3,08 - 0,00025*p. \quad (4)$$

The results of the study have shown that agricultural enterprises sold 9.0% of products with loss from the total volume of dairy raw materials (taking into account the Value Added Tax refund), and 16.3% in 2016. The calculations have shown that in order to keep the purchase price of milk in 2016 at 289.4 Euros/ton (the average price level in Poland), Ukraine would have to export about 48-50 thousand tons of milk monthly to 36.2 thousand tons of milk and dairy products in recalculation on milk.

An important factor affecting the competitiveness of milk is the cost of its production. Figure 2 indicates that the production costs of 1 ton of milk in Ukrainian agricultural enterprises corresponded to average European level and amounted to about 286.0 Euros in 2013, while in more efficient enterprises milk was produced

for 230-250 Euros/t. In 2016, mainly due to the devaluation of national currency in 2014-2015, the production cost of 1 ton of milk in Ukrainian agricultural enterprises amounted to 162.2 Euros on average, while more efficient enterprises produced milk for 130-140 Euros/t. In the structure of milk production costs in agricultural enterprises of Ukraine the largest share is occupied by feeds – 50-55% and labor costs 12-20%. The share of oil products costs is 4-7%, depreciation is 3-6%, deductions for social measures – 4-7%, services payment – 3-5% of total milk production costs.

An important direction for milk production competitiveness increase is the investment activity of enterprises, which includes: construction of new and reconstruction of old typical cowsheds using highly productive breeds of cattle; introduction of energy-saving technologies of feed production, cattle keeping and feeding; application of effective milking systems and herd management; compliance with regulatory requirements and principles to control production and products quality.

The results of research have shown that at the current purchasing prices for milk in Ukraine, the payback period of investments in the construction of dairy farms is more than 12 years old, and in the reconstruction of dairy farms – more than 9 years. With purchasing prices increase in Ukraine to the level of prices in the EU, the payback period of investments in the construction and reconstruction of dairy farms would be about 6-8 years (Ilchuk, Konoval, Radko, and Yevtushenko, 2017).

4 Conclusion

Thus, the main reasons for milk production decrease in Ukraine are: the drop in demand for products in the domestic market due to the reduction of population purchasing power; the loss of part and the impossibility of rapidly reorienting to new foreign markets for milk and dairy products due to the poor quality of its raw materials; high capital intensity of the industry compared to other branches of agriculture and the long payback period of investments.

The main directions of milk production competitiveness increase in agricultural enterprises of Ukraine are: development and implementation of measures on harmonization of legislation in the field of food hygiene and approximation to the EU legislation in the field of food chain tracking "from the lawn to the table"; the transition to modern technologies of cows keeping, milking and dairy raw materials cooling timely; construction and reconstruction of large modern dairy complexes; improvement of forage production and strengthening of forage base;

promoting the development of integration processes in the country's milk and product subcomplex, etc.

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