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## **THE COMPETITIVENESS FORMATION OF ALTERNATIVE FUELS IN THE CONTEXT OF AGRICULTURAL DEVELOPMENT STRATEGY IN UKRAINE**

*It was analyzed the market situation and the perspectives of fuel production and using alternative fuels in Ukraine. It was defined the factors of competitiveness formation of bioethanol and biodiesel. It was proved the necessity and the economic feasibility of the production and using of biofuels in the context of agricultural development strategy in Ukraine.*

**Keywords:** *bioethanol, byodyzyl, prime cost, Strategy development, Sugar beets*

**Introduction.** Internal and external effects on agro-industrial complex of Ukraine competition requires from domestic manufacturers create rapidly products competitive advantage and to consolidate the competitive position in the market. Our state provision is affordable by the energy carrier's price appropriating to accelerate the alternative fuels production, including from agricultural products in the growing problem conditions. Biofuels production and use will accelerate the strategic objectives following solution for the development of Ukraine and in particular agriculture as reducing producer dependence on imported fuel and ensure the demand satisfaction for these products at a lower price. These issues addressing will increase of agricultural enterprises of Ukraine competitiveness as in domestic and foreign markets.

There are a number of issues of biofuels competitiveness formation regarding in low paying capacity conditions of the industry that in the context of Ukraine agriculture strategies development is extremely important.

G. Kaletnik, S. Kvasha, M. Kodenska, V. Mesel-Veselyak, G. Pidlisetsky, M. Royik, P. Sabluk, A. Spychak, B. Bondar, A. Fursa, M. Yarchuk et al. were made a significant contribution in issues development of agricultural enterprises competitiveness and alternative fuels production. P. Shiyan, V. Sosnitsky, S. Oliynichuk et al. did a significant contribution in alcohol industry innovative technologies issues development. To ensure the theoretical approaches enterprises competitiveness were reflected in the works of G. Azoyeva, A. Marshala, M. Porter, A. Smith, R. Fatkhutdinova, A. Yudanova et al.

**Problem Statement.** The research aim is theoretical principles and practical recommendations substantiation and development for the alternative fuels competitiveness provision from agricultural products.

**Research results.** The competitiveness theory bases were laid in the marketing and strategic management work. This is due to the fact that competition research based on market research and strategy basis determining.

In economics does not provide accurate information about who and when introduced the term "competition" into scientific use at first. The main merit in the research of competition concept belongs to distinguished economist Adam Smith, who identified competition with the "invisible hand", "market system is capable of self-regulation, which is based on the "invisible hand" - a personal interest related to desire profit obtain. It is the primary motivating force for economic development "[1, p. 332]. An important contribution to competition research was made by USA scientific school and Harvard Business School representative of Professor Porter. In work "International Competition" scientist was noted that competition - a dynamic process, that evolving, landscape ever-changing in which there are new products, new ways of marketing, new production processes and market segments [2, p. 158].

In our opinion competition as a dynamic economic process between market subjects and objects interaction, relationship and fighting based on their opposite intention to product implement as more expensive, and possibly to buy cheaper in compliance with the specific market requirements in terms of product quality and in order to meet customers diverse needs who continually changing.

There is ambiguity regarding the essence define the "competitiveness" concept which is associated with a particular object of research, enterprises and products competitiveness identification; considering competitiveness in the global, national and regional levels. We consider that under the influence of internal and external factors competitiveness is reflecting compliance with the enterprise requirements of competitive environment on both domestic and foreign markets sales possibility and related to the economy globalization.

From the marketing standpoint the relationship between the businesses and products competitiveness is obvious: the market competitiveness is determined by consumers and the consumer, buying products, while product and the manufacturer competitiveness confirming. Therefore, products competitiveness is determined combination of product quality and cost characteristics, its competitive advantages and reflects satisfying extent of the consumers specific needs compared to existing similar products in the market.

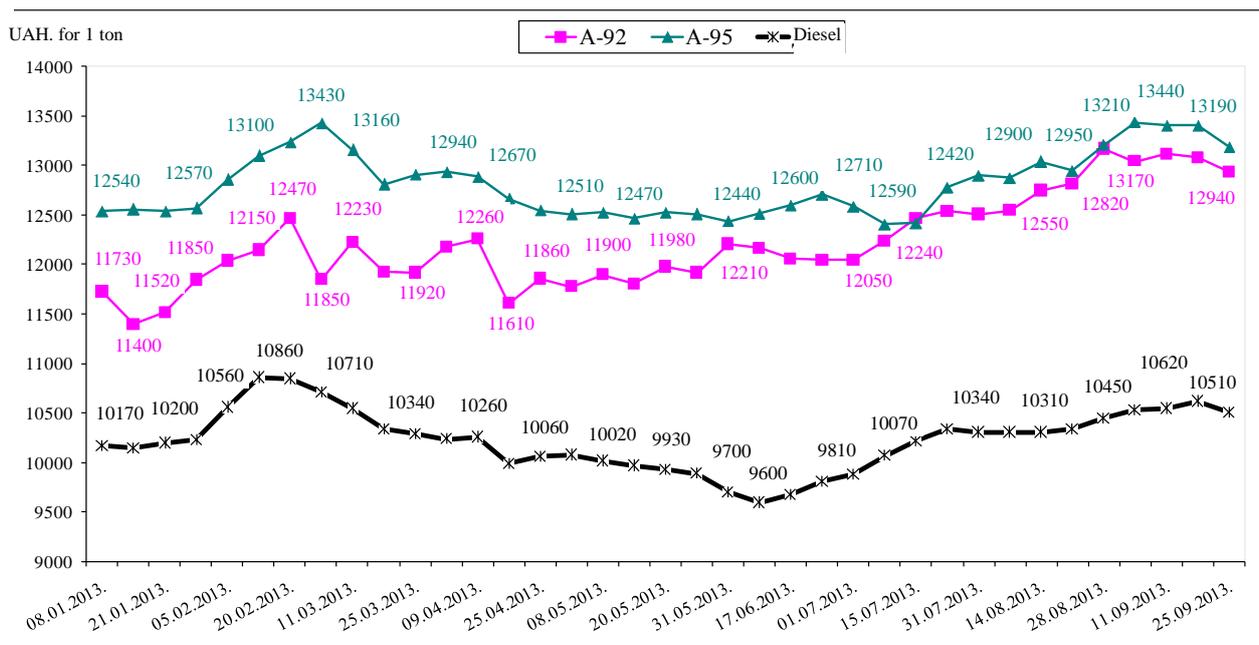
Meeting the agricultural producer needs at a lower price of fuel will promote agricultural production competitive and increase the effectiveness of the companies that produce biofuels.

According to the State Statistics Committee of Ukraine in agriculture the petrol average annual consumption is 0.2 million tons, while diesel - 1.2 million tons [3-7]. These volumes are forecasting with minor variations in 2013. There are no significant delays in farms providing of these fuel types. However, prices are increasing on petrol - 7%, diesel fuel - 15% almost every year. By the end of 2013 the price of petrol is expected of 12.6 UAH/t, diesel fuel - of 12 UAH/t, according to this tendency. In April and September we have fuel prices special annual increase in which coincides with the agriculture main field work - sowing and harvesting companies (Fig. 1).

In agricultural enterprises low solvency conditions may negatively affect on the production processes rhythm. In the world oil price is increases every year. Therefore, the output is alternative fuels - ethanol and biodiesel production and use, especially for agriculture.

Developed countries are making great efforts of traditional fuels to biofuels substitution. The European Union Directive RED 2009/28/ES as mandatory parameters sets 10% renewable energy use in transport and 20% renewable energy in gross energy consumption structure by 2020 [9].

According to the Law of Ukraine "About alternative fuel types" [10] provides that from 2013 will be advised at least 5% bioethanol to add to petrol and necessary these volumes add will expected in the 2014-2015. From 2016 necessarily ethanol content required sure to in motor petrol produced and / or sold in Ukraine, will be not less than 7%.



**Fig. 1. Fuel average wholesale prices in Ukraine in 2013**

Source: author was generated according to the data [8]

Our country must take into account European standards biofuels use in connection with the entry to the European Energy Community. There was the obligation, to bring the motor fuel biological component to 10% to 2020.

Bioethanol production is possible on alcohol and sugar plants that are converted for this production. In sugar factories manufacturing possible in several directions, including: in a sugar factory mounted ethanol workshop producing - plant is produce sugar by current technology, and from sweet roots product processing - bioethanol, or intended only bioethanol production from sugar beet (crude juice).

Also bioethanol production is possible from starch crops, including corn and wheat products processing of which using for human nutrition. But with the increasing problems of food lack in the world the international community can prevent the ethanol production from corn and wheat. Sugar beet processing sideline products is not used directly for food, which proves the using feasibility of it for the bioethanol production.

According to NASU "Ukrtsukor" for 2012/13 marketing year, sugar plants were processed 17.2 million tons of sugar beet, produced 2.2 million tons of sugar and 0.7 million tons of molasses [11, p. 42]. In case of molasses volumes processing may produce 165.9 thousand tons of bioethanol that is fully provide the agriculture need to produce 6 or 10% mixture of ethanol with petrol in 2013. To ensure all domestic market of Ukraine needs is necessary to produce 132.6 thousand tons of bioethanol from sugar beet additionally (share of ethanol 6%) or 331,6 thousand tons (share of ethanol 10%). It is necessary to process 1678 tons and 4197 tons of sugar beets additionally. That is to ensure bioethanol all domestic market needs in 2013 it was necessary to process 19.2 million tons of sugar beets - 6% ethanol mixed with petrol by 21.7 million tons of sweet roots - 10% ethanol.

To ensure the bioethanol production from sugar beet products processing competitiveness is significantly affects the sweet roots price in Ukraine (Table 1).

If we using for bioethanol production sugar beet by own production of 371.5 UAH/ton, the cost of bioethanol producing from molasses is 7246 UAH/t, respectively from sugar beet (crude juice) 10896 UAH/t. To ensure expanded reproduction it is necessary that the 1 ton of bioethanol from molasses selling price was 9420 UAH, respectively from sugar beet – 14150 UAH. In accordance with the roots average prices in 2012 430 USD/t [12, p. 15] – 1 ton of bioethanol from molasses selling price is 9720 UAH, sugar beets – 15,000 UAH. To ensure expanded reproduction of sugar beet and bioethanol production it is necessary that sugar beets selling price is 484 UAH/t, respectively bioethanol from molasses – 9980 UAH/t from sugar beet – 15800 UAH/t.

The raw material for bioethanol production except molasses and sugar beets can serve sugar beets by-products with high sugar content, such as green molasses and syrup. To reduce bioethanol cost and thus increase its competitiveness significantly affects on technology production. Bioethanol technology consists of two stages: raw ethanol production and subsequent its dehydration. For ethanol dehydration is using azeotropic distillation, adsorption on molecular sieves and evaporation through the membrane [13].

*Table 1*

**The competitiveness of bioethanol production from molasses and sugar beet depending on their cost in Ukraine in 2012/13 MY**

Index	2012/13 marketing year		
	1 ton of sugar beets cost, UAH	371,5	
1 ton of sugar beets realization price, UAH	430		484
Profit, UAH	58,5		112,5
Profitability level,%	15,7		30
1 ton of sugar beets purchase price, UAH	371,5	430	484
<i>1 ton of bioethanol from molasses in calculation</i>			
1 ton of bioethanol from molasses prime cost, UAH	7246	7469	7676
1 ton of bioethanol release price, UAH	9420	9720	9980
Profit, UAH	2174	2251	2304
Profitability level,%	30	30	30
<i>1 ton of bioethanol from sugar beet calculation</i>			
1 ton of bioethanol from sugar beet prime cost, UAH	10896	11567	12186
1 ton of bioethanol release price, UAH	14150	15000	15800
Profit, UAH	3254	3433	3614
Profitability level,%	30	30	30

Source: author calculation

Bioethanol lowest cost is obtained by evaporation through the membrane irrespective of raw material type for processing. A similar dependence obtained for bioethanol production from green molasses, syrup and molasses. Lowest cost of bioethanol from molasses was obtained for all three processing techniques (Table 2).

It should be noted that ethanol dehydration by azeotropic rectification requires considerable maintenance and energy costs. Less power consuming is ethanol dehydration technology by adsorption on molecular sieves and evaporation through the membrane. However, ethanol dehydration by evaporation through the membrane requires significant capital investment and the plant smooth operation.

*Table 2*

**The competitiveness of bioethanol production from sugar beet processing by different techniques, 2012/13 MY**

Raw material	Bioethanol production cost by different techniques					
	azeotropic rectification		adsorption on molecular sieves		evaporation through the membrane	
	UAH/t	UAH/l	UAH/t	UAH/l	UAH/t	UAH/l
Sugar beet	11567	9,1	11266	8,9	11013	8,7
Green molasses	9548	7,5	9248	7,3	8995	7,1
Syrop	13156	10,4	12856	10,1	12603	9,9
Molasses	7469	5,9	7169	5,7	6916	5,5

*Source: author calculation*

According to the State Statistics Committee of Ukraine it was collected 1,204.4 tons of rapeseed in 2012. [14] In case of 963.5 tons of rapeseed (80%) recycling it was possible to produce 385.4 thousand tons of biodiesel to 31,5%, to provide agricultural enterprises needs in it in 2013.

If we use rapeseed for biodiesel production by own production – 3232.7 UAH/t then biodiesel production cost is 8572 UAH/t. To ensure expanded reproduction is necessary that the 1 ton of biodiesel selling price was 11120 UAH. In accordance to the average price for rapeseed 3923.4 UAH/t in 2012 [12, p. 15] - the 1 ton of biodiesel selling price is 13350 UAH. To ensure expanded reproduction of rapeseed and biodiesel production it is necessary rapeseed realize at a price 4200 UAH/t (Table 3).

Table 3

**The competitiveness of biodiesel production depending on the rapeseed  
cost o in Ukraine, 2012/13 MY**

Index	2012/13 marketing year		
	1 ton of rapeseed prime cost, UAH	3232,7	
1 ton of rapeseed release price, UAH	3923,4		4200
Profit, UAH	690,7		967,3
Profitability level,%	21,4		30
1 ton of rapeseed purchase price, UAH	3232,7	3923,4	4200
<i>1 ton of biodiesel in calculation</i>			
1 ton of biodiesel prime cost, UAH	8572	10299	10990
1 ton of biodiesell release price, UAH	11120	13350	14250
Profit, UAH	2548	3051	3260
Profitability level,%	30	30	30

*Source: author calculation*

Therefore, it is advisable biodiesel producing and using for agricultural enterprises own needs, thereby their dependence reducing from the market prices and diesel fuel import. In Ukraine agricultural production significant increase [15] and the fuel rising prices promotes the biofuels production and use foretold by forecast to 2015 and 2020 (Table 4).

Bioethanol and biodiesel production and use will start producing environmentally clean alternative fuels, create new jobs, increase profits, and reduce Ukraine's dependence on imported fuel. These issues solution in particular needs to develop a state program comprehensive for the sugar industry development in Ukraine taking into account global trends in sugar beet production use for bioethanol manufacture as an alternative fuel.



improve sugar beet industry enterprises competitiveness in Ukraine. In the future, it is expedient biodiesel produce and use for agricultural enterprises own needs, thereby their dependence reducing on the market for imported diesel fuel.

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### *Анотація*

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***Формування конкурентоспроможності альтернативних видів пального в контексті стратегії розвитку АПК України***

*Проаналізовано кон'юнктуру ринку пального та перспективи виробництва і використання альтернативних видів пального в Україні. Визначено чинники формування конкурентоспроможності біоетанолу та біодизеля. Доведена необхідність і економічна доцільність виробництва і використання біопального в контексті стратегії розвитку АПК України.*

**Ключові слова:** конкурентоспроможність, біоетанол, біодизель, собівартість, стратегія розвитку, цукрові буряки

### **Аннотація**

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**Формирование конкурентоспособности альтернативных видов горючего в контексте стратегии развития АПК Украины**

*Проанализирована конъюнктура рынка горючего и перспективы производства и использования альтернативных видов горючего в Украине. Определены факторы формирования конкурентоспособности биоэтанола и биодизеля. Доказана необходимость и экономическая целесообразность производства и использования биогорючего в контексте стратегии развития АПК Украины.*

**Ключевые слова:** конкурентоспособность, биоэтанол, биодизель, себестоимость, стратегия развития, сахарная свекла.