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THE STATE AND PROSPECTS OF HOP-GROWING INDUSTRY IN THE CONDITIONS OF EUROINTEGRATION

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Aim. To substantiate the prerequisites of increasing the level of competitiveness and efficiency of domestic hop-growing industry on the road of Eurointegration and entering the international market. **Methods.** The following methods were used: statistical and economic method, comparative analysis, abstract-logical method. **Results.** It was established that supply and demand as well as the level of prices for hop products depend on the trends in the international market of hop and on the needs of brewing industry. The key factors of impacting the formation of supply and demand and the possibility of providing for it at domestic hop-producing enterprises are found to be the organization of the production process with the least loss of resources, the availability of competitive varieties, a wide range of quality products of the processing. The fulfillment of the mentioned conditions is possible via the integration of efforts in the spheres of hop products manufacturing, the sale of the latter and support services. **Conclusions.** The improvement of the efficiency of Ukrainian hop-growing industry will benefit from the development of integration processes, based on the cooperation between adjacent fields to form reliable industrial and sales relations and wide access to resources, the adjustment of Ukrainian standards for hop products and the variety assortment of cultivated hop in line with the European requirements.

Keywords: hop-growing industry, hop products, market, demand, supply, integration.

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INTRODUCTION

Beer is third most popular beverage in the world (following water and tea) and the most popular low-alcohol beverage, thus the demand for malt and hop is always high, which creates a market, attractive in terms of production volumes.

Over 30 countries of the world have their hop-growing industry. Among these Germany and the USA are prominent leaders, with the share of 73 % in the world hop production for 2014 (81 % produced alpha acids), whereas 13 % of hop were grown by China and Czech Republic together. The lion's share (60 %) of the world yield is bitter varieties, the rest being aroma (30 %) and mild aroma varieties (10 %). Starting with 2014, the demand for aroma hop has increased considerably, and its share in the structure of world production is 51 % (compared to 35 % in previous years).

During intense development of the brewing industry (in 2003–2013) the use of hop with high level of bitterness allowed the brewing masters to save some raw hop material, which was in short supply at the time. This is proven by a considerable reduction of norms of the introduction of hop into beer (Fig. 1).

The rise in the interest to hop products, manufactured using aroma hops, was conditioned by the development of craft brewing, slowdown in growth rates for industrial brewing, and financial crisis. The consumption of beer is considerably dependent on consumers' income [1]; the demand for beer decreases with the reduction in income, as beer is not the essential product. Thus, this situation stimulates producers to improve the recipe of the hop beverage and to return to traditional (classic) technologies of using aroma hops in the recipe.

The worldwide volumes of production of mild aroma varieties grow with each year, so the hop-growing in-

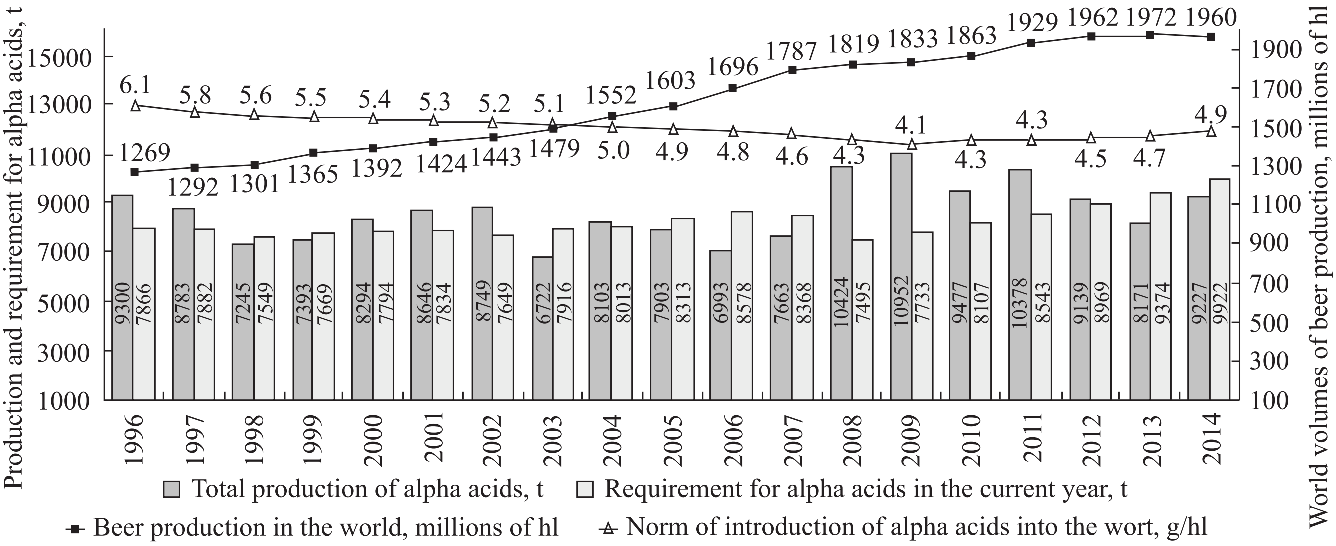

Fig. 1. The world production of beer and the balance of alpha acids (presented without any consideration of other branches) in 1996–2014. The share of alpha acids, introduced into the wort, gradually increased each year (up to 4.99 g/hl in 2014) which caused insignificant shortage of supplies (within the limits of 1,000 t) and the formation of profitable prices for hop products (up to UAH 75 thousand/t). The estimates based on the reports of Joh. Barth & Sohn Company [3−5]

dustry of Ukraine is quite capable of taking its niche in the international market, as its favorable geographic position and advantageous climate and soil conditions, determining sufficient moisturizing, are most suitable for growing this kind of hop.

The studies, conducted at the Institute for Agriculture of Polissia (IAP NAAS), testify to high brewing quality of hop granules, produced of domestic aroma varieties. The characteristics of Ukrainian hop products are at the level of the world analogues: biochemical and technological characteristics of hop granules of Klon 18 variety correspond to those of granules of Czech variety Zatecky; such varieties as Slovianka and Zagrava are unique and quite exceed their world equivalents in terms of content and quality of bitter substances and ether oils [2].

According to these studies the average annual index of the content of alpha acids in domestic aroma varieties is generally within the range of 6.2 %, whereas in Czech Republic, which specializes in growing aroma varieties, the average level of alpha acids is 4.0 % [3–5].

However, regardless of high quality of the above-mentioned varieties compared to foreign ones, there is no high demand for domestic hop, therefor there is general reduction in the production of this crop, and the hop products, required by brewers, are imported.

A considerable number of studies of Ukrainian scientists were dedicated to the estimation of the state of the hop-growing industry, the increase in its economic efficiency and search for perspectives of its development [6–10]. Still, regardless of the relevance of conducted studies, the issue of further functioning of this industry in the context of European integration requires deeper understanding of the adaptation of world experience to domestic production conditions.

The aim of the work was to substantiate the prerequisites for the increase in the level of competitiveness and efficiency of functioning of domestic hop-growing industry in the context of association with EU and entering the international market, to highlight the possibilities to minimize negative phenomena and to form the advantages of further development of the industry.

MATERIALS AND METHODS

The process of development of domestic hop-growing industry in the conditions of Eurointegration was studied. The following methods were used to conduct the studies: statistical and economic – to estimate the state of world production of hop; comparative analysis – to determine the main trends in the hop market; abstract and logical – to determine the factors, influencing the formation and provision for the demand for hop products which allowed obtaining scientifically grounded results.

RESULTS AND DISCUSSION

Starting with 2011 the quality of the cultivated hop increases gradually, and the indices of cultivated products are in absolute compliance both with domestic standards DSTU 4097.1-2002 and DSTU 4098.1-2002 for raw bitter and aroma hop, but also with the criteria, set by the EU Regulations for hop [11]. For instance, the Regulation allows the mass fraction of hop admixtures up to 9.0 %, whereas the Ukrainian standard for hop limits this index to only 5.0 %. Also the Regulation does not set any requirements to the external view of hop, lupulin grain and aroma. Thus, if Ukrainian hop is in compliance with the domestic standard in terms of quality assessment, it can meet the requirements of European consumers. The criteria of the current national standard, according to which the quality of each variety is estimated pursuant to inherent technological indices of the content of α- and β-acids, the content of volatile oil, *etc.*, are much stricter than EU Regulations. However, there is still a misunderstanding between hop producers and brewing enterprises regarding the requirements to the products, due to which Ukrainian producers are often at a loss.

During two recent decades the domestic hop-growing industry is under the impact of crisis phenomena, which are negative for the volumes of hop production. Thus, Ukraine is no longer one of five countries, which are the main suppliers of this crop to the world market, and current volumes of hop production are barely reaching 400 t annualy. Many enterprises are going bankrupt because of high costs of energy and a considerable number of competitors at the market who often suggest their goods at dumping prices. The increase in demand for domestic hop products is also hindered by the absence of capacities of deep processing of hop into extracts and insignificant amount of preliminary contracts, which would guarantee stable sales.

A similar situation was also conditioned by the world overproduction of hop which was observed in 2008–2011, because of which by the end of 2011 the cumulative remains of transit stock of alpha acids amounted to almost 10,000 t with considerable decrease in the realization prices for hop both on the international and domestic markets (since 2008 the price decreased from 43 to 17 thousand hryvna/t in 2011). During the market misbalance the advantages were given to the producers, who showed themselves as reliable suppliers of hop, so they could sell it at contract prices.

In 2012 due to rapid balancing of excessive fields and partially due to unfavorable weather conditions in the main countries-hop producers, and also due to intense development of craft (small) brewing the supply and demand somewhat balanced and the market became more stable.

During the analyzed period a number of hop enterprises and the average area of hop fields in five leaders – the largest countries, producing hop, – decreased. Compared to 2009, in 2014 a number of hop farms decreased considerably in Poland and Germany, which had been growing hop (by 376 and 281 respectively), and in Ukraine only 23 hop enterprises continued their activity (Table).

10 enterprises (out of 20 active hop producers), which managed to stay in domestic market in 2013, had preliminary contracts for the supply of their hop pro-

The dynamics of the activity of hop enterprises in the main countries – hop producers, 2009–2014

Position of the country	Country	Number of enterprises/average area of fields (ha) in years						Number of active hop enterprises in 2014 compared to 2009, +/–
		2009	2010	2011	2012	2013	2014	
1	Germany	1473/12.5	1435/12.8	1377/13.6	1294/13.2	1231/13.7	1231/13.7	–281
2	USA	74/217.0	73/174.0	74/163.0	76/170.0	71/201.0	71/201.0	–2
3	China	60/100.0	58/95.0	53/84.0	52/77.0	42/67.4	42/67.4	–23
4	Czech Republic	135/39.3	133/39.2	123/37.7	118/37.0	119/36.3	119/36.3	–20
5	Poland	1010/2.1	868/2.1	689/2.3	665/2.3	631/2.2	631/2.2	–376
14	Ukraine	59/16.2	57/15.6	46/13.7	28/16.0	20/18.9	20/18.9	–36

Note. The position of the country was determined by the rating of gross collection of alpha acids in the world for 2014.

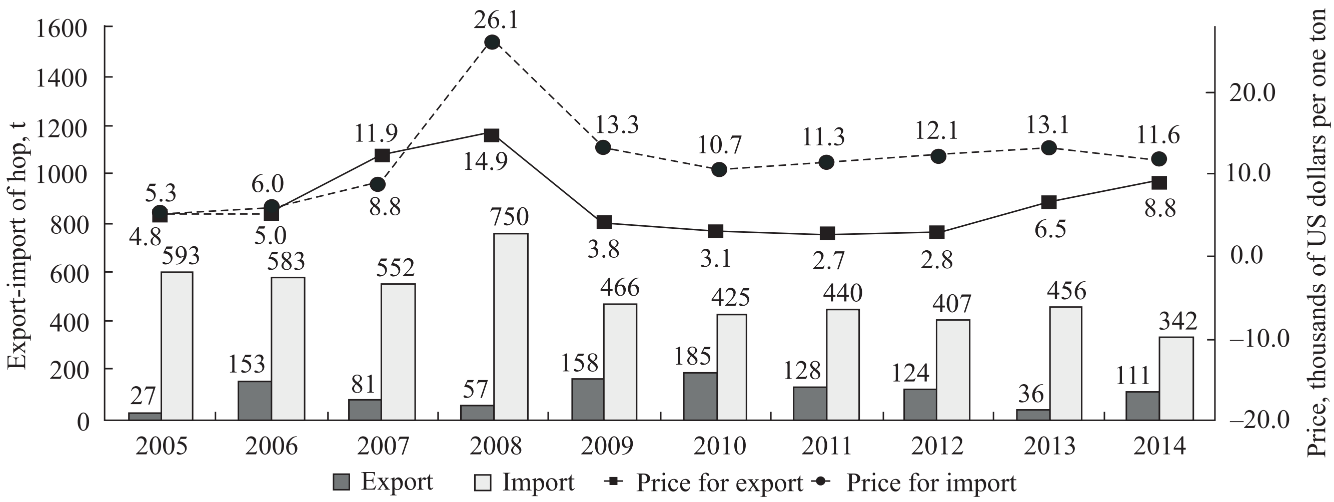

Fig. 2. The volumes of export-import of Ukrainian hop in 2005–2014

ducts, although there were similar cases in the previous years. A wide assortment of cultivated hop, high yield indices and quality of hop products allowed Ukrainian producers to timely fulfill their contractual obligations of supplying the products of required volumes and assortment and of ensuring stable quality indices.

Aroma varieties take a considerable part of hop fields in Ukraine – 84 % of current area. Hop products, made of aroma hop, are highly valued on the international market. However, hop export in Ukraine is conducted by negotiators or hop processors, so hop producers lose some profit. The representatives of craft (small) brewing also show their great interest to the products of aroma hop processing, which started developing intensively in the world.

The data of the state customs demonstrate that the export of Ukrainian hop mainly goes to the CIS states. In five recent years the main consumers of Ukrainian hop were Russian Federation, Belarus, Moldova, Uzbekistan and Azerbaijan. The share of these countries in the export structure was at the level of 80 % each year. Still in 2013 the export of hop decreased 3.4 times – down to 36 t, because due to the shortage of supplies a predominant part of hop products was consumed on the domestic market (Fig. 2).

In light of recent political events in Ukraine starting with 2014 the export of hop products to the CIS states decreased down to 25 %, and the rest (75 %) was exported to the European countries – Great Britain (34.2 t), Germany (18.6 t), Czech Republic (18.7 t), Latvia (11.4 t) *etc*. Since there were no long-term contracts until 2014 Ukraine almost did not have any product markets in the EU member states.

The data on the foreign trade demonstrate that the main volumes of hop export for recent years were coming into Ukraine from Germany. In different years the share of products, bought in Germany, was from 60 to 80 % in the total structure of import. In 2014 the main amount of hop products came from Europe – 82.6 % (in particular, from Germany – 192.5 t, from Czech Republic – 45.7 t, Slovenia – 44.1 t), and the rest came from the USA – 59.6 t. But the paradox lies in the fact that brewing companies buy imported raw hop material at contract prices, which are considerably higher than the ones, suggested by domestic hop producers.

Thus, at present some insignificant volumes of granulated and pressed hop are exported, compared to import. The main noteworthy drawbacks are differences in the quality of manufactured products, instability of supply volumes and the absence of required assortment. At present the hop-growing industry should aim at fast reorientation towards EU regulations and hop products should correspond to the quality of their analogues from European countries.

The issues of standardization in the hop-growing industry are getting even more urgent, especially in the light of Ukraine's becoming a WTO member and the association with EU, where the requirements to quality of products are rather high and subject to timely resolutions in this sphere.

Domestic hop is not inferior to foreign varieties in terms of substances, valuable for brewing. The studies of the laboratory of the Department of Biochemistry of Hop and Beer, IAP NAAS, accredited for quality assessment of hop products using internationally rec-

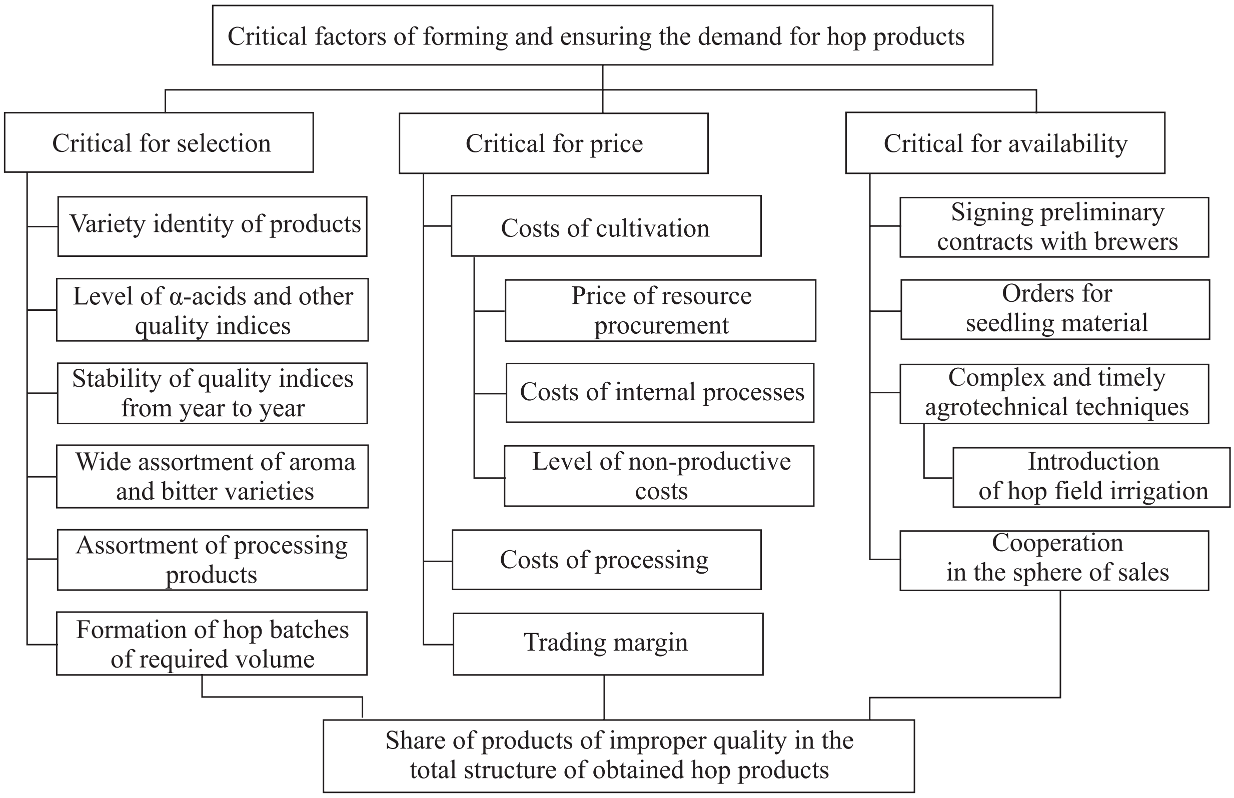

Fig. 3. Critical factors, influencing the ways of forming and ensuring demand for domestic hop products

ognized methods, revealed that domestic hop of 2009–2013 meets current national standards. The proof of the proper quality of products is the fact that a part of pressed hop, produced in recent years, was exported to different countries of the world.

At present Ukrainian hop is processed at a modern granulating mill of Hopsteiner Ukraine company using German packing materials. The enterprise established an efficient system of quality management, meeting the requirements of DSTU ISO 9001:2009. The granules are in compliance with DSTU 7028:2009 "Plant Production. Hop Granules. Technical Regulations", which came into force on July 1, 2011, and with current EU regulations for granules. Regardless of the fact that domestic hop producers cultivate varieties-analogues, similar to foreign ones in all the indices, the sale of products is very slow, as large brewing companies with foreign capital have introduced considerable restrictions for the use of domestic hop products in their production, and some enterprises buy only imported hop products. And the reason is not the absence of quality domestic hop products but the desire of parental companies of brewing enterprises, operating in the territory of Ukraine, to supply hop products of foreign production only.

It is important for large brewing companies with considerable scales of production not only to have quality hop products, but also to maintain the ability of enterprises-suppliers to keep it on a high and stable level. It is also relevant to use marketing techniques (advertisement on exhibitions and fairs, stimulation of sales, *etc.*) [12].

Foreign suppliers offer a wide assortment, stability of supplies and variety of hop products. For instance, signing a supply contract with a German company, the brewers are guaranteed that the fluctuation of the level of alpha acids in each subsequent batch will not exceed 10 % from its constant level, whereas the content of alpha acids for domestic suppliers is still fluctuating in the range of 40 % which may influence the taste of beer significantly.

The reason of insufficient demand for domestic hop products is the absence of assortment of processed products, in particular, the processing into extracts, greatly demanded by brewers. Another limitation to the sale of domestic hop products is the transition of brewers to the use of the products of processing bitter varieties only, whereas the traditional technology of brewing, based on many centuries of national traditions, presupposes the use of aroma hop in the recipes.

The study of the problems of sales and the analysis of consumers' requirements to hop products on domestic market demonstrated key factors, influencing the formation of demand and the possibility of meeting it at domestic hop enterprises (Fig. 3).

The mentioned problems of Ukrainian hop-growing industry as regards the increase in demand for the products and its supply to the international market were successfully solved by many European hop producers already.

For instance, in order to ensure better compliance with the requirements of procuring batches of specific volumes, assortment and quality of hop products, the hop producers of Germany and the USA consolidated their efforts in the fields of their production, processing and sale. At present three main companies cooperate at the hop market of Germany – Hopfenverwertungs-genossenschaft (HVG), Joh. Barth & Sohn Company and Hopsteiner GmbH. Yakima Chief, Inc. is one of the most prominent hop associations in the USA with the complete cycle of production, which is specialized both in cultivation and sale of hop products [13]. Uniting into companies and associations, the world producers of hop products control 40 % of the world hop production and produce all the kinds of hop products (carbon dioxide extracts, granules, oil compositions, natural hop).

Considering successful practice of the mentioned countries, it is noteworthy to mention the prerequisites of the formation and functioning of similar organizations in the hop-growing industry of Ukraine, in particular, the formation of the regional cluster association. A cluster may unite processing, scientific research, maintenance, supply, financial and other enterprises, providing services to the industry, promote free access to novel technologies, capital, information, upgrade qualifications of human resources, *etc.* [14]. At present enterprises lose a considerable part of income that could be generated via processing and sale of agricultural products, which does not allow them to have extended restoration of industrial production and to enter international markets with their products.

CONCLUSIONS

Further development of the domestic industry will greatly depend on the situation in the international hop-growing and brewing industry. Here the required condition is the reproduction of novel high quality hop varieties with the increased content of alpha acids, the mechanization and automation of most labor-consuming processes of hop production and processing as well as the compliance with the requirements of ecologization of the industrial process. The stages of innovation development of hop-growing industry should foresee the optimization of social, economic, organizational and technological processes, the introduction of informational and consultative support, activation of investment processes, the combination of which will ensure the transition to high quality management of production, processing and sale of hop products.

The industry should be brought up to date in a maximally short period of time in order not to lose the potential, acquired in previous years, and to reach the competitive level. Hop producers should use the international practices, stipulating technological approaches to sowing the fields with quality seeds of corresponding varieties, their scientifically grounded cultivation, processing, preliminary contracts for the yield with brewers, pharmacologists, food industry representatives, the adjustment of Ukrainian standards for hop material and the variety content of the cultivated hop to the European requirements, the regulation of legal framework on the issues of expanding the variety policy depending on the brewers' orders.

The efficiency improvement for the functioning of Ukrainian hop-growing industry is possible only because of the development of integration processes, observed in other successful countries. The cooperation between adjacent industries, based on increasing the level of coordination, the interpenetration of economic processes in different spheres of production, participation in the integration process as well as the use of product and technological innovations will promote the formation of reliable industrial and sale relations, and the industry will have wide access to resources and the possibility to solve complicated tasks and expand the sales market together.

Стан та перспективи галузі хмелярства за умов євроінтеграції

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Мета. Обґрунтувати передумови підвищення рівня конкурентоспроможності та ефективності функціонування вітчизняного хмелярства на шляху вступу до ЄС та виходу на світовий ринок. **Методи.** Використано методи: статистико-економічний, порівняльного аналізу, абстрактно-логічний. **Результати.** Встановлено, що попит і пропозиція, а також рівень цін на хмелепродукцію залежать від тенденцій на світовому ринку хмелю та від потреб пивоварної промисловості. Ключовими факторами впливу на формування попиту та можливості щодо його забезпечення на вітчизняних хмелепідприємствах визнано організацію виробничого процесу з найменшими втратами ресурсів, наявність конкурентоспроможних сортів, широкий асортимент якісних продуктів переробки. Виконання зазначених умов можливе завдяки об'єднанню зусиль у сферах виробництва хмелепродукції, її продажу і сервісного обслуговування. **Висновки.** Підвищенню ефективності функціонування українського хмелярства сприятиме розвиток інтеграційних процесів на основі співпраці між суміжними галузями для формування надійних виробничо-збутових зв'язків та широкого доступу до ресурсів, адаптація українських стандартів на хмелесировину і, відповідно, сортового складу вирощуваного хмелю до європейських вимог.

Ключові слова: хмелярство, хмелепродукція, ринок, попит, пропозиція, інтеграція.

Состояние и перспективы отрасли хмелеводства в условиях евроинтеграции

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Цель. Обосновать предпосылки повышения уровня конкурентоспособности и эффективности функционирования отечественного хмелеводства на пути вступления в ЕС и выхода на мировой рынок. **Методы.** Использованы методы: статистико-экономический, сравнительного анализа, абстрактно-логический. **Результаты**. Установлено, что спрос и предложение, а также уровень цен на хмелепродукцию зависят от тенденций на мировом рынке хмеля и от потребностей пивоваренной промышленности. Ключевыми факторами влияния на формирование спроса и возможностями относительно его обеспечения на отечественных хмелепредприятиях признаны организация производственного процесса с наименьшими потерями ресурсов, наличие конкурентоспособных сортов, широкий ассортимент качественных продуктов переработки. Выполнение отмеченных условий возможно благодаря объединению усилий в сферах производства хмелепродукции, ее продажи и сервисного обслуживания. **Выводы.** Повышению эффективности функционирования украинского хмелеводства будет способствовать развитие интеграционных процессов на основе сотрудничества между смежными отраслями для формирования надежных производственно-сбытовых связей и широкого доступа к ресурсам, адаптация украинских стандартов на хмелесырье и, соответственно, сортового состава выращиваемого хмеля к европейским требованиям.

Ключевые слова: хмелеводство, хмелепродукция, рынок, спрос, предложение, интеграция.

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