

УДК 338.439.5:637.5(477)

## **CURRENT STATE AND PROSPECTIVE DEVELOPMENT DIRECTIONS OF THE DOMESTIC MARKET OF OIL AND OIL FAT PRODUCTS: A QUALITATIVE ASPECT**

*The main results of the enterprises activities of the domestic oil and fat industry in 2020-2021 are shown in the articles. The profitability indicators of the production of oil crops of agricultural enterprises and farms of Ukraine by regions in 2020, the sown area under soybeans and sunflowers by regions of Ukraine for the 2021 harvest are studied, as well as the export of oilseeds in 2020/2021 compared to the 2019/2020 marketing year. It was emphasized that oilseed crops in Ukraine are traditionally the most profitable of all plant products, which is due to their high liquidity and demand from both exporters and the processing sector. export of vegetable oil and protein grist from Ukraine during the specified period was investigated, and the main reasons for changes were determined. On the basis of*

*The production of oil and fat products in Ukraine in 2020-2021 was analyzed, the the supply/demand balances of sunflower seeds and vegetable oil, the main trends in the functioning of the relevant market were determined and the priorities of future development were substantiated.*

*The price policy of industry enterprises and the reasons for the increase in the price of oil were studied. The processing capacities of the main types of oil crops, oil and deep processing products were evaluated, and the leaders of the respective markets were determined.*

*It was emphasized that the further market development of oil and oil-fat products of Ukraine will take place in the direction of improving the quality of manufactured products in terms of their safety and expanding exports. This is due to the further application of international standards at the enterprises of the industry and their timely reaction to changes in the regulatory and legal framework. New changes in FSSC 22000 scheme (version 5.1) are highlighted.*

**Keywords:** oil market, production profitability of oil crops, refined and unrefined oil, deep processing products, quality and safety of food products, domestic market, international standards ISO 22000.

## **СУЧАСНИЙ СТАН ТА ПЕРСПЕКТИВНІ НАПРЯМИ РОЗВИТКУ ВІТЧИЗНЯНОГО РИНКУ ОЛІЇ ТА ОЛІЙНО-ЖИРОВОЇ ПРОДУКЦІЇ: ЯКІСНИЙ АСПЕКТ**

*У статті розглянуто основні результати діяльності підприємств вітчизняної олійно-жирової галузі у 2020-2021 рр. Досліджено показники рентабельності виробництва олійних культур у сільськогосподарських підприємствах і фермерських господарствах України за регіонами у 2020 р., посівні площі під соєю і соняшником за регіонами України під врожай 2021 р., а також експорт насіння олійних культур 2020/2021 порівняно з 2019/2020 маркетинговим роком. Наголошено, що олійні культури в Україні традиційно є найбільш рентабельними з усієї продукції рослинництва, що обумовлено їх високою ліквідністю і попитом як з боку експортерів, так і переробного сектору.*

*Проаналізовано виробництво олійно-жирової продукції в Україні у 2020-2021 рр., досліджено експорт рослинної олії та протеїнових шротів з України протягом зазначеного періоду та визначено основні причини змін. На основі балансів попиту/пропозиції насіння соняшнику та рослинної олії визначено основні тенденції функціонування відповідного ринку та обґрунтовано пріоритети перспективного розвитку.*

*Досліджено цінову політику підприємств галузі та причини подорожчання олії. Оцінено потужності з переробки основних видів олійних культур, олії та продуктів глибокої переробки, а також визначено лідерів відповідних ринків.*

*Наголошено, що подальший розвиток ринку олії та олійно-жирової продукції України буде відбуватися в напрямку підвищення якості вироблюваної продукції в аспекті її безпеки та розширення експорту. Це пов'язано із подальшим застосуванням міжнародних стандартів на*

*підприємствах галузі та своєчасною їх реакцією на зміни в нормативно-правовій базі. Наголошено на нових змінах в схемі FSSC 22000 (версія 5.1).*

**Ключові слова:** ринок олії, рентабельність виробництва олійних культур, рафінована та нерафінована олія, продукти глибокої переробки, якість та безпека харчової продукції, внутрішній ринок, міжнародні стандарти ISO 22000.

**Formulation of the problem.** The oil market is particularly important for Ukraine, since its effective functioning is of primary importance for ensuring the country's food and energy security, on the one hand, and the economic component, on the other hand, due to the fact that Ukraine is one of the largest players today on the world market of vegetable oil and occupies a leading position in the volume of exports of oil crops. Therefore, the modern development of the oil market requires finding ways for further functioning in connection with the situation in Ukraine, taking into account the modern realities of today, as well as increasing the level of provision of oil raw materials for the annually growing needs of processing enterprises. In this regard, the analysis of trends in the current state of the market and the determination of prospects for its development become especially relevant.

The development of the oilseed market also directly affects agricultural production and is one of the most important economic and food components of the agro-industrial complex in Ukraine. Unfortunately, the economic situation in Ukraine has a negative impact on the agrarian sector of the economy. This led to changes in the structure of manufactured products and changed the vectors of agricultural production.

**Analysis of recent research and publications.** In recent years, a number of domestic scientists have devoted their scientific assets to researching the markets of oilseed crops, oil and products of its deep processing. In particular, such domestic economists as I. Chekhova (Чехова, Чехов, 2020), V. Tymchenko and A. Pylypchenko (Тимченко, Пилипченко, 2012), V. Tsikhanovska (Ціхановська, 2016) studied the problems of the formation and

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development of the domestic market of oilseed crops in general, as well as the state and prospects for the development of soybean production in Ukraine. The current state, the main trends in the production and export of sunflower oil were reflected in the works of Y. Barsuk (Барсук, 2017), O. Kucherenko (Кучеренко, 2015) and M. Talavyri (Талавирия, 2022). The marketing potential of innovations in the oil-fat subcomplex and the features of competition at the sunflower oil market are considered in the works of V. Lutsyak (Луцяк, 2020), T. Duranova (Дуранова, 2013) and M. Katran (Катран, 2018). Research of I. Sarafonova was devoted to the formation of a mechanism for regulating the activities of enterprises on the market of oil and fat products (Сарафонова, 2018). However, the dynamic development of the oil market and the radical change of external factors associated with the instability of the situation in the country require the justification of further priorities for the functioning of the market of oil and oil-fat products in view of the existing realities of today.

**The purpose of the study:** to disclose the main results of the activities of enterprises of the domestic oil and fat industry and to characterize the general trends of the oil market as a whole and to justify the prospective directions of its development in view of the changes in the military-political, socio-economic and financial situation in the country, which have advantages in the long-term perspective.

**Materials and methods.** The purpose of the research in the article was achieved by using a number of methods of scientific research. According to the classification of scientific research methods by the level of methodological analysis, the following methods of general scientific level are used in the article: analytical-synthetic, systemic-structural, logical, factorial. Considering concrete scientific methodology, typological methods (descriptive, normative, structural) were used in the article. Based on the generally accepted classification of scientific research methods, which are divided into general scientific and specific scientific (empirical), the following general scientific research methods are used in the article: analysis and synthesis, induction and deduction - in the assessment of sown areas under soybean and sunflower by regions and Ukraine

as a whole; system analysis – when developing the supply/demand balance of sunflower seeds and vegetable oil; ranking - when determining the rating of the main producers of oil (refined and unrefined) and oil and fat products; generalization - when developing directions for the use of new international standards by enterprises of the industry; systematization - when calculating the export of oilseeds, vegetable oil and protein meal from Ukraine; argumentation - when substantiating the evidence and persuasiveness of the conclusions. Among the empirical methods of research, the following are used in the article: measurement - when determining indicators of the profitability of the production of oil crops of agricultural enterprises in general and farms; comparison - in the evaluation of processing capacities of the main types of oil crops and oil, as well as the evaluation of the production of oil and fat products in Ukraine and the price situation in the industry.

**Presentation of the main results of the study.** In 2020/2021 marketing year (MY), the total production of the main types of oilseeds amounted to 18.466 million tons, including sunflower seeds - 13.111 million tons, soy - 2.798 million tons, rapeseed - 2.557 million tons.

Oil crops in Ukraine are traditionally the most profitable of all plant products, which is due to their high liquidity and demand from both exporters and the processing sector. (Сумець, 2014). After a long period of declining profitability, which began in 2016, positive dynamics resumed in 2020. Compared to the previous year, the profitability of sunflower seed production increased by 1.7 times, soy - by 2.3 times, rapeseed - by 1.8 times. (Чехова, Чехов, 2020).

The profitability of the production of oil crops in Ukraine by region in 2020 is presented in the table 1.

**Table 1. Production profitability of oil crops in agricultural enterprises and farms in Ukraine by regions in 2020**

Region	Soy		Rape (spring and winter)		Sunflower seeds	
	agricultural enterprises	farms	agricultural enterprises	farms	agricultural enterprises	farms
Ukraine	30.2	33.5	17.2	23.9	39.4	37.3

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Vinnitsya	5.0	23.4	21.7	16.3	35.9	35.2
Volyn	49.8	36.2	26.2	27.2	43.2	30.8
Dnipropetrovsk	17.9	19.8	38.7	47.7	35.5	38.3
Donetsk	×	×	37.9	41.5	43.2	42.6
Zhytomyr	29.0	47.1	13.9	16.2	50.4	58.3
Zakarpattia	62.1	118.0	×	×	25.6	61.2
Zaporizhzhya	44.3	72.4	23.6	27.5	53.8	49.7
Ivano-Frankivsk	26.3	34.4	0	31.9	9.0	33.3
Kyiv	18.2	24.0	6.9	6.9	38.6	29.7
Kirovohrad	11.2	19.7	19.1	20.3	33.8	29.6
Luhansk	×	×	35.3	34.1	39.1	36.3
Lviv	36.2	43.5	9.9	27.7	25.9	23.0
Mykolayiv	25.0	28.2	20.5	24.9	32.2	31.0
Odesa	3.2	×	16.4	17.4	19.9	16.9
Poltava	26.9	31.2	30.4	31.6	35.1	45.7
Rivne	34.3	35.6	10.5	23.9	47.7	54.9
Sumy	48.1	41.4	38.6	37.3	49.7	66.6
Ternopol	33.6	31.2	17.8	16.0	45.8	46.7
Kharkiv	32.8	42.6	24.0	21.1	44.5	40.6
Kherson	21.6	34.1	24.5	32.3	29.6	28.4
Khmelnyskiy	41.7	35.0	14.9	23.9	44.9	33.5
Cherkasy	10.8	13.4	17.6	7.0	49.2	35.6
Chernivtsi	33.6	48.1	18.3	52.6	35.5	46.0
Chernihiv	39.8	53.9	20.2	34.8	47.2	52.5
Kyiv city	43.5	×	×	×	20.6	31.3

\* Calculated by the authors based on the State Statistics Service of Ukraine

According to the State Statistics Service of Ukraine, in 2020, the profitability of sunflower production was the highest among other major types of oil crops, reaching 39.4% in agricultural enterprises, and 37.3% in farms. The profitability of sunflower seed production reached the highest level for the period of 2008–2020 in 2015 (80.5%) and in 2016 (63.0%). Regionally, the highest profitability of sunflower seed production in 2020 was demonstrated by Zhytomyr, Zaporizhzhya, Sumy, Rivne, and Chernihiv regions.

In 2020, profitability in agricultural enterprises processing soybeans also increased significantly compared to 2019, amounting to 30.2%, in farms - 33.5%. The maximum rate was observed in 2016 (52%). The analysis of the profitability of soybeans by regions of Ukraine showed the highest profitability in 2020 in Zakarpattia, Zaporizhzhya, Sumy and Chernihiv regions.

The profitability of rape production in 2020 in agricultural enterprises increased compared to 2019 to 17.2%, in farms - 23.9%. The minimum level since 2008 was observed in 2013 (8.6%), and the maximum - in 2008 (51.3%). Dnipropetrovsk, Donetsk, Sumy, and Chernivtsi regions stood out among the leading regions in terms of rape profitability in 2020.

The production of rape (856.2 UAH/cwt) and soybeans (759.9 UAH/cwt) was the most expensive among the mentioned oil crops in 2020, while the production of sunflower (710.0 UAH/cwt) was the least expensive.

In the second half of June 2021, sunflower and soybean sowing was completed in Ukraine. According to operational data of the Ministry of Agrarian Policy of Ukraine, as of June 24, 2021, sunflower and soybean sowing in Ukraine was completed. On the specified date, 6479.72 thousand hectares were sown under sunflower, which is 1% higher than the predicted value, as well as 1391.89 thousand hectares under soybeans (99% of the predicted value) (Экономические показатели работы масложирового комплекса Украины в сентябре-июне 2020/21МГ, 2021).

In terms of regions of Ukraine, the largest areas under sunflower are occupied in Dnipropetrovsk, Kirovohrad, Kharkiv and Zaporizhia regions, and under soybeans - in Khmelnytskyi, Zhytomyr and Poltava regions.

Sown areas under the main oil crops in a section of the regions of Ukraine are presented in the table 2.

**Table 2. Areas sown under soybeans and sunflowers by regions in Ukraine for the 2021 harvest (as of June 24, 2021)**

Region	Sunflower seeds, thousand ha			Soy, thousand ha		
	2020	2021	% 2020/2021	2020	2021	% 2020/2021
Vinnytsya	288.6	305.4	105.8	101.6	109.3	107.6

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Volyn	39.7	41.0	103.3	34.8	36.0	103.4
Dnipropetrovsk	617.8	601.0	97.3	2.8	3.0	107.1
Donetsk	331.1	347.6	105.0	0.0	0.5	100.5
Zhytomyr	138.2	147.6	106.8	118.0	133.4	113.1
Zakarpattia	2.8	2.9	103.6	13.2	11.2	84.8
Zaporizhzhya	524.6	530.9	101.2	10.2	9.7	95.1
Ivano-Frankivsk	23.3	26.8	115.0	38.3	34.2	89.3
Kyiv	183.8	197.4	107.4	94.9	104.1	109.7
Kirovohrad	596.9	576.1	96.5	74.2	70.8	95.4
Luhansk	389.6	451.4	115.9	0.0	0.0	-
Lviv	30.2	35.0	115.9	76.9	85.0	110.5
Mykolayiv	507.1	490.0	96.6	6.3	6.0	95.2
Odesa	353.1	425.0	120.4	5.8	5.2	89.7
Poltava	381.8	384.0	100.6	129.4	120.4	93.0
Rivne	35.8	42.0	117.3	66.4	67.0	100.9
Sumy	278.2	289.2	104.0	70.4	73.0	103.7
Ternopol	88.6	86.5	97.6	72.9	80.9	111.0
Kharkiv	596.9	543.7	91.1	20.7	20.9	101.0
Kherson	331.2	325.0	98.1	72.2	75.0	103.9
Khmelnyskiy	164.7	180.0	109.3	132.5	150.0	113.2
Cherkasy	218.9	205.0	93.7	75.4	84.5	112.1
Chernivtsi	19.3	21.4	110.9	56.1	59.8	106.6
Chernihiv	239.1	224.9	94.1	49.6	52.0	104.8
<b>Total</b>	<b>6381.3</b>	<b>6479.7</b>	<b>101.5</b>	<b>1322.6</b>	<b>1391.9</b>	<b>105.2</b>

\* Calculated by the authors based on the data of the Ministry of Agrarian Policy of Ukraine

As evidenced by the data in the table 2 in 2021, compared to 2020, the cultivated area under sunflower increased by 1.5%. With the exception of some regions, the area planted under sunflower increased almost in all regions. The greatest increase in area was observed in Luhansk (+15.9%), Lviv (+15.9%), Odesa (+20.4%) and Rivne (+17.3%) regions. The largest decrease in sunflower area was observed in Kharkiv (–8.9%), Cherkasy (–6.3%) and Chernihiv (–5.9%) regions.

In 2021, compared to 2020, the sown area under soybeans also increased by 5.2% in Ukraine as a whole. The largest increase in cultivated area was observed in Zhytomyr (+13.1%), Khmelnytskyi (+13.2%) and Cherkasy (+12.1%) regions. The



area under soybeans decreased the most during the specified period in Zakarpattia (–15.2%), Ivano-Frankivsk (–10.7%) and Odesa (–10.3%) regions.

A feature of the 2020/2021 MY is the lowest level of transitional stocks of all oil crops in recent seasons. According to the State Statistics Service of Ukraine, at the beginning of the season, the stocks of sunflower seeds were the lowest in the last three seasons and were almost twice smaller compared to the beginning of the previous 2019/2020 MY - 809.7 thousand tons compared to 1524.0 thousand tons.

As of July 1, 2021, there were totally 943.8 thousand tons of sunflower seeds (1.5 times less than in the same period of the previous year), including 559.2 thousand tons in agricultural enterprises, and 384.6 thousand tons in enterprises, which are engaged in processing and storage.

At the same time, the comparability of volumes in agricultural enterprises and processors confirms that since the beginning of the season, in conditions of dynamic price growth, agricultural producers have kept the available volumes of sunflower, expecting further price increases, which led to a reduction in processing volumes and the full or partial suspension of a number of powerful processing enterprises. (Ціхановська, 2016).

Soybean stocks in Ukraine at the beginning of the 2020/21 MY were also minimal in the last few years and more than 2 times less compared to the beginning of the previous season. As of July 1, 2021, they amounted to 302.9 thousand tons, which is slightly lower than last year's amount of 338.4 thousand tons, including in agricultural enterprises - 183.8 thousand tons, in processing enterprises - 119.1 thousand tons. Agribusinesses, judging by stocks that exceeded 1.5 times the volumes available to processors, also held soybeans in anticipation of higher prices on the domestic market.

Rape stocks, which at the beginning of the 2020/21 MY were more than 3 times lower than last year, by the time of its end as of July 1, 2021, were practically exhausted due to active export of 46,000 tons, and were mainly stored only in agricultural enterprises (42.1 thousand tons), were practically absent at processing enterprises (3.9 thousand tons), since processing was impractical for factories due to completed export contracts.

According to the data of the State Statistics Service of Ukraine as of July 1, 2021, from the beginning of the 2020/21 MY, 4,019.9 thousand tons were exported from Ukraine to foreign markets, including sunflower - 0.189 million tons, soybeans - 1.433 million tons, rape - 2.398 million tons.

The export of oilseeds is presented in table 3.

**Table 3. Export of oilseeds 2020/2021 compared to 2019/2020 (as of July 1, 2021)**

Name	2019/2020 MY			2020/2021 MY		
	thousand tons	total amount, \$ million	average price, \$/ton	thousand tons	total amount, \$ million	average price, \$/ton
Sunflower seeds	47.5	20.4	429.8	189.0	68.2	360.0
Soybeans	2623.8	860.7	328.0	1432.6	661.7	462.0
Rape	2996.0	1213.2	405.0	2397.8	1016.0	423.7
<b>Total</b>	<b>5667.3</b>	<b>2094.3</b>	<b>369.2</b>	<b>4019.9</b>	<b>1745.9</b>	<b>434.3</b>

\* Calculated by the authors based on the State Statistics Service of Ukraine

The specific weight of the main types of oilseeds in the total export from Ukraine was: sunflower seeds - 4.7%, soybeans - 35.6%, rape - 59.7%. It should be noted that in the 2020/21 MY, the export of soybeans decreased by almost 2 times compared to the previous season. One of the features of the 2020/21 MY is the rapid increase in the export of sunflower seeds of the 2020 harvest from Ukraine at the beginning of the season. In September-June 2020/21 MY, 193.3 thousand tons of it were exported from Ukraine, which shows an increase 23.1 times compared to the corresponding period of 2019/20 MY. The situation, when such a volume of sunflower seeds was exported abroad in the first months of the marketing year, happened for the first time.

The main importers of Ukrainian sunflower were EU countries, where 64.9% were shipped (including Bulgaria – 55.1% and Turkey – 31%). Soy was exported mainly to the EU (26.7% of the total volume), Turkey (39.2%), Belarus (18.5%), Egypt (7.5%). The EU countries were also the main market for rape (94.6%).

According to the State Statistics Service data, from the beginning of the 2020/21 MY as of June 1, 2021, 11.865 million tons of oil crops (64.2% of the gross harvest)

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were processed into oil in Ukraine, including sunflower - 10.8 million tons (82.4% of the gross harvest), soybeans - 0.820 million tons (29.3% of the gross harvest), rape - 0.245 million tons (9.6% of the gross harvest). In the volumes of total processing, the specific weight of sunflower seeds was more than 91%, the lowest volumes of processing were observed for rape.

The dynamics of production and stocks of vegetable oil shows that for the second year in a row the beginning of the season was characterized by the lowest transitional stocks of vegetable oils, as well as raw materials for their production. However, by the end of June 2021, the volumes of stocks of produced unrefined sunflower oil in the warehouses of manufacturing enterprises significantly exceeded the previous indicator for the same date (126.33 thousand tons compared to 94.27 thousand tons - 1.3 times more) with a significant reductions in production (242.89 thousand tons compared to 465.2 thousand tons - almost 2 times less). Soybean oil stocks at the end of June 2021 amounted to 16.6 thousand tons compared to 11.88 thousand tons in June 2020, and production volumes for the specified period amounted to 21.4 thousand tons and 23.14 thousand tons, respectively.

The production of the main types of oil and fat products in Ukraine during 2020–2021 is presented in the table 4.

**Table 4. Production of oil and fat products in Ukraine in 2020–2021, thousand tons**

Product name	January–June			September–June (for rape: July–June)		
	2021	2020	deviation from 2021 to 2020, %	2020 /2021 MY	2019/2020 MY	deviation from 2020/2021 to 2019/2020, %
Unrefined sunflower oil	2304.9	3214.6	71.7	450.1	5488.1	82.0
Unrefined soybean oil	116.2	149.4	77.8	176.7	244.6	72.2
Unrefined rape oil	–	18.1	–	16.2	16.5	66.2
Refined sunflower oil	338.5	492.0	68.8	643.7	790.0	81.5
Soybean grist	505.9	616.2	82.1	777.8	992.3	78.4
Sunflower grist	2416.1	3062.1	78.9	4598.9	5191.9	88.6
Margarine products	487.9	592.7	82.3	133.9	206.6	64.8
Sauces and	73.0	74.6	97.9	133.3	133.6	99.8

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\* Calculated by the authors based on the State Statistics Service of Ukraine

As evidenced by the indicators given in the table 4, in the 2020/2021 MY, a decrease in the production of all types of oil and fat products, especially soybean and rape processing products, as well as margarine, is observed. This was due to the active export of oilseeds and high prices for them, as a result of which most of the powerful plants partially or completely suspended processing.

The production of refined sunflower oil decreased by 21.6% in the reporting period of 2020/2021 of the MY compared to the same period of the previous season (September–June), and by 30.2% according to the results of the II half of 2021.

At the same time, the stocks of the specified products in the warehouses of manufacturing enterprises exceeded last year's amount by 1.6 times (21.3 thousand tons compared to 13.43 thousand tons) and are 2.3 times higher than the initial stocks of the 2020/2021 MY season (21.02 thousand tons compared to 9.32 thousand tons).

This situation is associated with a reduction in the volume of sales of products on the domestic market, mainly due to sales in trade networks, due to high prices during the season. For the same reason, for the first time in the last 5 years (2017–2022), vegetable oil stocks at wholesale trade enterprises amounted to about 1.5 times more than average seasonal indicators.

The production of protein grist (sunflower, soybean) for the period 2020–2021 decreased proportionally to the volume of processing of oilseeds.

As for products of deep processing of vegetable oil (margarine, mayonnaise), the production of which is traditionally seasonal, the production of mayonnaise was practically comparable to the production of the previous year, and the production of margarine products decreased by 40.2%, which was associated with a decrease in consumption both on the domestic market and by reducing exports. This situation was a consequence of the rise in prices for the finished product.

The export of vegetable oil from Ukraine during 2020–2021 is presented in the table 5.

**Table 5. Export of vegetable oil from Ukraine during 2020–2021 (as of July 1, 2021)**

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Product name	January–June			September–June (for rape: July–June)		
	2021	2020	deviation from 2021 to 2020, %	2020 /2021 MY	2019/2020 MY	deviation from 2020/2021 to 2019/2020, %
Unrefined sunflower oil	2562.8	3760.6	68.1	4746.1	5763.3	82.4
Soybean oil is unrefined	120.7	175.5	68.8	194.9	283.0	68.9
Unrefined rapeseed oil (MY: July– June)	1.1	35.5	3.1	104.7	183.7	57.0
<b>Total</b>	<b>2684.6</b>	<b>3971.6</b>	<b>67.6</b>	<b>5045.7</b>	<b>6230.0</b>	<b>81.0</b>

\* Calculated by the authors based on the State Statistics Service of Ukraine

Indicators of export of vegetable oil from Ukraine from the beginning of the 2020/2021 MY to June inclusive, were observed to be 19% lower than in the previous corresponding period. Totally 5045.7 thousand tons of vegetable oil was exported. Percentage of export of sunflower oil showed the smallest decrease (–17.6%), rape oil was delivered to foreign markets almost twice more than in the same period last season, and soybean exports decreased by 31%.

During 2020/2021, sunflower oil was shipped to more than 130 countries of the world, and the main importers were India (31.3% of the total volume of exports) and China (21.4%), the total share of which in the total volume of Ukrainian exports reached 52.7%. A significant part of sunflower oil (25.6%) was exported to the EU, the main importers of which were the Netherlands (10.2%), Spain (5.5%), Italy (4.1%).

The export of protein grist from Ukraine in 2020-2021 is presented in the table 6.

**Table 6. Export of protein grist from Ukraine in 2020-2021 (as of July 1, 2021)**

**Примечание [A11]:** a dot instead of a comma to separate the whole and fractional part of the number

**Примечание [B12]:** there is no reference in the text to this table in front of it

Product name	January–June			September–June (for rape: July–June)		
	2021	2020	deviation from 2021 to 2020, %	2020/21 MY	2019/2020 MY	deviation 2020/2021 MY to 2019/2020 MY, %
Soybean grist	247.8	335.5	73.8	436.2	620.7	70.3
Sunflower grist	2302.0	3036.5	75.8	4046.3	4669.6	86.7
<b>Total</b>	<b>2549.8</b>	<b>3372.0</b>	<b>75.6</b>	<b>4482.5</b>	<b>5290.3</b>	<b>84.7</b>

\* Calculated by the authors based on the State Statistics Service of Ukraine

In September–June 2020/21 MY, Ukraine exported 4,482.5 thousand tons of protein grist (table 6), which is 15.3% lower than for the same period of the previous year. The export of sunflower grist decreased by 13.3%, and soybean grist - by 29.7%. The main importer of Ukrainian sunflower grist is China, whose share in the total volume of exports was 44.1%, as well as EU countries (31.4%). Among the largest importing countries of the European Union are France (11.0%), Poland (8.0%), Italy (3.9%), the Netherlands (3.3%), Spain (3.0%). Turkey (7.4%), Morocco (4.3%) and Belarus (4.2%) also entered the TOP-10 largest buyers. During September-June 2020/2021, Belarus reduced the import of Ukrainian sunflower grist by 42% compared to the same indicator of the previous season. This situation is due to the fact that during the reporting period, Belarusian buyers preferred cheaper Russian products, the purchase of which ultimately significantly reduced the volume of Ukrainian grist. During the specified period of 2020/2021 of the MY, deliveries of Russian sunflower grist to Belarus increased by 16% compared to the same period of the 2019/2020 MY. As a result, the share of Russian products in the Belarusian market increased to 57% compared to 40% in the previous similar season. Accordingly, the share of Ukrainian grist was 43% compared to 60% in the previous season. Thus, for the first time, sunflower grist of Russian origin dominates the Belarusian market.

Soybean grist was supplied mainly to Poland and Belarus (about 60% in total).

Demand/supply balances of oilseeds and vegetable oil (without taking into account the temporarily occupied territories of the Republic of Crimea, the city of Sevastopol and the Donetsk and Luhansk regions), according to expert assessments of the Ministry of Economy, the State Committee of Statistics, the State Customs

**Примечание [B13]:** a dot instead of a comma to separate the whole and fractional part of the number

Service and the association "Ukroliyprom" as of September-June 2020/2021 of the Ministry of Economy are presented in the table 7 and table 8.

**Table 7. Balance of demand/supply of sunflower seeds in September-June 2020/2021 MY, thousand tons**

	2020/2021 MY (predicted)	September-June 2020/2021 MY (fact)	2021/2022 MY (predicted)
<b>Product offer</b>	<b>13976</b>	<b>13944</b>	<b>16527</b>
Internal market - everything, including:	13946	13920	16500
– production	13136	13110	15100
– inventories at the beginning of the period	810	810	1400
– foreign market (import)	30	24	27
<b>Demand for products</b>	<b>13976</b>	<b>13944</b>	<b>16527</b>
Internal market - everything, including:	13570	12220	15560
– processing	13150	11800	15000
other consumption, including:	420	420	560
feeds and losses	350	350	480
seed	70	70	80
foreign market (export)	250	189	150
Inventory at the end of the period	156	1535	817

\* Calculated by the authors on the basis of expert assessments of the Ministry of Economy, the State Committee of Statistics, the State Customs Service and the association "Ukroliyprom"

The production of sunflower seeds in the 2021/2022 is expected to exceed the indicators of the 2020/2021 MY and will amount to 15.1 million tons compared to 13.1 million tons, and transitional stocks will be sufficiently high.

**Table 8. Balance of demand/supply of vegetable oil in September-June 2020/2021 MY, thousand tons**

	2020/2021 MY (predicted)	September-June 2020/2021 MY (fact)	2021/2022 MY (predicted)
<b>Product offer</b>	<b>6328</b>	<b>5534</b>	<b>7518</b>
Internal market - everything, including:	6108	5316	7298
Own production of oil, including:	6248	5505	7298
– sunflower	5920	5200	6750
– rape	100	120	230
– soybean	220	177	310
– other	8	8	8
Stock change	-140	-189	-
Foreign market (import)	220	218	220
<b>Demand for products</b>	<b>6328</b>	<b>5534</b>	<b>7518</b>
Internal market - everything, including:	570	480	540
– consumption fund	540	450	540

sunflower oil from it	400	340	400
– other consumption	30	30	-
Foreign market (export)	5758	5054	6978
sunflower oil from it	5380	4747	6350
Consumption per capita, kg per year	12.9	12.9	12.9

\* Calculated by the authors on the basis of expert assessments of the Ministry of Economy, the State Committee of Statistics, the State Customs Service and the association "Ukroliaprom"

**Примечание [A14]:** a dot instead of a comma to separate the whole and fractional part of the number

Therefore, the production and export of sunflower oil is expected to increase. 2020/2021 MY, which began in Ukraine in September, demonstrated an uncharacteristic sharp increase in the prices of oilseeds and, accordingly, processed products, which continued until the end of March. Thus, for the period from the beginning of the MY to March, according to the State Statistics Service, the average sale prices of sunflower seeds by agricultural enterprises of Ukraine (without VAT, transport, shipping and overhead costs) reached their maximum in March, having increased by 2 times during this period (from 10,041.1 UAH/ton to 20,868.6 UAH/ton). Prices for rape continued to rise until the end of the season and reached a maximum in June (15,916.4 UAH/ton), increasing by 1.5 times. The price for soybeans increased by 1.5 times by May (from 10,613.9 UAH/ton to 17,765.2 UAH/ton). After the specified periods, prices began to decrease.

Selling prices of unrefined and refined sunflower oil increased from the beginning of the season until May, inclusive, after which they began to decrease. Over the specified period, the price of unrefined sunflower oil increased by 1.7 times (from 22,615.47 UAH/ton to 39,082.28 UAH/ton), and refined deodorized oil - by 1.6 times (from 28,950.37 UAH/ton to 45,502.57 UAH/ton). Accordingly, sunflower oil also became more expensive in retail chains – average prices rose from UAH 35.1/l in September to UAH 64.95/l (including VAT) or 1.9 times. The reasons for the increase in the price of oil in 2020-2021 are quite objective - high prices for sunflower due to the reduction of the harvest and the increase in its export at the beginning of the marketing year, the increase in world prices for vegetable oil and, accordingly, the binding of domestic prices for them, taking into account the export orientation of its sales (at least 95%), as well as the constant increase in tariffs for all components of the cost of its production. (Масличный сезон 2020/21 – испытание на прочность для производителей подсолнечного масла Украины, 2021).



The processing capacity of the main types of oil crops in Ukraine today is estimated at the level of 24 million tons. The most powerful producers of unrefined sunflower oil are agricultural holdings that unite several enterprises, in particular the company "Kernel" (which includes seven enterprises: Prydniprovskiy, Bandurskiy, Vovchanskiy, Peresichanskiy, Poltavaskiy, Kropyvnyiyskiy oil extraction plants (OEP) and Ukrainian Black Sea Industry), the specific weight of which in the national production is 26.5%, «BUNGE» (Dnipropetrovsk Oil Extraction Plant and European Transport Stevedoring Company (Mykolaiv Oil Extraction Plant) – 12%, Vioil industrial group (Vinnytsia and Chernivtsi Oil and Fat Combine ) – 5.5%, Myronivskiy Hliboproduct Holding (MHP) – 4.3%. (Характеристика олійно-жирового комплексу України, 2019).

Refining capacity in Ukraine is estimated at 1123.18 thousand tons per year (3690 tons/day). The most powerful producer of refined oil is "Delta Wilmar Ukraine" LLC, whose specific weight in national refining is 42%. The second-ranked manufacturer is Bunge (PJSC Dnipropetrovsk Oil Extraction Plant). According to the results of September-June 2020/2021 MY, the largest producers of refined sunflower oil were the Dnipropetrovsk Oil Extraction Plant with a share of 19.6% of the national volume of production, Delta Wilmar Ukraine (14%) and Poltava Oil Extraction Plant Kernel Group (12%). In total, these enterprises produced 45.5% of the specified products.

According to the results of September - June 2020/2021 MY, the largest producers of soybean oil in Ukraine were the Katerynopil elevator, which is part of the MHP holding, the Globinsky processing plant (agro-industrial holding "Astarta") and Transpostach, whose combined share in total production was 52.4 %.

The main volume of rape oil production (87.8%) for the specified period was provided by four enterprises: Allseeds Black Sea, Oliyar, Vinnytsia OSCF and Delta Wilmar Ukraine. At the same time, at the end of May 2021, within the framework of the adopted strategic decision regarding the diversification of the raw material base, the Allseeds company imported 64,501 tons of Australian canola for the first time, which had a positive effect on the work of the processing plant and on the turnover of the Pivdenny seaport, which is a strategic Allseeds partner. The Linden Trader vessel

arrived at the port on May 1 and completed the shipment on May 15, 2021, the raw materials were processed at the facility and the manufactured products were exported.

Among the producers of margarine products and special fats according to the results of 2020/2021 MY, Zaporizhzhia OFP (TM Shchedro) is the undisputed leader, providing 43.8% of total production. It is inferior to Delta Wilmar (13.5%). In total, these enterprises produced more than 60% of the national volume of production.

The main producers of mayonnaise and sauces, namely: Lviv FP, Volyn-holding (TM "Torchyn"), Viktor and K (TM "Korolivskyi smak") and Chumak (TM "Chumak") together produced 61.1% of the total volume of these products in Ukraine. (Показатели качества майонезов и майонезных соусов. Расчет энергетической и пищевой ценности майонезов, 2021).

Further development of the market of oil and oil-fat products of Ukraine will take place in the direction of improving the quality of manufactured products in terms of their safety and expanding exports (Поверляк, 2013). This is due to the further application of international standards at the enterprises of the industry and the improvement of their regulatory and legal framework. Nowadays all enterprises engaged in export activities are guided in their work by the requirements of the international standard ISO 22000 - this standard is the basis for the FSSC 22000 certification scheme. On March 22, 2021, on the official website of the International Organization for Standardization (ISO) there were published new Guidelines for the implementation of ISO 22000:2018. This document contains a large amount of information on the development, implementation and support of a food safety management system (FSMS) in accordance with the requirements of the international standard ISO 22000:2018 "Food safety management systems. Requirements for all organizations in the chain of production and consumption of food products". New Guidelines ISO 22000:2018 "Food safety management systems. The practical guidance, published by ISO in conjunction with the United Nations Industrial Development Organization, provides detailed information to help organizations to implement FSMS in accordance with the requirements of ISO 22000:2018. (Сарафонова, 2018).

Having such a system in place can greatly benefit any food manufacturing organization as it can help to reduce the risk of contamination and harm to the final consumer. However, its implementation is not always a simple task and may require significant costs.

From April 1, 2021, the new version 5.1 of the FSSC 22000 certification scheme came into force. FSSC 22000 (Food Safety System Certification 22000) is a food safety management system certification scheme that includes the ISO 22000 standard, as well as technical industry specifications and additional requirements certification schemes. The scheme is recognized by the Global Food Safety Initiative (GFSI) and is based on ISO 22000, ISO 9001, ISO/TS 22003 standards. (Новые международные стандарты для пищевой промышленности в 2021 г., 2021).

The new version 5.1 of the FSSC 22000 scheme was published in November 2020 and is functioning since April 1, 2021. The main reasons for making changes to the new version of the FSSC 22000 certification scheme were:

- inclusion of requirements for comparative analysis of GFSI version 2020.1;
- strengthening the licensing process and integrity program;
- minor editorial changes or amendments to the requirements of the V5 scheme;
- a process of continuous improvement.

The FSSC 22000 scheme (version 5.1) consists of six parts and supplements. All these documents also contain mandatory requirements of the Scheme. There are also guidance documents on several topics for additional support. A feature of the transition to version 5.1. is that reissuance of certificates is not required, and audits according to version 5.1 are carried out from April 1, 2021.

Major changes in version 5.1. relate to:

- new additional requirements;
- new requirements for "multi-site" certification;
- the duration of the audit;
- food safety culture.

The main changes are presented in Table 9.

***Table 9. Major changes in FSSC 22000 (version 5.1)***

Name of the section	The main changes
Management of services and procurement materials	<ul style="list-style-type: none"> <li>- requirements for the internal laboratory were added;</li> <li>- the need for a procurement procedure in cases of emergency situations;</li> <li>- the need to control prohibited substances for slaughter animals;</li> <li>- the need to analyze the specifications</li> </ul>
Product marking	<ul style="list-style-type: none"> <li>- conformity of labeling with all applicable legislative and regulatory requirements in the countries of intended sales;</li> <li>- the need to take into account the requirements regarding the presence of allergens;</li> <li>- the need to take into account the individual requirements of consumers</li> </ul>
Storage	<ul style="list-style-type: none"> <li>- the need to organize the inventory circulation system in accordance with the principles of FEFO (First Expire, First Out) and FIFO (First In, First Out);</li> <li>- added new requirements for the time and temperature of cooling or freezing products after slaughter</li> </ul>
Hazard control and cross-contamination prevention measures	<ul style="list-style-type: none"> <li>- the need to develop special requirements in the case of using active materials;</li> <li>- the need to inspect animals during slaughter</li> </ul>
Verification of PP (prerequisite programs)	- the need to carry out regular inspections of the object and check the PP (for categories C, D, G, I, K)
Product development	- the need to establish, implement and maintain product design and development procedures for new products and product changes or manufacturing processes to ensure the production of safe and legal products
Health status of personnel	- the need to implement a procedure of guarantees regarding the absence of an adverse effect on the health of personnel on feed production operations (for category D)
Culture of food safety	- the need to introduce a culture of food safety - a new requirement of GFSI. Food safety culture according to GFSI is the shared values, beliefs and norms that influence the way of thinking and behavior regarding food safety within the organization

Примечание [-15]: these abbreviations have not been used before

\* Compiled by the authors based on [2].

However, the implementation of international standards at the enterprises of food industry should be balanced and justified in accordance with today's conditions. Thus, the Order of the Ministry of Economy "On establishing metrological requirements for packaged goods" No. 969 of July 5, 2017, which was about new requirements for labeling food products in Ukraine and the existence of a transition period regarding the introduction of packaged products into circulation, deserves attention does not meet the requirements of clause 1 of this order. According to the Order of the Ministry of Economic Development of Ukraine "On Amendments to Clause 3 of the Order of the Ministry of Economy" No. 462 dated March 5, 2021, from this date, food manufacturers had to switch to a new format for putting information on the packaging of packaged goods in accordance with Order of the

Ministry of Economy No. 969. But, taking into account the fact that in 2020 the consumption of certain categories of food products decreased significantly and, accordingly, their sales decreased, companies created significant stocks of packaging materials. In such a situation, companies would have to write off prepackaged food products and packaging materials in large quantities only because of the non-compliance of some minor labeling components with the new rules. Losses for the business could be significant, and moreover, unjustified, since it is only about the label and does not affect the safety and quality of the product itself. Costs could reach several million hryvnias for individual companies. This would create additional problems for business, which it is already difficult to work for in the conditions of the deterioration of the economic situation in the country and the strengthening of challenges caused by the COVID-19 pandemic and the war in Ukraine. In such conditions, companies were faced with the lack of opportunities for timely adjustment of production lines. For example, checking the correctness of setting the criterion of the number of packaged goods in the package and its deviation from the nominal value, which is mandatory in accordance with the Order of the Ministry of Economy. Service departments located in other countries do not provide guarantees of arrival in Ukraine before the end of the transition period to check the operation of the equipment, as well as due to military operations. In addition, some food enterprises in Ukraine have restrictions on the presence of outsiders in production during the imposed quarantine to ensure the safety of employees.

### **Conclusions.**

Fierce competition in the market of vegetable oil, not only in the domestic market of Ukraine, but also in the global market, obliges manufacturers to modernize production and introduce technologies that allow to increase its efficiency, reduce costs and ensure the enterprise's energy independence from external sources, as well as improve the quality of the finished products to expand its sales markets. The functioning of enterprises in the conditions of the global financial and economic crisis and strict quarantine measures caused by COVID-19 complicated situation on the market during 2020-2021, which became a real challenge for the enterprises of the food industry.

**Примечание [-16]:** since the article is submitted in English and can be read by foreign specialists, it is not appropriate to quote hryvnias, it is better in dollars

Despite all the difficulties, enterprises of the oil and fat industry of Ukraine conduct a balanced price policy, ensuring priority deliveries of sunflower oil to the trade network. Producers of bottled sunflower oil are currently actually subsidizing the domestic market, regardless of the world prices for this product, since, with the high cost of raw materials, they maintain prices on the domestic market which are lower than economically justified.

In the future, the market development prospects will be related to the improvement of the quality of final products (oil) and products of its deep processing based on the cultivation of high-quality raw materials. This is possible through the implementation of new norms of international standards, in particular ISO 22000, which contain new requirements for food safety management and guarantee its high quality.

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