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# FOREIGN TRADE AND COMPETITIVENESS OF RASPBERRY OF THE REPUBLIC OF SERBIA AND SELECTED COUNTRIES

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## ABSTRACT

The subject of this study is the analysis of foreign trade and competitiveness of raspberries from Serbia and selected major producers and exporters (Poland and Ukraine), as well as from neighboring countries where raspberries play an increasingly important role in production and export (Bosnia and Herzegovina and Bulgaria), in the period 2010-2021. The aim of the paper is to examine the competitive position of raspberries from Serbia and selected countries on global market and to give insight into changes between countries regarding competitiveness of raspberries. The results show that Serbia and Poland are leaders in the global market of frozen raspberries. Frozen raspberries from Serbia, Ukraine and Bulgaria are quality competitive, while Polish raspberries are competitive in price. The decrease in competitiveness of the leading countries on global market of frozen raspberries is noticeable, while the greatest increase in competitiveness was achieved in Ukraine.

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## Introduction

Raspberries have a special economic importance for the overall economic development of the Republic of Serbia, such as increasing employment and total income, developing the food industry, improving infrastructure, contributing to the reduction of the overall foreign trade deficit of the economy, etc.

The high yields and permanent export to the global market contributed to the development and intensification of raspberry production. The high economic results obtained in

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production led to investments in perennial raspberry plantations and the establishment of an economically profitable business. Intensive raspberry production requires an organized approach to improve product quality, increase economic efficiency of primary production and processing, and an active role of the state (Kljajić, 2017).

Raspberry production in Serbia meets domestic needs, and significant quantities are exported. This market has certain specifics – it can be evaluated as a perfect competitive market on the supply side and an oligopoly on the demand side. It is also characterized with low level of organization of purchases, producers and processors (Pantić et al., 2021). Raspberries are one of the most profitable agro-industrial products, ranking third from 2017 in export value (behind maize and tobacco). About 92% of raspberries produced in Serbia are exported as frozen products (Užar & Radojević, 2020).

The biggest competitors of Serbian raspberry production on the global market are Russia, Poland and Chile. Russia place more than 90% of its raspberry production on the domestic market. Poland, Chile and Serbia compete for competitive positions in global market (Radosavljević, 2014). In the region, main Serbian competitor is Poland, while potential competitors are increasingly important raspberry producers: Ukraine, Bosnia and Herzegovina, and Bulgaria. By joining the EU, Poland obtained certain competitive advantages towards the growing and realization of raspberry comparing to Serbia. Some of the leading EU agro-food companies have built their capacities for raspberries processing in Poland, what confirmed the exporting status of this country in the European raspberry market (Kljajić et al., 2023). Therefore, it is important to analyze to what extent Serbia is competitive on the global raspberry market, especially in comparison with selected producers and exporting countries.

Competitiveness is related to competition, rivalry, or the process of bidding for the best possible results in international trade. It can be observed at the level of the economy, sector, company or product. Competitiveness is the result of many factors, which is why its measurement is associated with many difficulties, especially for agriculture and its products (Božić et al., 2021). Competitiveness in global fruit market depends on internal and external factors, where internal factors relate to production condition, availability of labour, domestic prices and investments, while external factors include uniqueness of products, proximity of demand markets etc. (Erdem, 2020).

The aim of this paper is to conduct a comparative analysis of foreign trade exchange and competitiveness of raspberries from Serbia and selected neighbouring countries on global market in the period 2010-2021. Three starting hypotheses were defined in the paper. (1) Serbia and the selected countries are net exporters of raspberries and they have a revealed comparative advantage on the global market of frozen raspberry. (2) Serbian raspberries have quality competition comparing to raspberries from other selected countries on global market. (3) The competitiveness position of selected countries is changing, i.e. the position of current leaders is threatened.

## Materials and methods

The analysis of the characteristics of foreign trade of frozen raspberries in the Republic of Serbia and selected countries was carried out using descriptive statistics, relative indicators of dynamics (average growth rates and indexes) and structural indicators. The countries included in the analysis are the main producers and exporters of raspberries (Poland and Ukraine) and neighboring countries where raspberries play an increasingly important role in production and export (Bulgaria and B&H).

Fresh raspberries do not have a significant share in the foreign trade of Serbia and selected countries (with the exception of Poland), so the analysis of competitiveness was carried out only for frozen raspberries, which occupy a dominant position in foreign trade. To study the competitiveness of raspberries in foreign trade of Serbia and neighboring countries in the global market, the following indexes were calculated: modified Revealed Comparative Advantage Index ( $RCA_1$ ) or Net Export Index (NEI);  $RCA_2$ ; Unit value (or price) of exports and imports; and Relative unit value (RUV).

The  $RCA_1$  index (NEI) is calculated for a country level from the ratio between the foreign trade balance of a given product and the total volume of that product's trade with the world (Balassa and Noland, 1989):

$$RCA_1 / NEI = \frac{(X_{ij} - M_{ij})}{(X_{ij} + M_{ij})}$$

where  $X$  – export,  $M$  – import,  $i$  – country,  $j$  – product.

The  $RCA_1$  index ranges from -1 to +1. If the value of the index is less than zero, the country is a net importer of a given product and has no comparative advantage in trade; a value of  $RCA_1$  greater than zero indicates that the country is a net exporter of that product, the production productivity of that product is higher than the international average, and there is a comparative advantage of the country in trade of that product (Jovović & Jovović, 2018).

$RCA_2$  is calculated according to the following formula (Utkulu & Seymen, 2004; Božić et al., 2021):

$$RCA_2 = \frac{\frac{X_{ij}}{X_{it}}}{\frac{M_{ij}}{M_{it}}} = \frac{X_{ij}}{M_{ij}} \cdot \frac{M_{it}}{X_{it}}$$

where  $X$  – export;  $M$  – import;  $i$  – country;  $j$  – product;  $t$  – group of products.

The  $RCA_2$  index of comparative advantage refers to one country. It represents the ratio of the share of exports of one good in a country's total exports to a given market and the share of imports of that good in the country's total imports from that market. A value greater than 1 means that a country's product has a comparative advantage on a certain market in relation to other sectors of the national economy.

For the analysis of the competitiveness of frozen raspberries, in addition to the RCA indicators, indicator of unit value of export and import was used. It was calculated as the ratio of export and import of a given product, expressed in value and quantity, and is therefore also called unit price of export ( $P_{xj}$ ) or unit price of import ( $P_{mj}$ ). Product with a higher exports than imports ( $X_j > M_j$ ) and higher unit price of exports than imports ( $P_{xj} > P_{mj}$ ) has quality competitiveness on the foreign market. If the unit price of imports exceeds the unit price of exports ( $P_{mj} > P_{xj}$ ) the product is competitive in price. If a country's imports are higher than its exports, the country does not achieve external competitiveness at all (Jefferson Institute, 2006; Marković, 2019).

The relative unit value (RUV) was used for the analysis of competitiveness in quality. It was calculated from the ratio between the unit price of exports ( $P_{xj}$ ) and the unit price of imports ( $P_{mj}$ ) (Brkić & Velić, 2021):

$$RUV = \frac{\text{unit price of export } (P_{xj})}{\text{unit price of import } (P_{mj})}$$

The RUV indicator is used to analyze intra-industry trade, which can be horizontal and vertical. Vertical trade refers to the exchange of products with different degrees of processing and quality, while horizontal trade involves the simultaneous export and import of products with approximately the same quality.

Data on raspberry production in the world, the Republic of Serbia and selected countries, which are important producers and exporters of raspberries, were taken from the database of the UN Food and Agriculture Organization (FAOSTAT).

Data on foreign trade of fresh and frozen raspberries by individual country and at the global level were obtained from the International Trade Center (ITC) database. These data were used to calculate indicators of foreign trade exchange and competitiveness of raspberries for Serbia and selected countries. The ITC database uses the Harmonized System (HS) which is a standardized numerical method of classifying traded goods used worldwide. Due to limited access to data, especially on the lower interval groups, and inconsistent availability of data for individual countries, it was not possible to collect data on exports of fresh and frozen raspberries at the individual product level for Bosnia and Herzegovina, Ukraine, and for the global level. Instead, for B&H, Ukraine and global level for fresh raspberries we used data for group 081020 Fresh raspberries, blackberries, mulberries and loganberries and for frozen raspberries data for group 081120 Raspberries, blackberries, mulberries, loganberries, black, white or red currants and gooseberries.

## Results and Discussion

The total production of raspberries in the world has steadily increased in 2010-2020, reaching 895.8 thousand tons last year. The largest raspberry producers in the world are the Russian Federation (with 182 thousand tons, i.e. 20% of the world production in 2020), Mexico (146.3 thousand tons), Poland (121.7 thousand tons), Serbia (118.7 thousand tons) and the USA (100.6 thousand tons) (FAOSTAT, 2022).

Poland is the largest producer of raspberries, accounting for 51% of total EU production (USDA, 2021). The country has a long tradition of growing raspberries and invests heavily in research and development, creating a solid foundation to becoming one of the world's largest exporters of frozen raspberries (Paraušić & Simeunović, 2016). Ukraine is an increasingly important raspberry producer and is expected to soon pose a serious threat to polish producers given competitive prices and lower costs (Wroblewska et al., 2019). Bosnia and Herzegovina is increasing raspberry production mainly due to high prices for this fruit (Životić et al., 2018). In Bulgaria, there is a revival of raspberry production and growing interest in this crop (Domozetova, 2012).

In the foreign trade of raspberries at the global level, frozen raspberries have a much higher value than fresh ones. The world's leading exporters of fresh raspberries in 2021 were Spain and Mexico, which exported nearly half and, together with the United States, Morocco, and Portugal, more than 80% of the value of global exports of this fruit. The world's largest importers of fresh raspberries are the USA (42.3% of total imports), followed by Germany, Canada and the UK (with a share of 10% each) (calculation based on the ITC database).

Fresh raspberries are not significantly represented in the exports of the Republic of Serbia and selected countries. The value of fresh raspberry exports from Serbia in 2021 amounted to 6.8 million US dollars (2.3% of the value of total Serbian raspberry exports), while the average import of fresh raspberries reaches just 56 thousand US dollars. The exception among the selected countries is Poland, which has higher export and import value of fresh raspberries, but still significantly lower than the leading European exporters.

### Foreign trade of frozen raspberries in Serbia and selected countries

The Republic of Serbia is the world's largest exporter of frozen raspberries with a share of about one third in 2021 (in the total berry group - 081120). Large exporters of these fruits are also Poland, Chile and Ukraine (*Table 1*).

**Table 1.** Main exporters and importers of frozen raspberries\* in the world in 2021

10 leading exporters			10 leading importers		
Countries	Value (000 US \$)	Share in total export (%)	Countries	Value (000 US \$)	Share in total import (%)
<b>Serbia</b>	<b>527,704</b>	<b>32.4</b>	Germany	325,225	19.0
Poland	305,989	18.8	USA	172,289	10.1
Chile	118,775	7.3	France	160,320	9.4
Ukraina	93,267	5.7	Belgium	134,861	7.9
Belgium	71,037	4.4	Poland	130,179	7.6
Germany	69,889	4.3	Canada	84,131	4.9
B&H	59,883	3.7	Great Britain	81,233	4.8
Mexico	43,644	2.7	Austria	72,270	4.2
Netherlands	42,554	2.6	Netherlands	64,223	3.8
China	42,416	2.6	<b>Serbia</b>	<b>42,200</b>	<b>2.5</b>

\* Data at the global level are for HS group 081120

Source: Authors' calculation based on data extracted from ITC Database

The value of Serbian exports of frozen raspberries increased from an average of US\$180 million in the first observed five-year period to US\$ 241.5 million in 2015-2019, or by 34% (Table 2). In the last two years of analysis, the value of exports continued to increase, reaching US\$ 424.2 million in 2021 (2.4 times higher than in the first five-year period). The export of frozen raspberries accounts for 97.7% of the export value of this fruit in 2021.

Raspberries have high demand on the world market. Over 95% of harvested raspberry fruits from Serbia are directed to global markets, while only small quantities are placed on the local market (Kljajić et al., 2023). Numerous factors have contributed to the Republic of Serbia's leading position in the global market of frozen raspberries, where competition is becoming increasingly fierce. In addition to the production volume and quality of this fruit, Serbia's place on the list of world exporters also depends on the production in other competing countries, price fluctuations on the domestic and foreign markets, etc. The organization of the distribution channel for frozen raspberries is also an important factor. The largest competitors on the global market (Chile and Poland) are working on improving standards in raspberry production in order to fully develop their competitive position on the global market (Stojanović & Radosavljević, 2013).

In terms of the value of exports of frozen raspberries, Poland ranks second in the world. After a long period of stable exports, Poland exported US\$ 223 million worth of frozen raspberries in 2021.

Ukraine is a major competitor of Serbia and Poland, ranking fourth among exporters in 2021 with exports of frozen raspberries worth US\$ 93.3 million. Among the selected countries, Ukraine achieved the most significant increase in the value of frozen raspberry exports. Compared to the average of 2010-2014, exports in 2021 increased 48 times. The growing production of berries in Ukraine, combined with limited consumption, may threaten the relative stability of the raspberry market in both Poland and Serbia (Wroblewska et al., 2019).

**Table 2.** Export value of frozen raspberries from Serbia and selected countries

	Export (000 US\$)				Rang in the world in 2021**	2021/Ø(2010-2014)
	Average 2010-2014	Average 2015-2019	2020	2021		
<b>Serbia</b>	<b>180,025</b>	<b>241,513</b>	<b>295,217</b>	<b>424,241</b>	<b>1</b>	<b>236</b>
Poland	113,758	110,358	113,626	223,159	2	196
Ukraine*	1,950	15,919	44,087	93,267	4	4783
B&H*	14,575	36,838	40,930	59,883	7	411
Bulgaria	11,553	14,144	13,117	17,214	14	149

\* Data for HS group 081120; \*\* The rank for individual countries was calculated based on data for HS group 081120 at the global level

Source: Authors' calculation based on data extracted from ITC Database

Bosnia and Herzegovina recorded significant growth in the export of frozen raspberries, which reached a value of US\$ 59.9 million in 2021 (four times higher than the average of the first five years) and ranked 7<sup>th</sup> on the list of global exporters. The export of frozen raspberries is very significant in fruit and vegetable exports from B&H, both in terms of volume and revenue generated (Životić et al., 2018).

The value of Bulgarian exports of frozen raspberries has grown more slowly compared to other countries, reaching US\$ 17.2 million in 2021, placing the country 14<sup>th</sup> in the world.

The value of imports of frozen raspberries in Serbia and in all selected countries increases significantly and amounts to US\$ 29.4 million in 2021, which puts Serbia on the 10<sup>th</sup> place in the world (*Table 3*).

Poland recorded the highest value and the most significant increase in the value of imports of frozen raspberries throughout the period. In 2021, it ranked fifth with imports worth US\$ 113 million, just behind the world's leading importers (Germany, United States, France, and Belgium). The leading exporters of frozen raspberries are also major importers, which can be explained by increasing re-exports. These countries have developed marketing channels to resell raspberries imported from other countries, thus generating additional revenue (EastFruit, 2021).

**Table 3.** Import value of frozen raspberry from Serbia and selected countries

	Import (000 US\$)				Rang in the world in 2021**	2021/Ø(2010-2014)	Foreign trade coverage ratio in 2021 (%)
	Average 2010-2014	Average 2015-2019	2020	2021			
<b>Serbia</b>	<b>7,230</b>	<b>16,081</b>	<b>21,007</b>	<b>29,451</b>	<b>10</b>	<b>407</b>	<b>1,440</b>
Poland	9,527	27,489	50,103	113,006	5	1186	197
Ukraine*	639	275	1,073	1,244	49	195	7,497
B&H*	936	2,043	2,836	4,925	36	526	1,216
Bulgaria	1,041	750	1,453	4,318	35	418	399

\* Data for HS group 081120; \*\* The rank for individual countries was calculated based on data for HS group 081120 at the global level

*Source:* Authors' calculation based on data extracted from ITC Database

Bosnia and Herzegovina, Bulgaria, and Ukraine also increase the value of imports of frozen raspberries, but they are significantly lower than the leading importers. Export-import values show that all studied countries (except Ukraine in 2011) have a positive foreign trade balance for frozen raspberries, which is highest in Serbia with 394.8 million US\$ in 2021, or 2.3 times higher compared to the period 2010-2014.

The Republic of Serbia and selected countries achieve a high coverage of imports by exports, which may indicate the success and advantages they achieve in the production of this fruit. In the last year of the analysis, Ukraine has the highest coverage index of imports by exports of frozen raspberries, which is mainly due to the low value of imports of this fruit (*Table 3*).

Since frozen raspberry dominates in foreign trade of the Republic of Serbia and selected countries, its competitiveness in foreign trade is analyzed below. The importance of this analysis stems from the fact that Serbia and its competitors (Poland and Ukraine), as well as selected neighboring countries, export frozen raspberries to approximately the same destinations.

The Republic of Serbia exports frozen raspberries to more than 30 countries in the world, with the top ten countries taking more than 90% of the total export value of this product. Almost one third of exports of frozen raspberries goes to the German market (Užar & Radojević, 2020), and then to the world's leading importing countries: France, USA, Belgium and Poland. Poland exports frozen raspberries more or less to the same destinations: Germany, Belgium, France, the Netherlands and the UK. Besides Poland, the main export destinations of Ukraine are Germany, the Netherlands and France. These countries are also among the leading export destinations for frozen raspberries from neighboring countries (B&H and Bulgaria).

### Competitiveness of frozen raspberries in foreign trade of the Republic of Serbia and selected countries

In order to determine the competitiveness of Serbia and selected countries on the global market, the index of revealed comparative advantage  $RCA_1$  (or Net Export Index – NEI) was calculated. The values of this index are positive in the observed period for all studied countries (except for Ukraine in 2011) (Table 4). Positive values of the  $RCA_1$  indicate that countries are net exporters of frozen raspberries and that they achieve higher production productivity than the international average, i.e. they have a revealed comparative advantage (Božić et al., 2021).

The Republic of Serbia had the highest values of the  $RCA_1$  index for frozen raspberries in the first years of the analysis (until 2013), which indicates higher competitiveness on the global market compared to the selected countries. The decrease in competitiveness of Serbian frozen raspberries on the global market was caused by a number of business factors (prices, organization of purchasing, i.e. distribution channels, etc.), as well as by a higher growth rate of the value of imports compared to exports.

**Table 4.**  $RCA_1$  index of frozen raspberry from Serbia and selected countries

	Serbia	Poland	Ukraine	B&H	Bulgaria
2010	0.96	0.86	0.32	0.73	0.78
2011	0.97	0.82	-0.08	0.82	0.79
2012	0.90	0.87	0.36	0.90	0.81
2013	0.90	0.87	0.43	0.91	0.85
2014	0.90	0.82	0.81	0.93	0.91
2015	0.90	0.71	0.90	0.94	0.96
2016	0.90	0.73	0.94	0.94	0.97
2017	0.85	0.57	0.97	0.95	0.89

	Serbia	Poland	Ukraine	B&H	Bulgaria
2018	0.85	0.53	0.99	0.91	0.84
2019	0.87	0.38	0.98	0.75	0.80
2020	0.87	0.39	0.95	0.87	0.80
2021	0.87	0.33	0.97	0.85	0.60

*Source:* Authors' calculation based on data extracted from ITC Database

Research by Wroblewska et al. (2019) confirms that the competitiveness of other countries has increased compared to the current leaders in the European raspberries market. Lower production costs in Ukraine have a significant impact on the increased competitiveness of raspberries compared to the current leaders in the European raspberry market (Serbia and Poland).

The most significant decrease in competitiveness of frozen raspberries on the global market in the studied period, measured by the  $RCA_1$ , is characteristic for Poland, which is mainly due to the higher growth rates of the value of imports compared to exports. Wroblewska et al. (2019) point out that the different operating conditions on the raspberry market are likely to put Polish producers in a more difficult position compared to foreign producers, who are subject to relatively lower production costs. Given the low supply and high prices of domestic fruits, imports of frozen raspberries from Ukraine to Poland at significantly lower prices are increasing. For this reason, Polish raspberry producers will have to change significantly in terms of improving production efficiency and fruit quality in order to effectively compete with both Serbia and Ukraine.

The largest increase in competitiveness of frozen raspberries was achieved in Ukraine, where the value of exports of this fruit reached a significant increase (by 48 times) compared to the increase in imports (by 95%) in the studied period. The increase in competitiveness with smaller fluctuations is also characteristic for selected neighboring countries.

In the following part of the analysis, the Index of Revealed Comparative Advantage ( $RCA_2$ ) is calculated. The value of this index, which is greater than 1 for all years and all countries, indicates that frozen raspberries have a comparative advantage in foreign trade in the global market compared to other products of these countries (Table 5).

**Table 5.**  $RCA_2$  index of frozen raspberries from Serbia and selected countries

	Serbia	Poland	Ukraine	B&H	Bulgaria
2010	75.2	14.5	2.3	12.1	9.9
2011	106.5	10.9	1.0	18.9	9.8
2012	31.4	14.9	2.6	38.7	12.0
2013	25.9	14.6	3.0	37.8	14.6
2014	27.0	10.3	9.9	54.8	24.8
2015	24.9	5.9	19.6	54.6	55.3
2016	24.5	6.1	37.9	51.2	63.5

	Serbia	Poland	Ukraine	B&H	Bulgaria
2017	16.1	3.6	68.5	58.2	18.5
2018	17.2	3.3	175.0	33.7	13.0
2019	19.8	2.2	127.4	12.1	10.2
2020	19.0	2.3	44.9	23.2	9.9
2021	19.0	2.1	79.6	18.4	4.5

*Source:* Authors' calculation based on data extracted from ITC Database

The highest value of the  $RCA_2$  in the first years of the analysis was recorded in Serbia and was 106.5 in 2011, which confirms the extraordinary importance of frozen raspberries for the country's overall foreign trade. In the following years, the value of the indicator generally decreased, which points to the decrease in competitiveness of frozen raspberries in comparison with other sectors of national economy, which is also characteristic for Poland during the analysed period.

At the same time, the value of the  $RCA_2$  increased in the neighboring countries – Bosnia and Herzegovina and Bulgaria, except in the last years of the analysis. The highest value of  $RCA_2$  was reached in Ukraine in recent years (175 in 2018), indicating the growing importance of frozen raspberries in foreign trade and the growth of competitiveness comparing with other sectors of the economy.

For the analysis of competitiveness of Serbia and selected countries in the global market of frozen raspberries, the unit price of exports ( $P_{xj}$ ) and the unit price of imports ( $P_{mj}$ ) were calculated. Although Serbia is the leader in raspberry production measured by quantity, this does not mean that it can dictate the export price, as it does not have well-organized marketing channels. The price of raspberries on foreign and domestic markets is also influenced by the supply from other countries (Stojanović & Radosavljević, 2013). The price of agricultural products on the global market is influenced by other factors such as product quality, demand, barriers to entry etc. (Nikolić et al., 2021).

The unit price of export ( $P_{xj}$ ) of frozen Serbian raspberries ranged from \$2,048 to \$4,343 per tonne and was higher than unit price of export in Poland, Ukraine and Bosnia and Herzegovina, in all years, while it was generally lower than the unit price of export in Bulgaria (*Table 6*).

The particular climatic location of the Republic of Serbia and a warmer climate, characterized by a longer growing season, allows raspberries to be harvested earlier than in competitor countries which ensure a slightly higher price. The higher price of Serbian raspberries compared to those in Poland and Ukraine is the result of many years of improvements in cultivation as well as the ability to maintain high fruit quality both during and after harvest (Wroblewska et al., 2019).

**Table 6.** Unit price of export of frozen raspberry in Serbia and selected countries (US\$/tons)

	Serbia	Poland	Ukraine	B&H	Bulgaria
2010	2,702	2,085	1,348	2,194	2,526
2011	2,397	1,938	1,508	2,276	2,640
2012	2,111	1,617	1,348	2,163	2,282
2013	3,051	2,100	1,387	2,853	2,933
2014	3,224	2,583	1,570	2,926	3,073
2015	2,853	2,375	1,360	2,675	3,319
2016	2,881	2,457	1,268	2,596	3,570
2017	2,483	2,026	1,356	1,788	3,106
2018	2,184	1,818	1,275	1,680	2,776
2019	2,048	1,710	1,519	1,669	2,533
2020	2,750	2,322	2,062	2,390	3,214
2021	4,343	3,730	1,838	4,192	4,764
Average	2,752	2,230	1,488	2,450	3,061

*Source:* Authors' calculation based on data extracted from ITC Database

The lowest unit prices of export for frozen raspberries were recorded in Ukraine (*Table 6*), which can be explained by the lowest production costs. With a similar technological level, the main factors determining the level of costs are human labor and natural conditions. Due to significantly lower costs per labor hour and fewer basic protection and fertilization treatments resulting from more favorable natural conditions, the direct costs of raspberry production in Ukraine were only slightly higher than half of those in Poland and Serbia (Wroblewska et al., 2019).

By comparing the unit prices of exports and imports, conclusions can be drawn about the source of competitiveness of products in the global market. Higher unit prices of exports indicate that a particular country sells products at higher prices than its competitors, implying that this product has certain non-price dimensions of competitiveness, which may be quality.

A higher unit export price is not necessarily an indicator of the quality of export goods. Low unit export prices may be the result of various factors such as low costs. However, a good whose export value is higher than the import value ( $X_j > M_j$ ) and which achieves a higher unit price of exports than imports ( $P_{xj} > P_{mj}$ ) is assumed to be qualitatively competitive in the foreign market. If the first condition is met, but the unit price of imports exceeds the unit price of exports ( $P_{mj} > P_{xj}$ ), the product is price competitive.

The unit price of frozen Serbian raspberry exports was generally higher than the unit price of imports (*Table 6 and 7*). This indicates that frozen Serbian raspberries are competitive on the global market in terms of quality. The higher quality of Serbian raspberries is related to the sugar content of the fruit, i.e. the particular climatic location of the Republic of Serbia, the cultivated varieties, and the maintenance of high quality of the fruit during and after harvest.

**Table 7.** Unit price of import of frozen raspberry in Serbia and selected countries (US\$/tons)

	Serbia	Poland	Ukraine	B&H	Bulgaria
2010	2,899	3,309	1,064	2,334	3,040
2011	2,136	2,672	1,164	2,358	2,780
2012	1,995	2,450	1,132	2,324	2,393
2013	2,508	3,366	920	2,813	2,411
2014	2,936	3,185	890	2,290	2,517
2015	2,869	2,982	851	2,327	3,144
2016	2,663	2,516	733	2,036	3,164
2017	1,878	2,049	880	1,779	2,409
2018	1,650	1,784	1,016	1,919	2,872
2019	1,828	1,848	1,695	1,923	2,908
2020	2,620	2,546	1,646	2,338	3,307
2021	4,525	4,247	2,029	4,114	4,563
Average	2,542	2,746	1,168	2,380	2,959

*Source:* Authors' calculation based on data extracted from ITC Database

Regarding the relationship between export and import unit prices for frozen raspberries, there are differences between the selected countries. In Poland, the value of exports of frozen raspberries is higher than that the imports, and the unit price of export ( $P_{xj}$ ) is lower than the unit value of import ( $P_{mj}$ ) in all years of analysis (except 2018). This confirms that Polish frozen raspberries are price competitive on the global market. Poland, as a member of the EU, achieves significant price competitiveness through extensive investment incentives from EU funds, as well as through well-organised channels for the sale, purchase, processing, and export of frozen raspberries.

Ukraine generally has higher unit prices of export than import for frozen raspberries, which, along with the surplus in the exchange of this fruit, indicates that frozen raspberries from Ukraine achieve competitiveness in terms of quality on the global market. Low export prices of Ukrainian raspberries (lower compared to prices in other selected countries) are primarily the result of lower production costs and may not necessarily be an indicator of the quality of exported frozen raspberries.

Bosnia and Herzegovina generally has a higher unit price of exports than imports, which, together with the surplus obtained in the exchange of frozen raspberries, indicates that the country is competitive in terms of quality on the global market. It is similar with Bulgaria, which has the highest export prices for frozen raspberries and is competitive on the global market in terms of quality.

For further analysis, the RUV (Relative Unit Value) indicator was determined as the ratio between unit prices of export and import. The RUV indicate that there are significant differences between the selected countries in terms of the degree of specialization in the trade of frozen raspberries.

Horizontal IIT specialization occurs when export and import of frozen raspberries are of approximately the same quality. This was the case in Serbia in most years, as well as in Bosnia and Herzegovina and Bulgaria.

**Table 8.** RUV of frozen raspberry in Serbia and selected countries

	Serbia	Poland	Ukraine	B&H	Bulgaria
2010	0.93	0.63	1.27	0.94	0.83
2011	1.12	0.73	1.30	0.97	0.95
2012	1.06	0.66	1.19	0.93	0.95
2013	1.22	0.62	1.51	1.01	1.22
2014	1.10	0.81	1.76	1.28	1.22
2015	0.99	0.80	1.60	1.15	1.06
2016	1.08	0.98	1.73	1.27	1.13
2017	1.32	0.99	1.54	1.00	1.29
2018	1.32	1.02	1.26	0.88	0.97
2019	1.12	0.93	0.90	0.87	0.87
2020	1.05	0.91	1.25	1.02	0.97
2021	0.96	0.88	0.91	1.02	1.04

*Source:* Authors' calculation based on data extracted from ITC Database

If the RUV indicator is above 1.15, it is considered a high quality export. This was found in Ukraine, which means that frozen raspberries of higher quality are exported and those of lower quality are imported (Table 8). If the RUV is below 0.85, it is considered to be a low-quality export, meaning that a country exports products of lower quality (at lower prices) and imports products of higher quality (at higher prices). This was found in Poland in the first years of the analysis.

## Conclusion

The Republic of Serbia and selected countries (Poland, Ukraine, Bosnia and Herzegovina, and Bulgaria) are major producers of raspberries and exporters of frozen raspberries. Serbia is the world's largest exporter of frozen raspberries, and its biggest competitors are Poland and Ukraine.

The values of  $RCA_1$  and  $RCA_2$  show that the selected countries are net exporters of frozen raspberries and achieve productivity in production higher than the international average, i.e. they have a revealed comparative advantage. It was confirmed that Serbia and Poland are leaders in the frozen raspberry market, but other countries also have a growing competitive position, especially Ukraine. This implies that all starting hypothesis in the paper are confirmed.

The higher unit price of export of Serbian frozen raspberries compared to the unit price of import indicates that Serbia is more competitive on the global market in terms of quality compared to the selected countries. Lower unit price of export compared to

import and positive foreign trade balance confirm that Polish frozen raspberries are price competitive on the global market, but also that this competitiveness is decreasing.

During the observed period, Ukraine had the lowest unit price of export for frozen raspberries. This means that Serbia and other countries need to improve the economic efficiency of raspberry production and processing, while improving quality, in order to successfully compete in the global market of frozen raspberries.

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### Conflict of interests

The authors declare no conflict of interest.

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