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Serbia oil crops export potentials

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Summary: Oil crops are very significant, both in the world and in Serbia. In terms of production, the three most important oil crops in Serbia are sunflower, soybean and rapeseed. Besides significant oil crops production, substantial quantities of oil are produced as well due to significant processing capacities in Serbia. Considering the fact that over the last few decades Serbian market has been characterized by integration with the international market and considering the actual market liberalization with the EU, CEFTA countries, Russia and others this paper analyses production and export of oil crops with special emphasis on comparative advantages in the export of oil crops using the method of revealed comparative advantage. Also, the level of intra-industry trade is considered in relation to the international market, EU and CEFTA countries. The results indicate that oils have more significant comparative advantage on international market, especially sunflower oil.

Key words: exports, markets, oil crops, sunflower

Introduction

The last two decade Serbian market was characterized by economic integration with foreign countries. The economic integration triggered numerous changes in terms of intensity and the structure of agri-food products trade. Also, market liberalization had an influence on oil

crops trade as well. Namely, previous research indicate that the Stabilization and association agreement with the European Union (EU) had influence on agri-food products export growth for 46%, and that at the same time the agreement with CEFTA countries had influence on the trade growth for 90% (Matkovski et al., 2017). Also, the previous research that considered oil crops market indicated a surplus in oil crops exchange during the coming liberalization (Popović et al., 2016).

Oil crops production is gaining in importance. According to OECD-FAO (2018) there are a great number of factors that influence on oil crops demand. In the last period, the most important factors that influenced on oil cake and oils demand were demand growth in developing countries which was induced by income and population growth. According to Agricultural Census (2013) three most important oil crops in Serbia are sunflower, soybean and rapeseed. Those three plants dominate in the structure of arable land with 97.5% among oil crops.

The aim of this paper is to look at the position of oil seeds and its preparations from Serbia on the international market. Namely, the aim is to perceive the export potential and the level of market integration with the international market. Also, the aim is to perceive the level of competitiveness on international market. The question of Serbian competitiveness determination is not an easy task. The most acceptable definition of competitiveness is the definition of World Economic Forum (WEF, 2015) that by competitiveness consider "a set of institutions, policies and factors that determine the level of productivity of the state". When it comes to the competitiveness of Serbian agri-food products in international market, numerous studies indicate that these products have lower level of competitiveness than it is the case with those products from EU. Erjavec et al. (2014) state that the main reason for this production performances gap in relation to other countries is lower level of labor productivity. A positive tendency is the progress of Serbia in terms of competitiveness ranking. Namely, in 2018 Serbia ranked 65th in the competitiveness rankings (out of 140 analysed countries), while in 2012 Serbia ranked 93rd (out of 148 countries analysed) (WEF, 2019). When it comes to oil crops, certain number of studies considered the level of oil crops competitiveness as well as the level of the Serbian market integration with the international market. Birovljev et al. (2015) examined Serbian agri-food products competitiveness on the market of region countries and found that in analysed period processed oil crops had greater comparative advantages than it is the case with oilseeds. Authors also realized that the greatest comparative advantages were evident in the export of these products to the Montenegro. The fact that vegetable fats and oils have greater comparative advantages than oilseeds confirmed the research of the authors Božić & Nikolić (2016). When it comes to the level of integration of these products with international market, using the intra-industrial trade index authors Matkovski et al. (2017) noticed a greater degree of integration of the market for oilseeds then for processed oil crops. Given the way in which this indicator is quantified, the reason for the slightly lower degree of integration of the market for the processed oil crops should be sought in the lower level of production of these products, which implies a lower level of exports of these products, especially in the CEFTA countries.

The structure of the paper consists of four sections. The first section is introduction which includes subject and aim of the paper, as well as literature review of the Serbian oil crops export potential on international market. Next section of the paper includes the materials and methods that had been used for the empirical part of the paper. The third part represent the results of the research and it encompass oil crops production potential at the world market, Serbian oil crops production potential, export tendencies, structure of export of oil crops and regional structure of export, comparative advantages and level of market integration. The last part includes conclusions with recommendation for future research.

Material and Method

For the analysis of the potentials of oil crops market, the three most important oil crops were selected: sunflower, soybean and rapeseed. Also, in the analysis of foreign trade, the data for the three most important oil crops were used, according to the Standard International Trade Classification (SITC), revision 4: 08 - Feeding stuff for animals (081.3), 22 - Oilseeds and oleaginous fruits (222.2, 222.4, 222.6) and 42 - Fixed vegetable fats and oils, crude, refined, or fractioned (421.1, 421.5, 421.7). For the necessary empirical basis of the research, data from the Statistical Office of the Republic of Serbia (SORS, 2019) were used, while data on the international oil crops market were taken from FAOstat (2019). This research was conducted for the period 2005-2018.

For the analysing of the export positions of oil crops from Serbia on the international market, but also on the markets of EU and CEFTA countries, the index of revealed comparative advantages was used, namely its modified version - the Lafay Index (LFI), established by the author Lafay, 1992.

$$LFI_j^i = 100 \left(\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^N (x_j^i - m_j^i)}{\sum_{j=1}^N (x_j^i + m_j^i)} \right) \frac{x_j^i + m_j^i}{\sum_{j=1}^N (x_j^i + m_j^i)}$$

where is: x – export, m - import, i – country; j – division/product; N – total export/import. When LFI is > 0 , it implies the existence of comparative advantages, and the higher the value of this index, the greater is the level of comparative advantages in the export of that product. This index of comparative advantages provides a more complete analysis of the positions of individual products or commodity group on the international market (Zekić et al., 2016).

In order to define the degree of integration of Serbia's oil crops market with the international market, as well as the most important markets (EU and CEFTA), the intra-industrial exchange index established by Grubel & Lloyd (1975) was used:

$$GLIIT_j = \left[1 - \frac{\sum_j |X_{ij} - M_{ij}|}{\sum_j |X_{ij} + M_{ij}|} \right] * 100$$

where is: X – export; M – import; i – country; j – division/commodity group. The value of this index closer to 100% indicates intra-industrial trade, which implies a higher level of economic integration of a sector, section or commodity group with a particular market, as well as adjusting to market conditions at a lower cost.

Results and Discussion

Oil crops production

In the period from 2005 to 2017 the production of oil crops in the world had been growing at an average annual rate of 6.53% (Figure 1). Sunflower average annual growth rate was at the highest level of 4.49% followed by soybean (4.37%) and rapeseed (3.76%). The EU production of oil crops had been growing as well at an average annual rate of 2.66%, and soybean production was growing at the highest annual rate of 8.11% (FAOstat, 2019). More than 40% of world's soybean production is traded worldwide. Soybean trade is expected to decline in the coming period mainly due to a decline in the soybean processing in China. When it comes to trade in other oil crops, around 14% of the total world's oil crops production is traded on the international market (OECD/FAO, 2018).

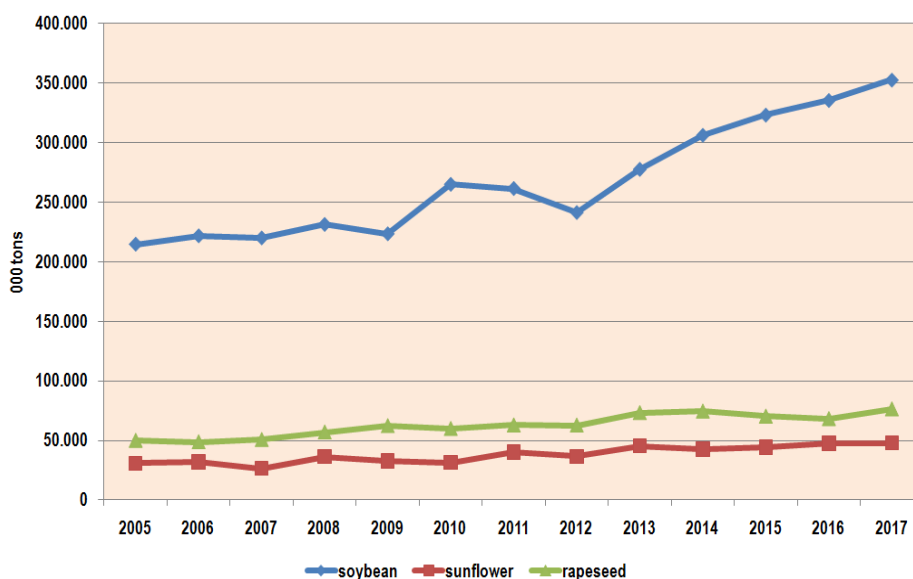


Figure 1: Production of oil crops in world in period 2005-2017
 Source: The authors' calculations on the basis of FAOstat, 2019

The production of oil crops in Serbia is becoming more important. According to harvested area, the three most important oil crops in Serbia are sunflower, soybean and rapeseed. Unlike world oil crops production where the soybean production is the most important oil crops, in Serbia sunflower is the most important oil crops. According to Kaya (2014) Serbia sunflower production is not only important for the Serbia but for other countries from the region. In the analysed period, below average sunflower production was achieved until 2012 (Figure 2), after which production began to rise with significant growth in sunflower production in 2016 and 2018. According to data of FAOstat (2019), sunflower yields in Serbia are among the highest in Europe and in period 2006-2017 Serbia was on fourth place in Europe, after Switzerland, Croatia and Austria.

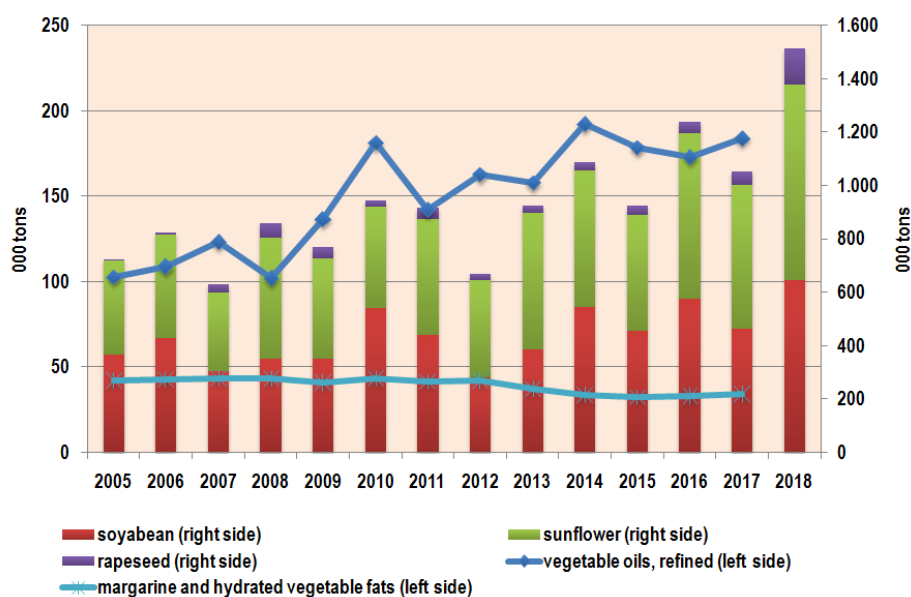


Figure 2: Production of oil crops and oils in Serbia in period 2005-2018

Source: The authors' calculations on the basis of SORS, 2019

Soybean is one of the most important leguminous species in Serbia and successful production is achieved through the selection of high-yielding varieties and the correct and timely production technology. Total soybean production records a significant oscillation with a tendency to grow (Figure 2). The record production from 645 thousand tons was achieved in 2018. Although represents one of the three most important oil crops in Serbia, rapeseed production covers small part of arable land relative to sunflower and soybean. The first significant increase of rapeseed harvested area and significant increase of rapeseed production was in 2007 when first biodiesel production plant was opened in Serbia. After that rapeseed production and area harvested had tendency of slow growth. The record production was achieved in 2018 as a result of important increase of area harvested, from 19,379 ha in 2017 to 45,628 ha in 2018. Also, important factors that induce changes in rapeseed areas are weather conditions during sowing (drought) and sometimes due to freezing of crops during winter.

Looking at the oil crops production by regions, it can be concluded that dominant role in the production have north part of Serbia (Srbija-Sever). According to SORS data (2019) more than 90% of total sunflower, soybean and rapeseed production comes from north part of Serbia which is expected considering the size of area harvested with these three crops. According to Đurišić-Mladenović et al. (2018) such unequal production of this crops is the result of several factors. Namely, Vojvodina has a long tradition when it comes to oil crops production and the greatest number of oil plants is located in that region of Serbia. Also, north part of Serbia has much more favourable conditions for oil crops growing than mountain part of Serbia (Srbija-Jug).

Oil crops processing capacities allow for an annual processing of about 885 thousand tons of sunflower, 482 thousands of soybean and 247 thousands of rapeseed. However, oil production is far lower with an average utilization rate of processing capacity of about 40% for sunflower and 70% for soybean (Službeni glasnik Republike Srbije 85/2014, 2014). In period from 2015 to 2017 the production of refined vegetable oil averages 149 thousand tons per year, while the production of margarines and hydrated vegetable fats averaged 33 thousand ton which represents about 94% of Serbia's total production. Oil crops processing capacities could process far more quantities of oil crops but, according to SORS data, in analysed period significant amount of oil crops production is being exported instead processed. One of the reasons for this imbalance between processed and exported/imported oil crops quantities is unfair relations between oil crops processors and producers. Also, the oil crop processing industry is characterized by an unfavourable environment that involves the takeover of some processing capacities in some years. Also, there have been the obvious distortions of competition in the edible oil market in some years. The largest producer of oil is Viktoriaoil from Šid. Significant producers are Dijamant from Zrenjanin, Vital from Vrbas, Novo Sunce from Sombor, Banat from Nova Crnja and Sojaprotein from Bečej. Viktoriaoil and Sojaprotein are part of the Viktoria Group, Vital is part of the Invej group, while owner of Novo Sunce is Bimal.

Serbia's oil crops export

In the period from 2005 to 2018 oil crops export represent important part of total agri-food products export. That is, oil crops export account for 8% of total agri-food export (Figure 3). Oil crops export from Serbia recorded an average annual growth rate of 16% and the largest growth was in the case of oilseeds. The highest export value was achieved in 2016 when worth of these products export was over \$343 million.

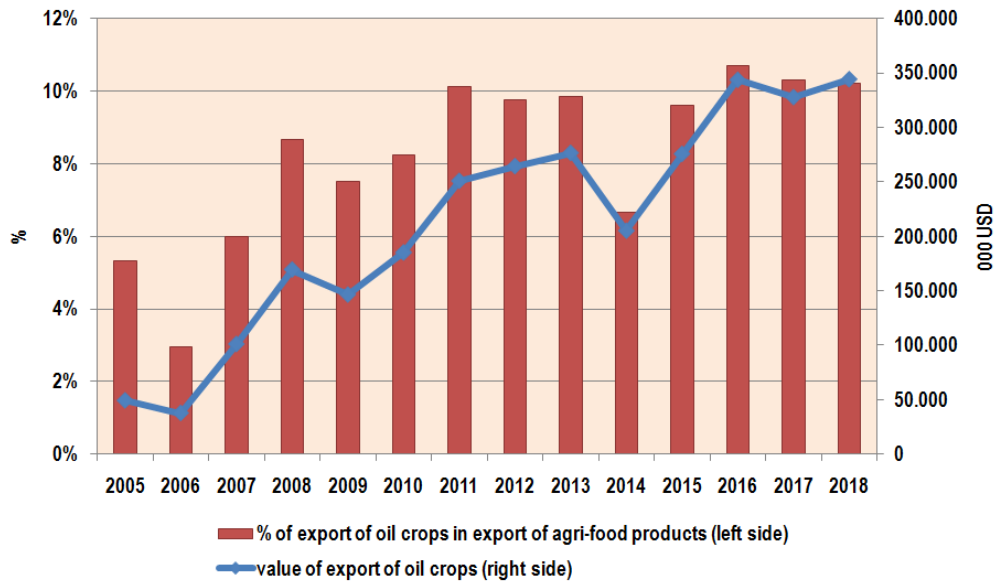


Figure 3: Export of oil crops from Serbia in period 2005-2018
 Source: The authors' calculations on the basis of SORS, 2019

The structure of oil crops export value is dominated by oil export (64%) followed by the oil seeds export (27%) (Figure 4). From the aspect of oil crops export, the most important oil crop is sunflower. Sunflower export is dominated by sunflower oil export which accounted 42% of total oil crops export. Sunflower seeds export represents 12% of total oil crops export, with a tendency of an export growth especially on the market of Bosnia and Herzegovina. Such a great amount of sunflower seeds export is directed to Bosnia and Herzegovina as a result of newly opened processing capacities in this country, very low oil crops production in this country and special trade agreement between Bosnia and Herzegovina and Turkey. Soybeans export accounted 30% of total oil crops export, of which 10% relates to crude soybean oil, 9% to soybean seeds and the rest to the soybean cake. The lowest importance in the export structure has rapeseed with 10%, of which 5% refers to rape seed, 4% on rapeseed oil and the rest on the rapeseed cake.

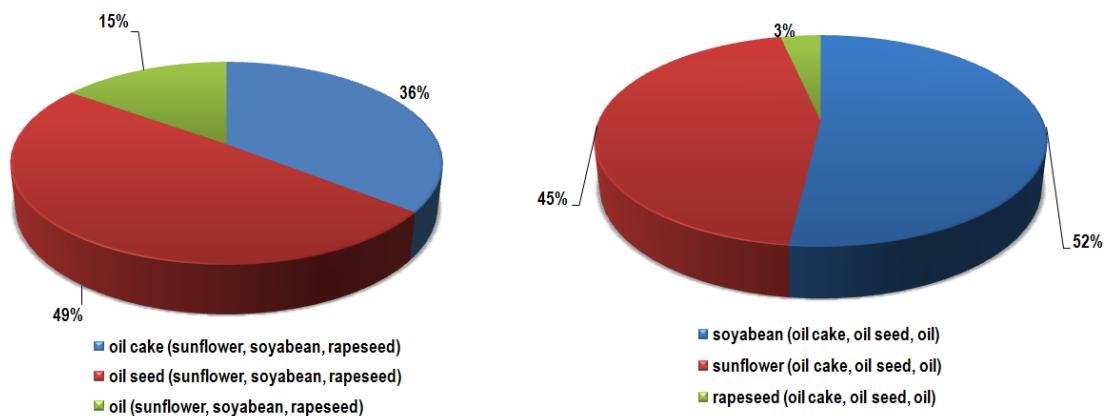


Figure 4: Structure of export of oil crops of Serbia in period 2005-2018
 Source: The authors' calculations on the basis of SORS, 2019

The largest share of oil crops export is directed to EU countries (63%) (Figure 5), especially to the Italy, Croatia, Slovenia, Germany and Hungary. CEFTA countries accounted for about 33% of total oil crops export and the most important importing country is Bosnia and Herzegovina.

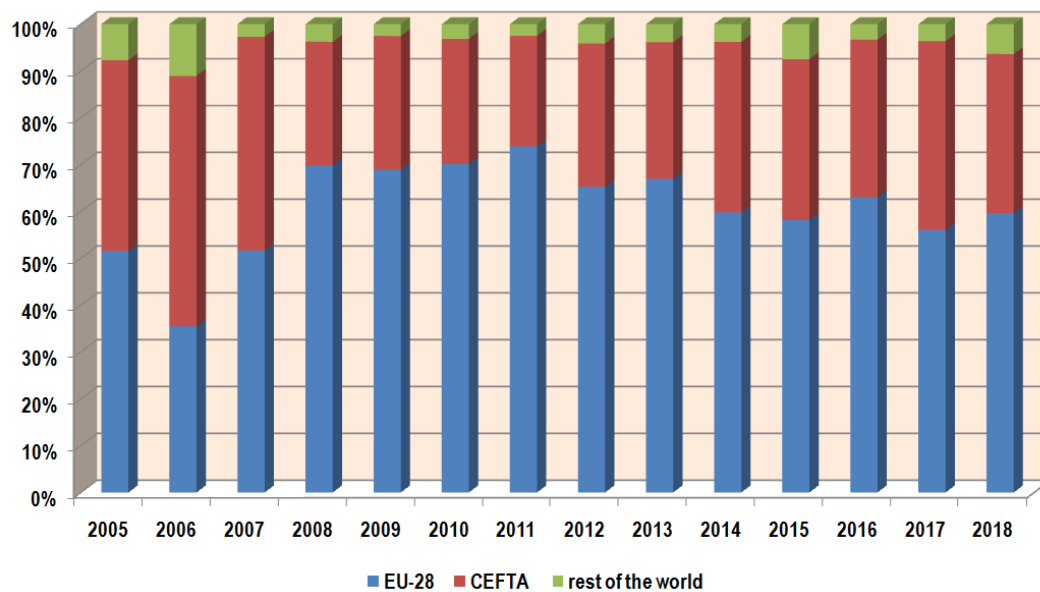


Figure 5: Regional structure of export of oil crops of Serbia in period 2005-2018

Source: The authors' calculations on the basis of SORS, 2019

One of the biggest challenges for the processing oil crops industry is the trend of sunflower exports to Bosnia and Herzegovina, to which Serbia has responded by trying to establish an administrative ban on sunflower exports. Serbia also increased its exports of crude oil to Bosnia and Herzegovina, while reducing its exports of refined oil to EU countries. As Bosnia and Herzegovina has made significant oil exports to Turkey, and bearing in the mind the same conditions as the tariff rate of Serbia and Bosnia and Herzegovina for exporting oil to this country, it is obvious that additional efforts should be made to establish relations with this market (SEEDEV, 2017).

Comparative advantages of export of oil crops from Serbia

Analysing the levels of comparative advantage for the main oil crops products (Figure 6), it is obvious that the highest level of comparative advantage on the international market has sunflower, which participated about 45% in the total value of oil crops exports. Significant comparative advantages of sunflower on the international market, without significant variations, are realized due to the significant export of sunflower oil, but also the growth of sunflower seed exports. Rapeseed and its products have comparative advantages in the international market, but the presence of this oil crop in Serbia is very small. The greatest fluctuations in the level of comparative advantages are observed in soybeans due to significant fluctuations in foreign trade. These fluctuations are present due to different levels of imports of soybean cake in Serbia, but also variations in the exports of soybean seeds and soybean oil from Serbia.

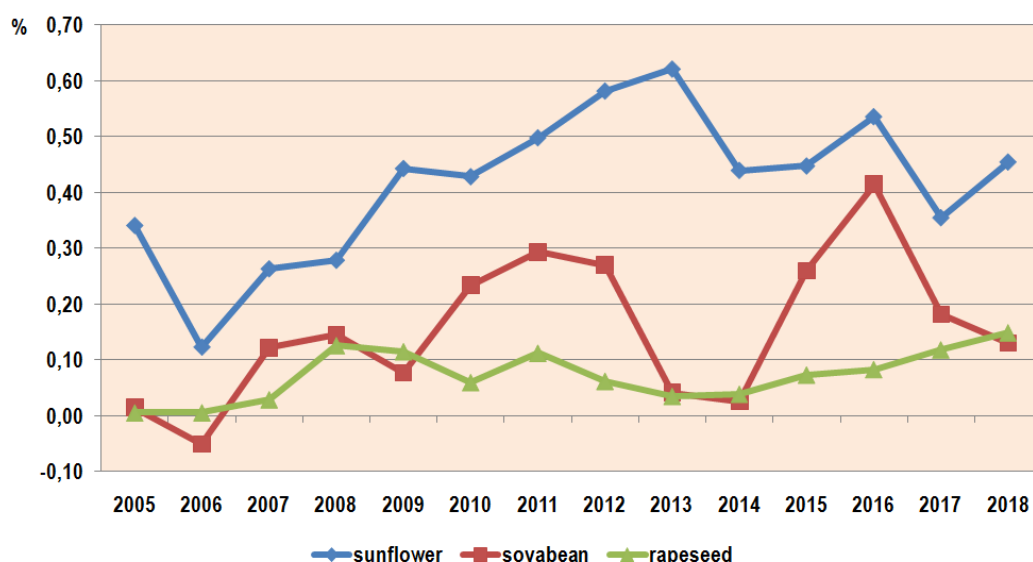


Figure 6: Comparative advantages of export of sunflower, soyabean and rapeseed and its preparations of Serbia

Source: The authors' calculations on the basis of SORS, 2019

If the level of comparative advantages of oil crops is analysed individually for cakes, seeds and oils (Table 1), it can be concluded that the most significant level of comparative advantages on international market is achieved by oils, which in the export structure of oil crops participate over 64%. In few analysed years, the oil cakes have comparative advantages, while oilseeds and oleaginous fruits have no comparative advantages in exporting from Serbia. The main reasons are the significant fluctuations in the foreign trade of all oil products, and the realization of a significant negative foreign trade balance in some years.

Table 1: Comparative advantages of export of oil cakes, oilseeds and oils from Serbia

OIL CAKE															
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	average
sunflower	0.03	0.00	-0.01	0.01	0.07	0.05	0.03	0.10	0.04	0.05	0.05	0.03	0.02	0.06	0.04
soyabean	-0.08	-0.08	-0.02	-0.04	-0.02	-0.01	-0.01	0.06	-0.08	-0.08	-0.03	0.06	-0.01	-0.02	-0.03
rapeseed	0.00	0.00	0.01	0.03	0.02	0.01	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
total - oil cake	-0.05	-0.07	-0.03	0.00	0.07	0.05	0.04	0.16	-0.03	-0.02	0.03	0.10	0.01	0.04	0.02
OIL SEED															
sunflower	0.05	0.03	0.01	0.02	0.00	-0.03	0.02	0.01	0.14	0.08	0.09	0.16	0.03	0.12	0.05
soyabean	0.00	0.00	0.01	0.01	-0.05	0.06	0.08	-0.04	0.02	0.00	0.10	0.16	0.06	0.06	0.03
rapeseed	0.01	0.01	0.00	0.00	0.02	0.00	0.04	0.04	0.04	0.00	0.04	0.05	0.09	0.13	0.03
total - oil seed	0.06	0.03	0.02	0.03	-0.03	0.03	0.13	0.01	0.20	0.09	0.23	0.36	0.18	0.31	0.12
OIL															
sunflower	0.26	0.09	0.26	0.24	0.37	0.41	0.45	0.47	0.44	0.31	0.31	0.35	0.30	0.28	0.33
soyabean	0.09	0.03	0.13	0.18	0.14	0.19	0.22	0.25	0.09	0.10	0.18	0.19	0.14	0.09	0.15
rapeseed	0.00	0.00	0.02	0.09	0.08	0.04	0.06	0.02	0.00	0.03	0.03	0.03	0.03	0.02	0.03
total - oil	0.35	0.12	0.42	0.52	0.59	0.64	0.73	0.75	0.54	0.44	0.52	0.57	0.47	0.39	0.50

Source: The authors' calculations on the basis of SORS, 2019

As the level of integration of the oil crops market with international market is concerned, it can be seen that the intra-industrial specialization prevails (Figure 7). Also, it is obvious that there is a tendency of decrease of integration in recent years, which is a consequence of the liberalization of the market, as well as significant variations in the level of foreign trade in

analysed period. A slightly lower level of integration is evident with the CEFTA countries, with significant fluctuations present in the analysed period. The results of this research of comparative advantages and the level of integration of the oil crops market are in line with previous research on this issue, where it is concluded that oils have more significant comparative advantages than oilseeds and oleaginous fruits (Birovljev et al., 2015; Božić & Nikolić, 2016; Matkovski et al., 2017).

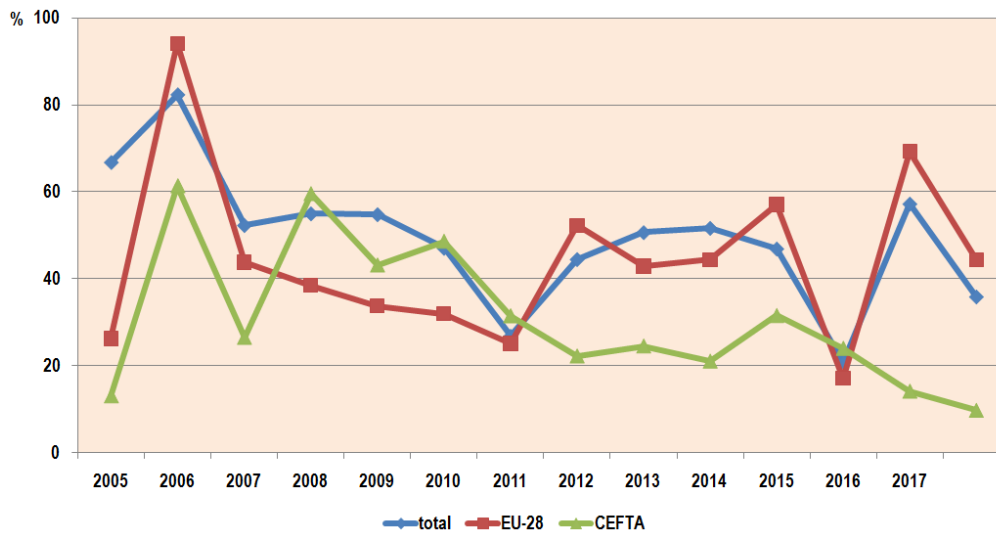


Figure 7: Integration of oil crops market of Serbia
Source: The authors' calculations on the basis of SORS, 2019

Conclusion

As a result of many factors, the production of oil crops is becoming more significant and is constantly increasing. According to harvested area, three most important oil crops in Serbia are sunflower, soybean and rapeseed, and 90% of total oil crops production is located in north part of Serbia (Srbija-Sever). Besides of oil crops production, the export of oil crops, which represents the significant part of the agri-food products export in Serbia, is constantly increasing. The structure of the oil crops export value is dominated by oil export.

Examining the level of comparative advantage it was found that sunflower has the highest level of comparative advantage on international market compared to soybean and rapeseed. Also, the revealed comparative advantage indicators showed that among oilseeds and oil crops products the most significant level of comparative advantage is achieved by oils, especially sunflower oil, while seeds do not have comparative advantage. On the other hand, examining the integration of Serbian oil crops markets with the international market indicates the existence of intra-industrial specialization with the tendency of integration decline.

In order to further improve the export position of oil crops in the international market, it is necessary to appear on non-traditional markets, but also to improve positions in the existing market segments. Also, it is necessary to make additional efforts to make better use of domestic processing capacities. Further research will be directed towards a more detailed analysis of Serbia's individual oil crops and their export positions on the international market.

References

Agricultural Census (2013). Database of agriculture of Statistical Office of Republic of Serbia, Retrieved from: <http://data.stat.gov.rs/?caller=SDDDB> (5.6.2019)

- Birovljev, J., Matkovski, B., Četković, B. (2015). Konkurentnost poljoprivredno-prehrambenih proizvoda Srbije na tržištu zemalja regiona. *Anali Ekonomskog fakulteta u Subotici*, 51(33), 61-78.
- Božić, D., Nikolić, M. (2016). Obeležja spoljnotrgovinske razmene poljoprivredno-prehrambenih proizvoda Srbije. *Marketing*, 47(4), 293-304. doi:10.5937/markt1604293B
- Đurišić-Mladenović, N., Kiss, F., Škrbić, B., Tomić, M., Mičić, R., Predojević, Z. (2018). Current state of the biodiesel production and the indigenous feedstock potential in Serbia. *Renewable and Sustainable Energy Reviews*, 81, 280-291. doi:10.1016/j.rser.2017.07.059
- Erjavec, E., Mortensen, K., Volk, T., Rednak, M., Eberlin, R., Ludvig, K. (2014). Gap analysis and recommendations. In T. Volk, E. Erjavec, K. Mortensen (Ed.), *Agricultural Policy and European Integration in Southeastern Europe* (39-60). Budapest: Food and Agricultural Organization of the United Nations.
- FAOstat (2019). Official data base, Retrieved from: <http://www.fao.org/faostat/en/#home> (4.6.2019)
- Grubel, H.G., Lloyd, P.J. (1975). *Intra-Industry Trade: The theory and measurement of international trade in differentiated product*. Wiley, London: MacMillan.
- Kaya, Y. (2014). Sunflower production in Balkan region: current situation and future prospects. *Agriculture & Forestry*, 60(4), 95-101.
- Lafay, G. (1992). The measurement of revealed comparative advantages. In: Dagenais M.G., Muet P.A. (eds): *International Trade Modelling*. Chapman and Hill, London.
- Matkovski, B., Lovre, K., Zekić, S. (2017). The foreign trade liberalization and export of agri-food products of Serbia. *Agricultural Economics - Zemědělská ekonomika*, 63(7), 331-345. doi: 10.17221/345/2015-AGRICECON
- OECD/FAO (2018). OECD-FAO Agricultural Outlook 2018-2027, OECD Publishing, Paris/Food and Agriculture Organization of the United Nations, Rome. Retrieved from: https://doi.org/10.1787/agr_outlook-2018-en (4.6.2019)
- Popović, R., Jeremić, M., Matkovski, B. (2016). Oil Crops Market in Serbia. *Ratarstvo i povrtarstvo*, 53(2), 74-80. doi: 10.5937/ratpov53-9828
- SEEDDEV (2017). Konkurentnost poljoprivrede Srbije, Retrieved from: https://www.seeddev.org/publikacije/Konkurentnost_poljoprivrede_Srbije/Konkurentnost_Srbije_Analiza.pdf (5.6.2019)
- Službeni glasnik Republike Srbije 85/2014 (2014). Strategija poljoprivrede i ruralnog razvoja Republike Srbije za period 2014-2024. godine, Retrieved from: <http://www.minpolj.gov.rs/wp-content/uploads/datoteke/razno/4827014.0116.30-1.pdf> (5.6.2019)
- Statistical Office of Republic of Serbia (2019). Official data base, Retrieved from: <https://data.stat.gov.rs/?caller=SDDDB> (8.6.2019)
- World Economic Forum - WEF (2015). The global competitiveness report 2014-2015, Retrieved from: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf (5.5.2019)
- World Economic Forum - WEF (2019). Official web page, Retrieved from: <https://www.weforum.org/>
- Zekić, S., Matkovski, B., Đokić, D., Kleut, Ž. (2016). Competitiveness of Tobacco and Tobacco Products: The Case of Serbia. *Custosagroecoonocio*, 12(2): 191-211.

Potencijali izvoza uljarica iz Srbije

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Sažetak: Uljarice predstavljaju veoma značajan usev u svetu, ali i u Srbiji, a sa aspekta proizvodnje tri najznačajnije uljane kulture u Srbiji su suncokret, soja i uljana repica. Pored

značajne proizvodnje semena uljarica, Srbija proizvodi i značajne količine ulja, zahvaljujući postojanju značajnih prerađivačkih kapaciteta. Imajući u vidu činjenicu da je tržište Srbije poslednjih nekoliko decenija okarakterisano integracijom sa međunarodnim tržištem, te da je aktuelna liberalizacija tržišta sa EU, CEFTA zemljama, Rusijom i drugim zemljama, u radu su analizirani proizvodnja i izvoz uljarica, sa posebnim akcentom na komparativne prednosti u izvozu uljarica upotrebom metoda otkrivenih komparativnih prednosti, a sagledan je i nivo intra-industrijske razmene u odnosu na svet, zemlje članice EU kao i zemlje članice CEFTA sporazuma. Rezultati istraživanja pokazuju da značajnije komparativne prednosti na međunarodnom tržištu ostvaruju ulja, u okviru kojih se izdvaja suncokretovo ulje.

Ključne reči: izvoz, suncokret, tržište, uljarice