COMPARATIVE ADVANTAGE IN HONEY TRADE AMONG THE EUROPEAN UNION'S TOP EXPORTING COUNTRIES

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Abstract

The goal of this study is the analysis of the competitiveness of the EU top 10 honey exporting countries. Based on World Bank data for the period 2018-2021, Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), Trade Balance Index (TBI), Production Mapping (PM) and Comparative Export Performance Index (CEP have been determined. RCA results proved that the comparative advantage is "strong" for Bulgaria, Hungary, Romania and Greece, "moderate" for Spain, "weak" for Poland and Belgium, while Germany, Italy and France have "no" advantage. The RSCA positive values showed that Spain, Hungary, Poland, Greece, Romania and Bulgaria are advantaged in honey trade, while Germany, Italy and France are disadvantaged. According to TBI results, Spain, Hungary, Romania, Greece and Bulgaria are net exporting countries, while Germany, Poland, Belgium, Italy and France are net importing member states. Romania has a high comparative export performance against France, Italy, Germany and Belgium (CEP>5), a moderate performance against Poland and Spain (2 <CEP <4), and a low performance against Bulgaria, Hungary and Greece (CEP <1.5). As honey demand is higher and higher on the EU market and the competitiveness as well, the exporting countries must intensify their production and quality to better satisfy the needs of the importing member states. Also, they need to maintain a comparative advantage against the imported honey on the EU market.

Key words: *comparative advantage, honey, EU, top 10 exporting countries, RCA, RSCA, TBI, PM, CEP*

INTRODUCTION

Bees are essential for mankind survival as they are a part of biodiversity [45].

From an economic point of view, besides other insects and animals, bee colonies contribute to the development of agriculture, assuring pollination of the agricultural crops and wild plants [16, 34, 35], in a word their reproduction, biodiversity preservation and environment conservation.

From a social point of view, bees assure jobs and pleasant work in fresh air for beekeepers, income for many rural livelihoods [1, 29, 30], contributing to the development of the rural areas.

According to FAO, about 30% of global food production depends on bees, showing how important are these insects to food security [11, 41].

Honey, pollen, royal jelly, propolis, bee venom and beeswax are the main products coming from beekeeping and by their high nutritional quality help people to maintain health and life.

Beekeeping is practiced in all the EU countries in a large diversity of geographical conditions regarding climate, flora type and structure, which result to various yields and honey quality.

In 2021, the global honey production reached 1,772 thousand tons, to which China contributed by 486 thousand tons (27%) and the EU by 215 thousand tons (12%) [9, 43].

Despite that beekeeping is practiced in all the EU countries, the main producing countries

are Spain, Romania, Hungary, Greece, Poland, Germany, Italy and France [8, 37].

In 2021, in the EU there were 20,058 thousand bee hives, by 6% more than in 2020 and by 18.22% more than in 2016. The most numerous beehives are in Spain, Romania, Poland, France, Italy, Hungary, Germany, Bulgaria and Portugal [9, 25, 26].

The number of apiaries differs from an EU member state to another, and the apiary size in terms of the number of bee families as well. Important efforts are made to increase apiary size to ensure a higher productivity and profitability [23, 24, 32]. The higher the apiary size, the higher profitability in beekeeping [3, 12, 17, 28].

In the EU, the highest honey production is achieved by Spain, Romania, Poland, Greece, Germany, France, Hungary and Italy [33, 36].

Also, the EU is the 2nd importer of honey after USA, because the EU is only 60% self-sufficient in honey. In 2021, it imported 173,511 tons honey whose value accounted for Euro 406,800 thousand, representing 28.3% of the world import value. From the EU honey imports, 31% come from Ukraine and 28% from China. At present, the EU average imports are about 175,000 tons honey [9].

The EU is also a honey exporter in the world. In 2021, the global honey export accounted for 751,070 tons, equivalent to Euro 1,863,875 thousand [44].

In 2021, the EU exported 25,025 tons honey, which ranked the EU the 8th after China, India, Argentina, Ukraine, Brazil, Vietnam and Mexico.

But, for the equivalent in Euro 152,040 thousands, representing 8.2% of the global honey export value, the EU came on the 2nd position after China (11.9%) [44].

The extra-EU honey export value accounted for Euro 146,442 thousand [10].

In 2021, the average price for honey export was Euro 2.34, while the average price for honey import accounted for Euro 5.76 per kg. Its volatility is determined by demand and offer amount and quality [10, 31].

As beekeeping is facing the decline of the bee population and honey yield caused by many factors like: reduction of bee colonies habitat, high consumption of chemical substances (fertilizers, herbicides, pesticides) to sustain intensive agricultural technologies, parasites attack and diseases occurrence, invasive species, and climate change [38, 39, 40, 49]. to sustain beekeeping, the EU offers financial support for the Apiculture Programme 2020-2022, approved by Commission Implementing Decision EU 2019/974 in all the EU member states. The funds are destined to eight specific measures concerning: (a) technical assistance (beekeepers training on breeding, disease prevention, honey extraction, storage and packaging); (b) combating beehive invaders and diseases, especially varroa; (c) transhumance improvement; (d) analysis of bee products quality; (e) applied research; (f) restocking of beehives; (g) bee products marketing; (h)improvement of bee product quality to better compete on the intra and extra-EU market [8].

Also, United Nations established "Environment Programme to support biodiversity, preserve the habitat and management, and mitigate the effects of climate change on beekeeping development [45].

Taking into account the high demand of honey on the international market, the competition among producers, exporters and importers, has become more enhanced.

Scientific research provides a large range of econometrical analysis tools destined to study the competitiveness of products and countries [27].

In this field, the most relevant studies mentioned by literature regard specific indices developed to measure the comparative advantage like: The Revealed Comparative Advantage index, RCA, [5], Balassa's RCA more detailed interpretation established [13], the Revealed Symmetric Comparative Advantage, RSCA [19], Trade Balance Index, TBI [18], Comparative Export Performance Index, CEP [7], Products Mapping, PM and other econometric tools [46, 47].

Despite the existence of these econometric methods and procedures to study

competitiveness on honey market, the literature provides just a few examples as mentioned below.

-Comparative Advantage applied in China, Argentina and Mexico [20]; in Serbia [14]; in Brazil [6]; RCA and TBI in Turkye [42] and also RCA, RSCA and TBI in Turkye [2]; in Mexico [4]; in the EU and Italy using TXA, RMA, RTA [21, 22]; in Visegrad four countries group using RCA [15].

In this context, the objective of the paper was to analyze the comparative advantage of honey among the EU top 10 honey exporters in the period 2018-2021 using RCA, RSCA, TBI, PM and CEP in order to established the status of each member state regarding the comparative advantage or disadvantage on honey market, which countries are net exporters and which countries have a high export performance.

MATERIALS AND METHODS

Data collection

To set up this research study, the empirical data for the period 2018-2021 have been picked up from the data bases belonging to World Bank World Integrated Trade Solutions.

The EU selected countries

The EU countries for which the comparative advantage for honey was analyzed have been Germany, Spain, Hungary, Poland, Greece, Romania, Bulgaria, Belgium, Italy and France, which in 2021 were the top exporters of honey.

The main indices reflecting the comparative advantage used in this study were the following ones:

(i)Revealed Comparative Advantage RCA_{it}^{j} [5]:

$$RCA_{it}^{j} = \frac{(X_{it}^{j})}{(X_t^{j})} / \frac{(X_{it}^{w})}{(X_t^{w})} \quad ....(1)$$

where:

RCA_{it}^{j} = comparative advantage index for commodity i of the country j in the year t.

(X_{it}^{j}) = export of commodity i of the country j in the year t;

(X_t^{j}) = export of all commodities of the country j in the year t;

(X_{it}^{w}) = world export of the commodity i in the year t;

(X_t^{w}) = world export of all goods in the year t.

The RCA results were interpreted using Balassa's classification (1965) [5], according to which:

- $RCA_{it}^{j} > 1$, the country j has a comparative advantage; $RCA_{it}^{j} < 1$, the country j has a comparative disadvantage; $RCA_{it}^{j} = 1$, the comparative advantage is revealed for the country j.

Also, RCA values were appreciated using Hinloopen and Marrewijk's classification (2001) [13], according to which when $0 < RCA \leq 1$, the country j has " no" comparative advantage, when $1 < RCA \leq 2$, the country j has a "weak" comparative advantage, when $2 < RCA < 4$, the country j has a "moderate" comparative advantage, and when $RCA > 4$, the country j has a "strong" comparative advantage.

(ii)Revealed Symmetric Comparative Advantage-RCSA $_{it}$ (Laursen, 1998) [19],

$$RSCA_{it}^{j} = \frac{(RCA_{it}^{j} - 1)}{(RCA_{it}^{j} + 1)} \quad ....(2)$$

When RSCA has a positive value, $0 < RSCA < 1$, the country j has a comparative advantage , and when f RSCA has a negative value, $-1 \leq RSCA < 0$, the country j has a comparative disadvantage.

(iii)Trade Balance Index- TBI_{it}^{j} (Lafay, 1992)[18]

$$TBI_{it}^{j} = \frac{(X_{it}^{j} - M_{it}^{j})}{(X_{it}^{j} + M_{it}^{j})} ....(4)$$

where:

(X_{it}^{j}) = export of commodity i of the country j in the year t;

(M_{it}^{j}) = import of commodity i of the country j in the year t.

When TBI has a positive value, $0 < TBI < 1$, the country is a net exporter of the commodity i, when TBI has a negative value, $-1 \leq TBI < 0$, the country is a net importer of the

commodity i and when TBI = 0, the export value is equal to import value.

(iv)Production Mapping (PM) allows a classification of the countries j in four groups of comparative advantage based on a mix between the RSCA and TBI values as follows (Widodo, 2008, 2009) [46, 47]:

Group A: RSCA > 0 and TBI > 0, the country j has a comparative advantage and is a net exporter;

Group B: RSCA > 0 and TBI < 0, the country j has a comparative advantage and is a net importer;

Group C: RSCA < 0 and TBI > 0, the country j has a comparative disadvantage and is a net exporter;

Group D: RSCA < 0 and TBI < 0, the country j has a comparative disadvantage and is a net importer.

(v)Comparative Export Performance Index- CEP_{it}

$$CEP_{it}^{j} = \frac{(X_{it}^{j}/X_{it}^{r})}{(X_{t}^{j}/X_{t}^{r})} \quad ....(5)$$

where:

(X_{it}^{j}) = export of commodity i of the country j in the year t;

(X_{t}^{j}) = export of all goods of the country j in the year t;

(X_{it}^{r}) = export of commodity i of the competitor country r in the year t;

(X_{t}^{r}) = export of all goods of the competitor country r in the year t.

RESULTS AND DISCUSSIONS

Honey production in the EU

The EU is an important honey producing area, in the year 2021, achieving 228,837 tons. In the last years, honey production remained relatively constant compared to the world honey output, which registered a decline by 1.68% in the interval 2019-2021. In 2021, the EU contributed by 13.35% to the global honey production of 1,713,785 tons, which means by +0.26 percentage points more than in 2019.

In the decreasing order of the production performance, the top 10 member states producing honey are: Spain, Romania,

Poland, Greece, Germany, France, Hungary, Italy, Bulgaria and Portugal, which together, in 2021, produced 190,056 tons, representing 83.05% of the EU honey output and 11.68% of the world honey production (Figure 1, Table 1).

Table 1. Honey production in the EU in 2021 and growth rate compared to 2019=100 (Tons)

Country	2021 (Tons)	Growth rate (%) 2019=100
Austria	3,830	-4.25
Belgium	5,000	ND
Bulgaria	11,638	+1.04
Croatia	8,630	+3.06
Cyprus	520	-21.22
Czechia	6,086	-26.32
Denmark	ND	-
Estonia	1,343	+4.27
Finland	3,100	-6.07
France	14,382	-8.72
Germany	19,600	-18.68
Greece	21,400	-5.27
Hungary	12,794	-28.07
Ireland	ND	ND
Italy	12,450	-17.00
Latvia	2,135	-0.21
Lithuania	7,894	+49.39
Luxembourg	48	-68.22
Malta	ND	ND
Netherlands	ND	ND
Poland	21,520	+13.07
Portugal	10,441	+3.33
Romania	30,831	+22.00
Slovakia	ND	ND
Slovenia	195	-71.14
Spain	35,000	+12.31
Sweden	ND	ND
EU-TOTAL	228,837	+0.3

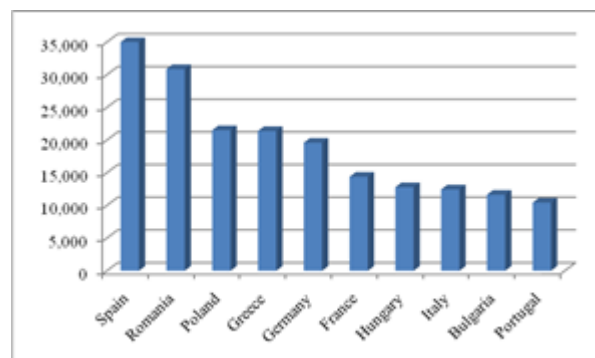Source: Own results based on the data from [48].
ND- No data.

Fig. 1. Honey production in the EU top 10 producing countries in the year 2021 (Tons)
Source: Own design based on the data from [48].

The tendency of production varied from a country to another. Compared to 2019, in 2021, important growth rates were noticed in Lithuania, Romania, Poland, Spain, Portugal, Croatia. But, the majority of the member states registered decreases: Slovenia, Luxembourg, Hungary, Italy, Germany, France, Finland, Greece (Table 1).

Honey export value in the EU top exporting countries
In the EU, honey export value increased from USD 628.53 million in 2019 to USD 860.32 million in 2021, meaning by 36.87%. This was determined by the high growth of honey export in the top 10 exporting countries: Germany, Spain, Hungary, Poland, Greece, Romania, Bulgaria, Belgium, Italy and France, which in 2021 reached USD 751.79 million, by 37.43% more than in 2019. The top 10 member states contribute by 89.59% to the EU honey export value. In general, almost all the top honey exporters registered a higher growth rate, except Belgium (Table 2, Figure 2).

Table 2. Honey export value in the EU top exporting countries of honey in 2021 (USD million), and growth rate, 2019 = 100

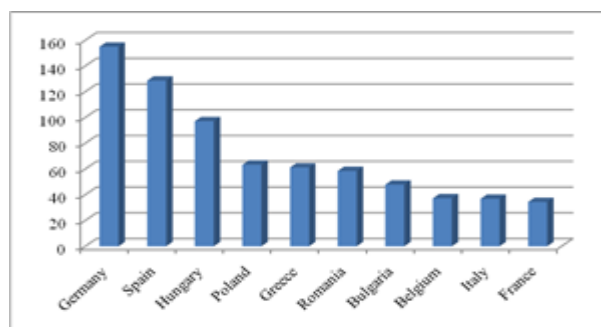|	Honey export value (USD million)	Growth rate (%), 2019=100
Germany	154.97	+13.90
Spain	128.64	+45.42
Hungary	97.12	+14.50
Poland	63.32	+46.53
Greece	61.20	+315.7
Romania	58.49	+33.50
Bulgaria	47.87	+18.4
Belgium	37.26	-0.80
Italy	36.82	+21.03
France	34.42	+14.77

Source: Own results based on the data from [48].

Fig. 2. Honey export value in the EU top 10 exporting countries of honey in the year 2021 (USD million)
Source: Own design based on the data from [48].

Honey import value in the EU top importing countries
The higher demand than production requires honey imports to cover the needs in the EU. For this reason, not only the amounts of honey coming from various suppliers increased. In 2021, honey import value accounted for USD 1,097.32 million compared to USD 815.35 million, therefore, being by 34.58% higher.
The main member states importing honey are: Germany, France, Italy, Poland, Spain, Netherlands, Belgium, Greece, Austria, Denmark, followed by Portugal, Czechia, Sweden, Romania, Ireland and Bulgaria. All these 16 countries summed a honey import value of USD 1,052.23 million in the year 2021, representing 95.96% of the EU import.
Compared to 2019, in 2021, most of these countries recorded high growth rates: Bulgaria, Czechia, Greece, Romania, Denmark, Germany, Spain etc and only Sweden and Ireland registered a negative rate (Table 3, Figure 3).

Table 3. Honey import value in the EU top importing countries of honey in 2021 (USD million), and growth rate, 2019 = 100

	Honey import value (USD million)	Growth rate (%), 2019=100
Germany	338.23	+45.70
France	120.66	+1.70
Italy	107.50	+34.60
Poland	91.35	+15.50
Spain	83.42	+45.20
Netherlands	66.95	+28.00
Belgium	48.11	+10.47
Greece	35.05	+94.90
Austria	28.72	+12.89
Denmark	25.94	+52.49
Portugal	21.49	+39.96
Czechia	20.17	+99.90
Sweden	20.07	-14.67
Romania	16.05	+84.40
Ireland	15.54	-14.80
Bulgaria	12.91	+231.00

Source: Own results based on the data from [48].

As we may notice, in 2021, Romania was ranked the 2nd for honey production, the 6th for export value and the 14th for the import value.
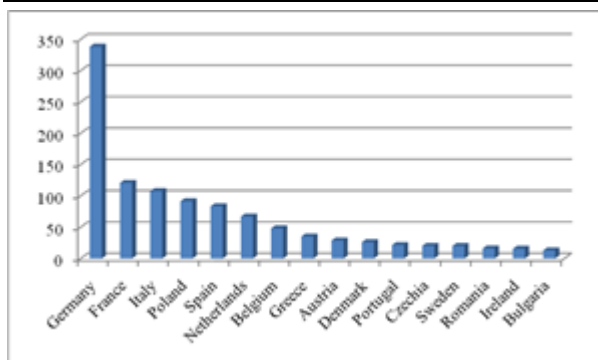
Fig. 3. Honey import value in the EU top 16 importing countries of honey in the year 2021 (USD million)
Source: Own design based on the data from [48].

The competitiveness of the EU top 10 exporting countries of honey

(i)Revealed Comparative Advantage-RCA registered different values from a country to another.

Germany, Italy and France in all the years and Belgium in 2021 recorded A RCA smaller than 1, reflecting that they have a comparative disadvantage, while the other countries: Bulgaria, Greece, Hungary, Romania, Spain, Poland in all the years of the period 2018-2021 and Belgium in the years 2018, 2019 proved to have a comparative advantage as RCA was higher than 1.

Bulgaria looks to be on the top position for its RCA which has the highest values, ranging between 12.06 in the year 2019 and 11.37 in the year 2018.

The lowest RCA was found in case of France. The small RCA values are determined by the low share of the honey export value in the export of all the commodities in the countries mentioned above (Table 4).

Table 4. Revealed Comparative Advantage for the EU top 10 honey exporting countries in the period 2018-2021

Country	2018	2019	2020	2021	2021/2018 %
1.Germany	0.85	0.93	0.89	0.74	87.05
2.Spain	2.78	2.62	2.85	2.59	93.16
3.Hungary	6.67	6.93	6.32	5.44	81.55
4.Poland	1.50	1.71	1.93	1.57	104.66
5.Greece	4.23	3.87	4.87	10.24	242.08
6.Romania	5.62	5.66	5.48	5.23	93.06
7.Bulgaria	11.37	12.06	9.86	9.22	81.09
8.Belgium	1.19	1.20	1.02	0.54	45.37
9.Italy	0.52	0.56	0.40	0.47	90.38
10.France	0.49	0.53	0.46	0.46	93.87

Source: Own calculations based on the official data from [48].

Looking at the dynamics of RCA values, we may easily notice a general decreasing trend from 2018 to 2021 for almost all the EU top exporting countries, except Greece and Poland were RCA increased. Table 5 presents a more detailed classification of the EU top exporting countries of honey based on the method developed by [13].

Table 5. The classification of the EU top 10 exporting countries based on RCA values, 2019-2021

	"Strong" comparative advantage RCA > 4	"Moderate" comparative advantage" 2 < RCA ≤ 4	"Weak" comparative advantage 1 < RCA ≤ 2	"No" comparative advantage RCA 0 ≤ 1
1.Germany	-	-	-	In all the years
2.Spain	-	In all the years	-	-
3.Hungary	In all the years	-	-	-
4.Poland	-	-	In all the years	-
5.Greece	In all the years	-	-	-
6.Romania	In all the years	-	-	-
7.Bulgaria	In all the years	-	-	-
8.Belgium	-	-	In 2018, 2019, 2020	In 2021
9.Italy	-	-	-	In all the years
10.France	-	-	-	In all the years

Source: Own classification based on [13].

The hierarchy of the EU top exporting countries according to RCA values in 2021 is shown in Figure 4.
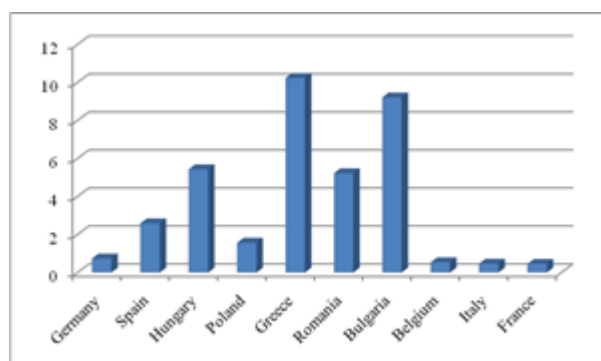

Fig. 4. The hierarchy of the EU top 10 exporting countries of honey based on RCA in 2021
Source: Own design based on own results.

(ii)Revealed Symmetric Comparative Advantage-RSCA registered both positive values and also negative values, depending on the EU member state and year, and of course, of RCA values which are included in the calculation formula.

The countries which registered a positive RSCA like: Spain, Hungary, Poland, Greece, Romania and Bulgaria have a symmetric comparative advantage for honey, while Italy and France in all the years and Belgium in 2021 have a symmetric comparative disadvantage as RSCA recorded negative values (Table 6).

Table 6. Revealed Symmetric Comparative Advantage for the EU top 10 honey exporting countries in the period 2018-2021

Country	2018	2019	2020	2021	2021/2018 %
1.Germany	-0.08	-0.03	-0.05	-0.14	57.14
2.Spain	0.47	0.44	0.48	0.44	93.61
3.Hungary	0.73	0.74	0.72	0.68	93.15
4.Poland	0.20	0.26	0.31	0.22	110.00
5.Greece	0.61	0.58	0.65	0.82	134.42
6.Romania	0.69	0.69	0.69	0.67	97.10
7.Bulgaria	0.83	0.84	0.81	0.80	96.38
8.Belgium	0.08	0.09	0.009	-0.29	-362.50
9.Italy	-0.31	-0.28	-0.42	-0.36	116.12
10.France	-0.34	-0.65	-0.36	-0.36	105.88

Source: Own calculations based on the official data from [48].

The hierarchy of the EU top exporting countries according to RSCA values in 2021 is shown in Figure 5.
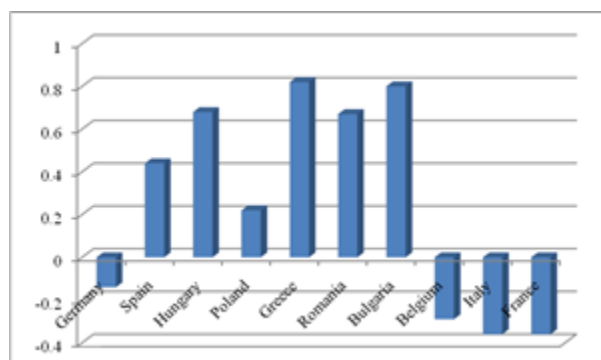

Fig. 5. The hierarchy of the EU top 10 exporting countries of honey based on RSCA in 2021
Source: Own design based on own results.

(iii)Trade Balance Index- TBI carried out different values from a member state to another, either with positive and negative values depending on the export and import values and the formula of calculation.

A negative TBI was achieved by Germany, Poland, Belgium, Italy and France in all the studied years and Greece and Bulgaria in 2018, reflecting that these countries were net importers of honey.

On the other pole, there are Spain, Hungary and Romania in all the years, Greece and Bulgaria in 2021, 2020 and 2019, which carried out positive TBI values, reflecting that they are net exporting countries (Table 7).

The hierarchy of the EU top exporting countries according to TBI values in 2021 is shown in Figure 6.

Table 7. Trade Balance Index TBI for the EU top 10 honey exporting countries in the period 2018-2021

Country	2018	2019	2020	2021	2021/2018 %
1.Germany	-0.33	-0.37	-0.29	-0.37	112.12
2.Spain	0.21	0.21	0.25	0.26	123.80
3.Hungary	0.99	0.99	0.99	0.80	80.80
4.Poland	-0.18	-0.17	-0.12	-0.18	100.00
5.Greece	-0.02	0.09	0.14	0.27	1,350.00
6.Romania	0.62	0.44	0.49	0.57	91.93
7.Bulgaria	-0.85	0.82	0.84	0.05	5.88
8.Belgium	-0.008	-0.07	-0.03	-0.12	1,500.00
9.Italy	-0.52	-0.44	-0.51	-0.41	78.84
10.France	-0.60	-0.59	-0.63	-0.60	109.09

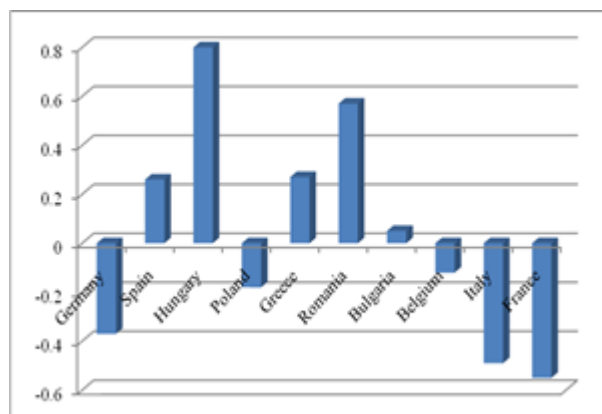Source: Own calculations based on the official data from [48].

Fig. 6. The hierarchy of the EU top 10 exporting countries of honey based on TBI values in 2021
Source: Own design based on own results.

(iv)Production Mapping-PM reflected the situation of each EU member state concerning the comparative advantage or disadvantage and its position as trader- net exporter or net importer of honey. The EU countries belonging to Group A, having a comparative advantage and being net exporters of honey are: Spain, Hungary, Romania in all the analyzed years, Greece and Bulgaria in 2019, 2020 and 2021. Poland in all the years and Belgium in 2018, 2019, 2020 belong to Group B, having a comparative advantage, but a negative honey trade balance. None of the top 10 honey exporting countries belonged to Group C. But, there are member states belonging to Group D, reflecting that they have a comparative disadvantage for honey and that they are net importing countries. It is about Germany, France and Italy in all the studied years and Belgium in the year 2021 (Table 8).

Table 8. Production Mapping for honey in the EU top 10 exporting countries, 2019-2021

	2018	2019	2020	2021
1.Germany	D	D	D	D
2.Spain	A	A	A	A
3.Hungary	A	A	A	A
4.Poland	B	B	B	B
5.Greece	B	A	A	A
6.Romania	A	A	A	A
7.Bulgaria	B	V		
8.Belgium	B	B	B	D
9.Italy	D	D	D	D
10.France	D	D	D	D

Source: Own results.

(v) Comparative Export Performance Index-CEP was calculated only for Romania to show its position in connection to the other top nine competitors in the EU honey market. CEP values obtained by Romania reflect that the country has a high comparative export performance against France, Italy, Germany and Belgium (CEP > 5), a moderate export performance against Poland and Spain (2 < CEP < 4) and a low comparative export performance against Bulgaria, Hungary and Greece (CEP < 1.5) as shown in Table 9.
Compared to 2018, in 2021, CEP value for Romania registered a decline against Greece, Poland and Spain, and an increase against Germany, Hungary, Bulgaria, Belgium, Italy and France.
Comparative Export Performance - CEP of Romania against the other EU top nine honey exporting countries in the year 2021 is shown in Figure 7.

Table 9. Comparative Export Performance - CEP of Romania against the other EU top nine honey exporting countries in the period 2018-2021

Country	2018	2019	2020	2021	2021/2018 %
1.Germany	6.58	6.17	6.17	6.98	106.07
2.Spain	2.02	2.16	1.92	2.01	99.50
3.Hungary	0.84	0.81	0.86	0.96	114.28
4.Poland	3.76	3.31	2.84	3.32	88.29
5.Greece	1.32	1.45	1.12	0.53	40.15
7.Bulgaria	0.49	0.46	0.55	0.56	114.28
8.Belgium	4.69	4.72	5.04	9.66	205.97
9.Italy	10.73	10.06	12.69	11.02	102.70
10.France	11.02	10.57	11.14	11.25	102.08

Source: Own calculations based on the official data from [48].
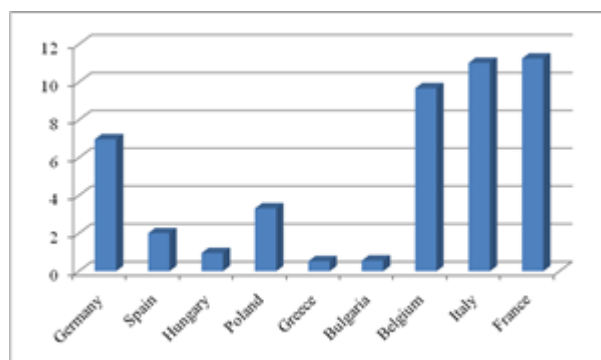

Fig. 7. Comparative Export Performance - CEP of Romania against the other EU top nine honey exporting countries in the year 2021
Source: Own design based on own results.

In this study, CEP index was calculated for each EU exporting country in order to evaluate its export performance against the other nine member states with which it is in competition on the honey market. The results are shown in Table 10.

Germany had a small CEP index against the other nine competitor countries. Its values varied between 0.07 against Greece and 1.60 against France, reflecting a low export performance in general.

Spain registered CEP values ranging between 0.25 against Greece and 5.58 against France. Spain is a weak competitor for Greece, Bulgaria, Hungary and Romania, but with a higher export performance against Italy, France and Spain.

Hungary carried out CEP values ranging between 0.53 against Greece and 11.70 against France. It looks to be a strong competitor for France, Italy, Belgium and Germany, but a weak one against Greece, Bulgaria and Romania.

Poland obtained CEP values varying between 0.15 against Greece and 3.38 against France, reflecting a weak position as competitor on the EU honey market.

Greece obtained the highest CEP values ranging between 1.88 against Hungary and 22.22 against France. It could be considered the strongest competitor country against France, Italy, Belgium, Germany and also against Poland and Spain, but a weak competitor against Bulgaria, Hungary and Romania.

Bulgaria also looks to be an important competitor because its CEP values varied between 0.90 against Greece and 19.85 against France, the highest value. It is a strong competitor against France, Italy, Belgium and Germany, but a weak competitor against Greece, Hungary and Romania.

Belgium recorded low CEP levels, most of them being below 1 against almost all the other EU countries, except Italy and France. It proved to be a weak competitor on the honey market.

Italy also achieved small CEP values ranging between 0.04 against Greece and 1.02 against France. It is one of the weakest competitor against the other EU exporting countries of honey.

France also proved to be a weak rival against the other nine top exporting countries, as its CEP levels were smaller than 1, ranging between 0.04 against Greece and 0.97 against Italy.

Romania, as mentioned before, plays an important role on the EU honey market both as producer and exporter. In 2021, it registered three CEP values below 1, 0.53

being the smallest one against Greece and six values higher than 2, the highest value accounting for 11.25 against France. Therefore, Romania is strong competitor for France, Italy, Belgium and Germany, but a weak rival against Greece, Bulgaria and Hungary (Table 10).

Table 10. The matrix of CEP values for each top EU exporting country against the other nine in the year 2021

Country against	Germany	Spain	Hungary	Poland	Greece	Bulgaria	Belgium	Italy	France	Romania
Germany	-	0.28	0.13	0.47	0.07	0.08	1.38	1.57	1.60	0.14
Spain	3.47	-	0.47	1.64	0.25	0.28	4.54	5.44	5.58	0.49
Hungary	7.27	2.09	-	3.45	0.53	0.58	10.09	11.41	11.70	1.04
Poland	2.10	0.60	0.28	-	0.15	0.17	2.91	3.30	3.38	0.30
Greece	14.07	3.95	1.88	6.52	-	1.11	19.09	21.58	22.22	1.95
Bulgaria	12.32	3.57	1.69	5.86	0.90	-	17.12	19.40	19.85	1.76
Belgium	0.72	0.20	0.09	0.30	0.05	0.05	-	1.13	1.16	0.10
Italy	0.63	0.18	0.08	0.30	0.04	0.05	0.88	-	1.02	0.09
France	0.62	0.17	0.08	0.29	0.04	0.05	0.86	0.97	-	0.08
Romania	6.98	2.01	0.96	3.32	0.53	0.56	9.68	11.02	11.25	-

Source: Own results.

CONCLUSIONS

The analysis for the comparative advantage for honey in case of the EU top 10 exporting countries in the period 2018-2021 was analyzed using the following specific indicators Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), Trade Balance Index (TBI), Production Mapping (PM) and Comparative Export Performance Index (CEP).

RCA results proved that Bulgaria, Hungary, Romania and Greece have a "strong" comparative advantage, while Spain has a "moderate" advantage, Poland and Belgium have a " weak" advantage and Germany, Italy and France have "no" advantage, in other words, their disadvantage on honey market was revealed.

The RSCA positive values reflected Spain, Hungary, Poland, Greece, Romania and Bulgaria are advantaged in honey trade, while Germany, Italy and France are disadvantaged because they carried out negative values for this symmetric index.

The results obtained for TBI showed that Spain, Hungary, Romania, Greece and Bulgaria are net exporting countries, while Germany, Poland, Belgium, Italy and France are net importing member states. Therefore, for the first group of countries, export is more important, while for the last group, import is required to cover the internal market needs.

Concerning the compared export performance, CEP values reflected that Greece is the strongest competitor country against France, Italy, Belgium, Germany and also against Poland and Spain, but a weak competitor against Bulgaria, Hungary and Romania.

Also, Bulgaria is a strong competitor against France, Italy, Belgium and Germany, but a weak competitor against Greece, Hungary and Romania.

Hungary is a strong rival for France, Italy, Belgium and Germany, but a weak one against Greece, Bulgaria and Romania.

Romania has a high comparative export performance against France, Italy, Germany and Belgium (CEP>5), a moderate performance against Poland and Spain (2 <CEP <4), and a low performance against Bulgaria, Hungary and Greece (CEP <1.5).

The EU honey market is in a continuous extend as honey demand is higher and higher. For this reason, the competitiveness between producers and exporters has increased.

The financial support given to the EU members will strengthen production and honey quality to better satisfy the needs of the population and also the competition will become stronger for a higher export performance.

Honey imports are needed to cover 40% difference to reach self-sufficiency, but they must not affect the EU beekeepers chance to valorise honey production at a convenient price to cover their costs and assure income and profitability of the beekeeping sector.

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