

Competitiveness of Indonesian Essential Oil Exports in the Chinese Market and Rival Countries

Nina Rahmida Dalimunthe^{1♥}, Nia Rosiana², Amzul Rifin², and Harmini²

¹Master of Science in Agribusiness, Department of Agribusiness, Faculty of Management and Economy, IPB University, Bogor, Indonesia

²Department of Agribusiness, Faculty of Management and Economy, IPB University, Bogor, Indonesia

♥Corresponding author email: nina26dalimunthe@apps.ipb.ac.id

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Abstract. Indonesia is one of the world's largest producers of essential oils; however, its export competitiveness in the Chinese market has fluctuated over time. This study aims to analyze the level and dynamics of Indonesia's essential oil export competitiveness compared to other major exporting countries in the Chinese market. The research uses secondary time-series data from 2011 to 2023 obtained from Trade Map. Competitiveness is assessed using the Revealed Comparative Advantage (RCA) and Dynamic Revealed Comparative Advantage (DRCA) methods. The findings reveal that Indonesia generally demonstrates strong competitiveness, except in 2011 when it was weak and in 2022 when it was moderate. Based on DRCA, Indonesia was classified as a "rising star" in 2011–2013 and 2017–2019, a "falling star" in 2013–2015, a "lost opportunity" in 2019–2021, and experienced a decline to the "lagging retreat" position in 2015–2017 and 2021–2023. These fluctuations are influenced by unstable production, limited product innovation, and quality standards that do not fully align with market requirements. To strengthen its competitiveness, Indonesia must enhance product quality, adopt technological innovations, and foster collaboration among stakeholders.

Keywords: chinese market; competitiveness; DRCA; essential oil; RCA

INTRODUCTION

Essential oils represent one of Indonesia's leading export commodities, possessing high economic value and experiencing growing demand in the global market. Classified under medicinal plants, aromatics, and spices, essential oils contributed an export value of US\$465.1 million in 2023 ([Badan Pusat Statistik, 2023](#)). As one of the world's largest producers, Indonesia plays a critical role in the global essential oil trade, supplying raw materials and processed products to major international markets. However, sustaining this position requires maintaining strong and stable competitiveness, particularly amid the intensifying competition from both developed and developing countries. One of the main export destinations for Indonesian essential oils is China.

China ranks among the world's major importers of essential oils, with demand steadily increasing, particularly from the cosmetics, pharmaceutical, and food

industries. According to data from [The Observatory of Economic Complexity \(2021\)](#), China imported essential oils worth US\$407 million in 2021, ranking third after the United States and France. However, this figure declined to US\$342 million in 2022, placing China as the fourth largest importer after the United States, France, and Germany. This strong demand is driven by sustained economic growth, rising consumer awareness of natural products ([Turek & Stintzing, 2013](#)), and the increasing popularity of essential oils in personal care, traditional medicine, and premium food sectors among the expanding middle class ([Mora, 2022](#)).

According to Trade Map data (2024), Indonesia is one of the top five countries exporting essential oils to the Chinese market in 2023. Germany is the first country to export essential oils, accounting for 29 percent of the Chinese market. France is second with a percentage of 22 percent, Bulgaria is third with a percentage of 20 percent, Indonesia is fourth with a percentage of 6 percent, and the United States is fifth

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with a percentage of 3 percent and the rest is exported from other countries with a percentage of 20 percent, as presented in [Figure 1](#).

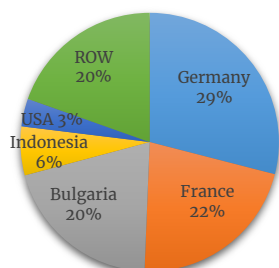


Figure 1. Export Market Share of Essential Oils by Exporting Countries in the Chinese Market in 2023

The essential oils exported by Indonesia to China are classified under HS code 33019090. This code refers to essential oil concentrate products that have undergone processing to remove most of the solvent components or other non-essential materials, resulting in a highly concentrated oil rich in active compounds. The production of these concentrates typically involves methods such as steam distillation or solvent extraction, yielding oils with high potency and purity.

Table 1. Volume and Value of Indonesian Essential Oil Exports in the Chinese Market

Year	Volume (Kilogram)	Value (000 US\$)
2019	26281	1064
2020	25139	1273
2021	38200	1894
2022	4500	400
2023	19032	584

Source: [Trade Map \(2024\)](#)

Based on data from [Trade Map \(2024\)](#), the volume of Indonesian essential oil exports from 2019 to 2022 fluctuated, although in 2022 there was a significant decline. During the last five-year period (2019-2023), Indonesia successfully exported essential oils, averaging 14,175.8 kilograms with a value of \$1,043,000 US. It was recorded that the highest balance of Indonesian essential oil exports occurred in 2021 at 1,894 thousand US\$, while the lowest balance of Indonesian

essential oil exports occurred in 2022 at 400 thousand US\$, as presented in [Table 1](#).

However, despite having a comparative advantage as an essential oil-producing country, the competitiveness of Indonesian essential oil exports in the Chinese market has fluctuated. Based on data from [Trade Map \(2024\)](#), Indonesia's essential oil market share in China has been unstable, decreasing significantly in 2022 before increasing again in 2023. This shows that the dynamics of Indonesia's essential oil competitiveness in the Chinese market are influenced by various factors, including changes in trade policies, consumer preferences, and competition with major exporting countries such as Germany, France, and Bulgaria.

[Huda et al. \(2021\)](#) revealed that Indonesian patchouli oil had a consistently high RCA value from 2001 to 2018, indicating strong competitiveness compared to its main competitors. [Nurcahyani & Salqaura \(2023\)](#) also found that Indonesian essential oils have a high comparative advantage due to consistent quality and price advantages. [Kartika et al. \(2023\)](#) emphasized that RCA helps understand the dynamics of competition and the strategic position of essential oil exports, while [Puspita et al. \(2021\)](#) highlighted Indonesia's great potential in meeting global demand, despite facing stiff competition from Brazil, India, and America which placed Indonesia in 11th position as an essential oil exporter in 2018. However, the sustainability of this competitiveness is also influenced by trade policies, production innovation, and improvements in product quality and added value.

Based on the above description, previous studies have generally focused only on the competitiveness of Indonesian essential oils, with limited research analyzing the dynamics of Indonesia's essential oil export competitiveness. Examining the dynamics of competitiveness is crucial, as it provides insight into changes in Indonesia's competitive position over time, identifies periods of strengthening or weakening competitiveness, and reveals the factors

influencing these shifts. Such information is crucial for developing effective policy strategies and industry development plans.

Previous research has also tended to discuss Indonesia's essential oil competitiveness in the general context of the international market, while studies focusing specifically on exports to particular markets, such as the Chinese market, remain scarce. Moreover, most prior studies have used four-digit or six-digit HS codes, which are more general and combine various product categories, resulting in analyses that may not fully capture the specific competitiveness characteristics of a given product. Research using the eight-digit HS code is particularly important, as it enables a more detailed analysis of the exact product being exported, such as essential oil concentrates. This approach yields more accurate and relevant results, especially in formulating strategies to enhance competitiveness for specific commodities in targeted markets.

Based on the explanation, this study aims to analyze the level of competitiveness and the dynamics of the competitiveness of essential oils between major exporting countries in the Chinese market. There are five major exporting countries in the Chinese market, namely Germany, France, Bulgaria, Indonesia, and the USA. As well as making strategic efforts by providing policy recommendations to increase the competitiveness of Indonesian essential oils in the Chinese market.

METHODS

Types and Sources of Data

The data used in this study are secondary data in the form of time series from 2011 to 2023 obtained from Trade Map. The data included data on the value of essential oil exports (US\$) from major exporting countries, namely Germany, France, Bulgaria, Indonesia and the USA. The total value of all commodities in major exporting countries of essential oils, the export value of essential oils in the Chinese market and the

total export value of all commodities in the Chinese market. The essential oils analyzed in this study are essential oils with the Harmonized System (HS) code 33019090 (Concentrants in fats, etc.; terpenic by products, aqs diatillates; of essentials oil).

Data Analysis Method

Revealed Comparative Advantage (RCA)

The Revealed Comparative Advantage (RCA) method is used to assess the relative competitiveness of an export commodity in the international market. RCA was introduced by [Balassa\(1965\)](#), and has become a popular method for identifying a country's comparative advantage in a particular commodity compared to other countries in the global market. With RCA, it can be seen whether a commodity from a particular country has a comparative advantage or not. The RCA value is calculated using the [Equation 1](#).

$$RCA = \frac{X_{ij}/\sum_j X_{ij}}{X_{wj}/\sum_j X_{wj}} \dots 1$$

Description:

RCA = Competitiveness of a country towards a commodity

X_{ij} = Export value of commodity j in country i (US\$)

$\sum_j X_{ij}$ = Total export value of all commodities from country i (US\$)

X_{wj} = Export value of commodity j in the world (US\$)

$\sum_j X_{wj}$ = Total export value of all commodities (US\$)

RCA calculates the comparison of a commodity's export share from one country to the commodity's export share at the global level. The RCA value ranges from 0 to infinity (∞). If the RCA value is greater than 1, the commodity is considered competitive because its export share in the country is higher than its share in the global market. Conversely, if the RCA is below 1, the commodity is not competitive.

[Hinloopen and Van Marrewijk \(2001\)](#), and [Erkan and Yildirimci \(2015\)](#), grouped RCA values into four categories:

1. $0 < RCA \leq 1$: Not competitive
2. $1 < RCA \leq 2$: Weak competitiveness
3. $2 < RCA \leq 4$: Medium competitiveness

4. $RCA > 4$: Strong competitiveness

The Revealed Comparative Advantage (RCA) method was chosen because it is widely recognized for measuring a country's relative export competitiveness by comparing a product's share in a country's exports to its share in global exports. RCA is particularly suitable for long-term time-series data and allows for cross-country comparisons. Although alternative measures such as the Trade Competitiveness Index (TCI) or Constant Market Share Analysis (CMSA) could be used, RCA is preferred in this study because it provides a clear, quantitative benchmark that is easily interpretable in the context of policy formulation.

Dynamic Revealed Comparative Advantage (DRCA)

The Dynamic Revealed Comparative Advantage (DRCA) method is a development of RCA that considers changes in RCA values over a period of time. DRCA is used to analyze the dynamics or trends of competitiveness over time, making it suitable for studying the long-term changes in the competitiveness of specific products. DRCA is calculated by calculating the difference in RCA between periods, or it can also be done by using the percentage change in RCA. In general, the [Equation 2](#).

$$DRCA = \frac{\Delta RCA}{RCA} = \frac{\Delta(\frac{X_{ij}}{\sum_j X_{ij}})}{\frac{X_{ij}}{\sum_j X_{ij}}} - \frac{\Delta(\frac{X_{wj}}{\sum_j X_{wj}})}{\frac{X_{wj}}{\sum_j X_{wj}}} \dots 2$$

Description:

DRCA = Change in a country's competitiveness towards a commodity

X_{ij} = Export value of commodity j in country i (US\$)

$\sum_j X_{ij}$ = Total export value of all commodities from country i (US\$)

X_{wj} = Export value of commodity j in the world (US\$)

$\sum_j X_{wj}$ = Total export value of all commodities (US\$)

The DRCA method, as described by Edwards and Schoer (2002) and Özçelik and Erlat (2013), is a technique used to analyze changes in the competitiveness of a commodity over a specified period. Edwards and Schoer emphasize that DRCA can help assess a country's ability to maintain or improve its comparative advantage dynamically and identify trends in the increasing or decreasing competitiveness of certain commodities, allowing policy and development strategies to be formulated to enhance the competitiveness of a country's export products. This can be explained as in [Table 2](#) regarding the Dynamics of Export Market Position.

Table 2. Dynamics of Export Market Position

RCA	Growth of Share of Commodity j in country i		Growth of Commodity Share j in world exports	Export Market Position	Export Evaluation
Go on	↑	>	↑	Rising Stars	Successful Restructuring
	↑	>	↓	Falling Stars	Poor Restructuring
	↓	>	↓	Lagging Retreat	Poor Restructuring
Down	↓	<	↑	Lost Opportunity	Poor Restructuring
	↓	<	↓	Leading Retreat	Successful Restructuring
	↑	<	↑	Lagging Opportunity	Poor Restructuring

Source: [Edwards and Schoer \(2002\)](#); [Özçelik and Erlat \(2013\)](#)

The Dynamic Revealed Comparative Advantage (DRCA) method was selected to complement RCA by capturing changes in competitiveness over time. DRCA enables

classification of export performance into strategic categories (e.g., rising star, falling star, lagging retreat, lost opportunity, leading retreat, lagging opportunity), which is crucial

for identifying trends and assessing the sustainability of competitive advantage. While other dynamic approaches, such as Markov chain analysis or shift-share analysis, can also track changes, DRCA was chosen for its direct compatibility with RCA results and its established use in international trade competitiveness studies. By combining RCA and DRCA, this study not only quantifies the current level of competitiveness but also examines its evolution over time, providing a more comprehensive understanding of Indonesia's position in the Chinese essential oil market.

RESULTS AND DISCUSSION

Competitiveness of Essential Oils

Competitiveness analysis using the Revealed Comparative Advantage (RCA) method is employed to assess a country's comparative advantage in exporting specific commodities. This method reflects a country's trade specialization based on the share of commodity exports compared to the

share of global exports. The higher the RCA value, the greater the contribution of the commodity's exports to the country's foreign exchange earnings. Based on the highest RCA value as presented in [Table 3](#), the five main countries that dominate essential oil concentrate exports to the Chinese market are Germany, France, Bulgaria, Indonesia, and the USA.

Based on data from the [ITC Trade Map \(2024\)](#) and the Indonesian Ministry of Trade (2023), Table 2 shows that the five countries with the highest export competitiveness of essential oils in the Chinese market are Bulgaria, France, Indonesia, the United States, and Germany. During the period 2011–2023, Bulgaria recorded the highest average RCA value, namely 1,379.3, followed by France at 30.4, in third place Indonesia at 16.7, in fourth place the United States at 7.4 and in fifth place Germany at 6.6. The five countries have RCA values above four, indicating that the five countries are highly competitive.

Table 3. RCA Value (Competitiveness) of Essential Oil Exports of 5 Main Exporting Countries

Year	RCA Value of Major Exporting Countries				
	Germany	France	Bulgaria	Indonesia	USA
2011	1.514	15.1	78.4	0.5	8.2
2012	2.447	33.4	268.4	4.8	12.3
2013	0.877	74.1	247.3	4.4	5.7
2014	0.541	26.9	703.8	19.2	8.0
2015	0.976	27.6	1.001.3	37.5	9.5
2016	1.164	26.1	1.896.2	17.6	4.0
2017	0.929	41.7	5.255.6	10.5	7.8
2018	2.059	26.0	1.855.3	23.8	10.7
2019	4.946	21.2	2.117.9	27.6	8.2
2020	24.081	29.1	1.207.3	31.5	11.8
2021	17.824	17.1	786.8	20.1	1.5
2022	21.754	27.0	1.133.6	2.7	0.9
2023	17.043	49.4	1.132.6	5.8	1.3
Average	6.6	30.4	1.379.3	16.7	7.4

Source: Processed 2025

Bulgaria has a very strong competitiveness in essential oil exports, as reflected by the much higher RCA value compared to other countries. This shows that essential oil exports are a leading sector that

contributes significantly to the country's foreign exchange. France also has high competitiveness, which is due to the large demand in the essential oil-based perfume and cosmetics sector.

Indonesia has a fairly strong export competitiveness of essential oils with an average RCA value of 16.7 during 2011–2023. This competitive advantage is influenced by the availability of abundant raw materials and Indonesia's position as one of the world's main producers of essential oils ([FAO, 2023](#)). Despite having supportive climate conditions, this competitiveness fluctuates due to production factors, selling prices, and competition with other commodities such as coffee, rubber, and palm oil ([Faradiva, 2020](#)). The highest RCA was recorded in 2015 at 37.5, driven by increasing global demand and product diversification, while the lowest value occurred in 2011 at 0.5 due to a decrease in exports, which only reached US\$161,025,700, lower than in subsequent years. This fluctuation highlights the need for a strategy to enhance production efficiency, maintain price stability, and diversify products to strengthen Indonesia's competitiveness in the global market.

The USA and Germany have lower competitiveness compared to Bulgaria and France. However, both remain important competitors in the essential oil industry, especially as producers of derivative products such as perfumes, cosmetics, and pharmaceuticals. Germany's relatively stable RCA value suggests that the country continues to play a significant role in the global trade of essential oils. The trend in RCA values during the study period shows that Bulgaria fluctuates, but remains at a very high level. In contrast, Indonesia and France have more stable competitiveness, reflecting the resilience of their essential oil industries in facing global market dynamics.

Indonesia's strong competitiveness presents a great opportunity to increase essential oil exports by implementing strategies such as improving product quality, diversifying essential oil variants, and strengthening market penetration through trade agreements and international promotions. In addition to price and export volume factors, the competitiveness of essential oils is also influenced by meeting

the quality standards set by the destination country. China as one of the main markets imposes strict quality requirements, such as pure essential oil content, cleanliness, and contaminant-free laboratory tests. Compliance with these requirements is one of the strategies to increase the competitiveness of Indonesian essential oils in the Chinese market ([Kementerian Perdagangan RI, 2025](#)).

Based on [Figure 2](#), the average RCA growth of major essential oil exporting countries in the Chinese market was positive throughout the 2011–2023 period. Indonesia recorded the highest RCA growth compared to other exporters, with an average growth rate of 1.08 percent. Germany ranked second with an average RCA growth rate of 0.57 percent, followed by Bulgaria at 0.54 percent. France recorded an average RCA growth rate of 0.20 percent, while the United States ranked last with an average growth rate of 0.02 percent.

With a positive and high average RCA growth, Indonesia has significant potential to increase its essential oil exports. [Rosiana et al. \(2018\)](#) stated that enhancing competitiveness and market strength in the export sector can be achieved by improving the quality and continuity of domestic commodities in line with global consumer demand. In addition to price and export volume factors, the competitiveness of essential oils is also influenced by compliance with quality standards set by the destination countries. China, as one of the main markets, imposes strict quality requirements, including pure essential oil content, cleanliness, and laboratory tests that are contaminant-free. Adherence to these requirements is one of the key strategies for improving the competitiveness of Indonesian essential oils in the Chinese market ([Kementrian Perdagangan Republik Indonesia, 2025](#)).

During the period 2011–2013, as presented in [Table 4](#), the competitiveness of Indonesian essential oils increased significantly, as evidenced by Indonesia's classification as a "rising star" in the

Chinese market, indicated by a market share growth rate exceeding the global average. The primary driving factors behind this growth were the ease of export procedures and the upward trend in prices, which incentivized producers to boost both production and exports ([Rosiana et al., 2017](#)). In the same period, France and Bulgaria also held "rising star" positions; Bulgaria offered more competitive pricing,

while France maintained superior product quality ([Guerra, 2023](#)). In contrast, Germany and the United States experienced a decline in market share and were categorized as "lost opportunities," primarily due to higher production costs, increased price competition from developing countries such as Indonesia, and shifting market preferences in China ([Tripathi et al., 2016](#)).

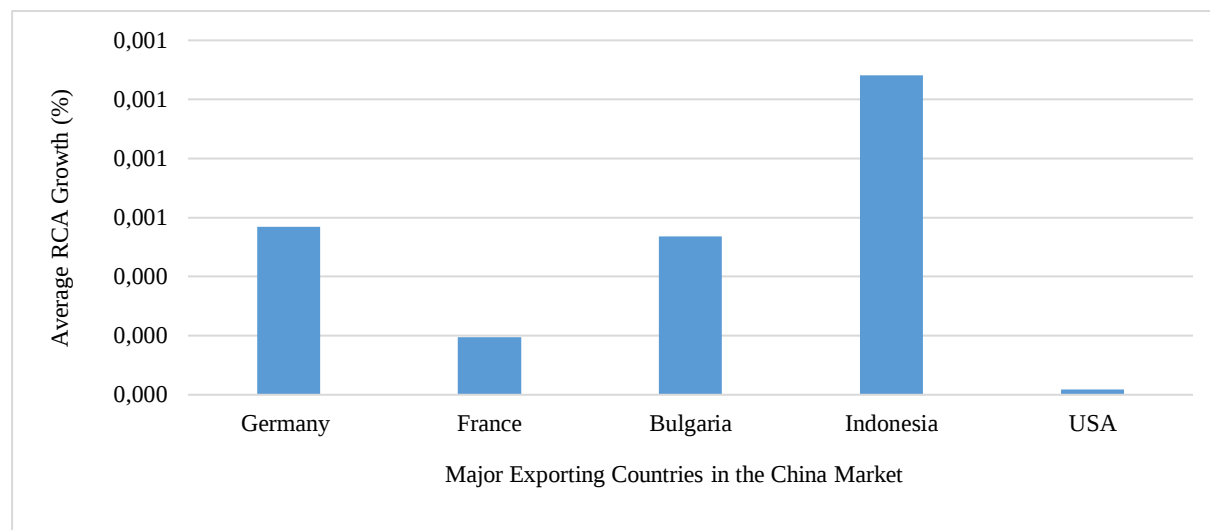


Figure 2. Average RCA Growth of Major Essential Oil Exporting Countries in the Chinese Market, 2011–2023.

Table 4. Competitive Position of Indonesian Essential Oil Exports and Main Competitor Countries in the Chinese Market in the First Period (2011-2013)

Country	Growth of Essential Oil Export Share	Growth of Essential Oil Share in China's Exports	Export Market Position
Germany	-0.30770	0.19495	lost opportunity**
France	4.86862	0.19495	rising stars*
Bulgaria	2.76932	0.19495	rising stars*
Indonesia	10.36825	0.19495	rising stars*
USA	-0.17552	0.19495	lost opportunity**

Description: *) Successful restructuring ; **) Poor restructuring

This shift in market dynamics during the early 2010s highlights the growing competitiveness of developing countries in the essential oils sector, especially in expanding markets like China. Indonesia, Bulgaria, and France succeeded by adapting through competitive pricing, quality improvements, and efficient supply

chains. In contrast, Germany and the United States struggled due to high production costs and limited market adaptability. These trends emphasize the need for continuous innovation and strategic positioning to maintain competitiveness in the global essential oil market.

Table 5. Competitive Position of Indonesian Essential Oil Exports and Main Competitor Countries in the Chinese Market in the Second Period (2013-2015)

Country	Growth of Essential Oil Export Share	Growth of Essential Oil Share in China's Exports	Export Market Position
Germany	0.02743	-0.07717	falling stars**
France	-0.65631	-0.07717	lagging retreat**
Bulgaria	2.73613	-0.07717	falling stars**
Indonesia	6.84645	-0.07717	falling stars**
USA	0.54376	-0.07717	falling stars**

Description: *) Successful restructuring ; **) Poor restructuring

During the period 2013–2015 as presented in [Table 5](#), the competitiveness of Indonesian essential oils remained strong but experienced a slight deceleration compared to the previous period. Indonesia continued to record positive export share growth; however, its position in the export market shifted to the "falling star" category. This indicates that although Indonesian exports were still expanding, their growth began to lag behind that of other competitors in the Chinese market. The slowdown was attributed to several factors, including intense competition from other exporting countries capable of producing essential oils at lower costs ([Tempo, 2010](#)), as well as the

deceleration of China's economic growth, which led to reduced demand for essential oil imports ([Media Center Riau, 2015](#)).

Bulgaria recorded the highest growth (2.73613), but remained in the same category due to persistent competitive pressure. Germany posted modest growth (0.02743) but was also categorized as a "falling star". Meanwhile, France experienced an export contraction (-0.65631) and fell into the "lagging retreat" category, signaling a decline in its competitiveness. The United States, with a growth rate of 0.54376, was also classified as a "falling star", reflecting insufficient export growth.

Table 6. Competitive Position of Indonesian Essential Oil Exports and Main Competitor Countries in the Chinese Market in the Third Period (2015-2017)

Country	Growth of Essential Oil Export Share	Growth of Essential Oil Share in China's Exports	Export Market Position
Germany	-0.12871	-0.08430	lagging retreat**
France	0.38444	-0.08430	falling stars**
Bulgaria	3.80621	-0.08430	falling stars**
Indonesia	-0.74336	-0.08430	lagging retreat**
USA	-0.24361	-0.08430	lagging retreat**

Description: *) Successful restructuring ; **) Poor restructuring

During the period 2015–2017, as presented in [Table 6](#), the competitiveness of Indonesia's essential oil exports declined, as reflected by its classification as a "lagging

retreat" in the Chinese market. The negative export share growth indicates a loss of competitiveness and a diminishing market share in China. This decline was driven by

intensified competition from other exporting countries, shifting consumer preferences in China, and limited innovation in product development and processing technologies. Additionally, the lack of product diversification and the absence of fully standardized quality measures further weakened Indonesia's position in the Chinese market ([Dewan Atsiri Indonesian, 2018](#)).

Bulgaria and France were categorized as “falling stars,” indicating that although these countries had demonstrated strong competitiveness in the previous period, their

export shares began to stagnate or decline. Bulgaria continued to maintain a relatively high market share, supported by more competitive pricing, while France remained focused on delivering high-quality products. In contrast, Germany and the United States were classified as “lagging retreat,” suggesting a continued erosion of their competitiveness in essential oil exports. This was primarily attributed to high production costs, changes in trade policies, and increasing competition from developing countries offering more competitive prices.

Table 7. Competitive Position of Indonesian Essential Oil Exports and Main Competitor Countries in the Chinese Market in the Fourth Period (2017-2019)

Country	Growth of Essential Oil Export Share	Growth of Essential Oil Share in China's Exports	Export Market Position
Germany	6.73433	0.45273	rising stars*
France	-0.26118	0.45273	lost opportunity**
Bulgaria	-0.41460	0.45273	lost opportunity**
Indonesia	2.81334	0.45273	rising stars*
USA	0.51766	0.45273	rising stars*

Description : *) Successful restructuring ; **) Poor restructuring

During the period 2017–2019, as presented in [Table 7](#), Indonesia's essential oil export competitiveness improved, as indicated by its classification as a “rising star” in the global market, with an export share growth of 2.81334 percent. This improvement was driven by production stability, high demand from the perfume and cosmetics industries, and an aggressive export strategy. Furthermore, the adoption of international quality standards and innovations in production processes significantly enhanced Indonesia's competitiveness, particularly in China, its primary export destination ([BISIP, 2023](#)).

Alongside Indonesia, Germany also demonstrated a strong export performance, recording the highest export share growth of 6.773433 percent, thereby securing a “rising star” position in the Chinese market. Germany's success in enhancing its export

competitiveness can be attributed to product innovation, production efficiency, and effective market penetration strategies. The United States also entered the “rising star” category, although with a more modest growth rate of 0.51766 percent, indicating a moderate improvement in competitiveness.

In contrast, France and Bulgaria experienced declines in their essential oil export shares, by -0.26118 percent and -0.41460 percent, respectively, placing them in the “lost opportunity” category. These declines were primarily due to increased competition from other countries, particularly Indonesia and Germany, and shifting market preferences toward more competitively priced products. Additionally, higher production costs and stricter export regulations may have contributed to the weakening export competitiveness of both countries.

Table 8. Competitive Position of Indonesian Essential Oil Exports and Main Competitor Countries in the Chinese Market in the Fifth Period (2019-2021)

Country	Growth of Essential Oil Export Share	Growth of Essential Oil Share in China's Exports	Export Market Position
Germany	3.57083	0.26827	falling stars**
France	0.02276	0.26827	lagging opportunity**
Bulgaria	-0.52880	0.26827	lost opportunity**
Indonesia	-0.07422	0.26827	lost opportunity**
USA	-0.76766	0.26827	lost opportunity**

Description: *) Successful restructuring ; **) Poor restructuring

During the period 2019–2021, as presented in [Table 8](#), the COVID-19 pandemic had a significant impact on the competitiveness of essential oil exports, including that of Indonesia, which experienced a decline in market share and was categorized as a “lost opportunity” due to negative export growth. Although global demand for essential oils increased, driven by the rising trend in health and aromatherapy product usage during the pandemic, Indonesia was unable to capitalize on this opportunity effectively. According to [Prasetya et al. \(2022\)](#), the decline was triggered by production disruptions resulting from industrial restrictions, lockdown policies that slowed distribution, and supply chain instability that led to increased logistics costs and delivery delays. Consequently, Indonesia lost market ground to other supplier countries that were more adaptive during the crisis.

Similar conditions were experienced by the United States and Bulgaria, which were also categorized as “lost opportunities,” while France was classified as “lagging opportunity,” indicating stagnant export growth. In contrast, Germany, although placed in the “falling stars” category, recorded the highest growth in export share. However, this growth came with concerns about the sustainability of its long-term competitiveness. The pandemic introduced new dynamics in the global essential oil trade,

where countries with greater flexibility in production and distribution systems demonstrated stronger resilience, while those facing significant supply chain disruptions lost momentum in the international market.

During the period 2021–2023, as presented in [Table 9](#), Indonesia’s essential oil export competitiveness declined, as reflected in its classification as a “lagging retreat,” with negative export share growth indicating a loss of market share and reduced competitiveness at the global level. The suboptimal utilization of essential oils has contributed to the decline in Indonesia’s export performance in the Chinese market. To address this issue, Indonesia needs to implement strategic measures, one of which includes establishing essential oil processing facilities that comply with domestic quality standards ([Nurfauziah and Octaviani, 2021](#)) and cater to the growing demand for exports.

Germany and the United States were also categorized as “lagging retreat,” with negative export share growth of -0.15370 and -0.23672, respectively, reflecting weakening competitiveness due to high production costs and increased pressure from emerging economies. Meanwhile, Bulgaria and France were classified as “falling stars,” indicating that although they previously held strong competitive positions, their export shares have begun to stagnate or decline. France recorded the highest export share growth (1.55771) yet remained in the “falling stars” category, possibly due to rising competition

from new entrants or shifting global consumer preferences. Bulgaria, with an export share growth of 0.27402, continues to

face challenges in maintaining its market position.

Table 9. Competitive Position of Indonesian Essential Oil Exports and Main Competitor Countries in the Chinese Market in the Sixth Period (2021-2023)

Country	Growth of Essential Oil Export Share	Growth of Essential Oil Share in China's Exports	Export Market Position
Germany	-0.15370	-0.11489	lagging retreat**
France	1.55771	-0.11489	falling stars**
Bulgaria	0.27402	-0.11489	falling stars**
Indonesia	-0.74471	-0.11489	lagging retreat**
USA	-0.23672	-0.11489	lagging retreat**

Description: *) Successful restructuring; **) Poor restructuring

CONCLUSION

This study reveals that Indonesia's essential oil exports have generally maintained strong competitiveness in the Chinese market during the 2011–2023 period, although they have remained below those of key competitors such as Bulgaria, France, and Germany. RCA analysis indicates fluctuating performance, peaking in 2015 and sharply declining in 2022, while DRCA results show that Indonesia was in the “rising star” category in 2011–2013 and 2017–2019, in the “falling stars” position in 2013–2015, in the “lost opportunity” position in 2019–2021, and in the “lagging retreat” position in 2015–2017 and 2021–2023. These dynamics were driven by production instability, limited innovation, and quality standards that did not fully meet market demands.

Beyond China, the findings highlight broader implications for Indonesia's global trade competitiveness. Strengthening essential oils in a key market like China can improve Indonesia's role in supply chains, bargaining power in trade negotiations, and serve as a model for other agricultural commodities. To address challenges, Indonesia must enhance quality and consistency through strict standards, promote innovation and diversification, utilize trade agreements for wider access, and strengthen

collaboration among the government, producers, and exporters to build sustainable supply chains. Future research should explore competitiveness in markets, assess trade policies and non-tariff measures, examine post-harvest and processing technologies, and conduct cross-commodity comparisons to identify strategies for Indonesia's broader export portfolio.

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