

Can Indonesian Biopharmaceutical Plant Grab a Chance in Global Market? Ginger Trade Revisited

Gilang Wirakusuma

Department of Agricultural Socio-economics, Faculty of Agriculture, Universitas Gadjah Mada, Indonesia

*Corresponding author. Email: gilang_wirakusuma@ugm.ac.id

ABSTRACT

Biopharmaceutical plants have shown remarkable expansion since the outbreak of COVID-19. Ginger, one of the leading biopharmaceutical crops, grows rapidly in transactions in the global market. Among many countries, Indonesia has consistently been one of the world's main suppliers of the ginger. This study aims to: (1) describe the trend of ginger in the global market; (2) evaluate the competitiveness of Indonesian ginger with the partner country markets; and (3) identify potential export markets for Indonesian ginger. Trade data and other indicators used in this study were obtained from FAOSTAT and the World Bank's World Integrated Trade Solution (WITS) with commodity code HS091010. The data period is the last 10 (ten) years (2010-2019). Descriptive analysis with data visualization was employed to achieve the first objective of this study. Meanwhile, analysis of Revealed Comparative Advantage (RCA), Export Product Dynamic (EPD) and X-Model Potential Export Products (X-Model) were conducted to evaluate the competitiveness of Indonesian ginger in the global market and to identify its potential markets. The results of this study show that trade volume in the global market increased rapidly in the 2010-2019 period. In this period, ginger exports grew by 6.6% per year and imports also continued to show prominent increase with an average growth of 8.65 percent per year. Furthermore, the competitiveness of Indonesian ginger proceeds to a high level in the United Kingdom (RCA = 2.84) and Germany (RCA = 1.90). Moreover, the Indonesian ginger export market in Bangladesh, Germany, and Malaysia is classified as a potential market development level. Thus, the Indonesian ginger business stakeholders must consider the market potential in these countries to improve ginger trading performance in the global market

Keywords: ginger, Indonesia, global market, competitiveness

1. INTRODUCTION

Coronavirus Disease 2019 (Covid-19) has become an extraordinary phenomenon experienced by all countries in the world. The World Health Organization (WHO) has declared it a pandemic on March 11, 2020 [1-3]. Along with this pandemic, the consumption of biopharmaceutical products is increasing because it is part of the community's efforts to maintain immunity and prevent severe symptoms due to COVID-19 infection. The efficacy of native Indonesian biopharmaceutical plants has been believed to be very effective in treating all kinds of diseases. Among the many medicinal plants, ginger (*Zingiber officinale* Rosc.) is one of the most popular products [4].

Ginger is a multifunctional plant because apart from being used as a medicinal raw material it is also consumed as a spice. Ginger is one of the four major medicinal plants that are widely used for traditional herbal medicine, small industries, large medicine industries, food/beverage industries, and spices [5]. In Indonesia, there are 3 types of ginger commonly traded, namely: elephant ginger (*Zingiber officinale* Rose. var. *officinale*), emprit ginger (*Zingiber officinale* Rose. var. *vubrum*), red ginger (*Zingiber officinale* Rose. var. *amarum*) [6]. Ginger is cultivated in almost all parts of Indonesia. In 2020, ginger production reached 183,517 tons and became the most widely produced biopharmaceutical plant in Indonesia [7].

Ginger has potential to grow because it is one of herbal plants needed by the world community, especially for spices and traditional medicines. Moreover, ginger has become an export commodity with high demand and a higher price compared to its production costs. Thus this is profitable. Based on data obtained from the World Integrated Trade Solution (WITS), the world's largest export of rhizomes is ginger (HS 091010) [8].

In the global market, ginger is a tradable goods that generates large trade value. Export and import indicators can represent the performance of Indonesian ginger in international trade. For Indonesia, ginger is one of the export commodities. Not only being consumed as raw materials for traditional medicines, ginger also contributes in generating foreign exchange and employment. Based on the latest data, ginger has become a spice plant with the largest export value for Indonesia, which is around 4.9 million USD [9]. However, Indonesia is not the world's largest supplier of ginger. China is the largest exporter of ginger in the world, with an export value of USD 571.72 million. This value is about 57.9%% of the total world ginger export value in 2019. Meanwhile, the Netherlands and Thailand are in the second and third largest exporters with export values of 106 million USD and 55.77 million USD respectively in the same period. Furthermore, the list of the top ten major ginger exporters in the world are India (44.55 million USD), Peru (41.44 million USD), United Arab Emirates (29.05 million USD), European Union (25.83 million USD), Brazil (22.16 million USD), Germany (15.66 million USD), and Spain (10.7 million USD).

Indonesia is one of the countries with the largest ginger cultivation area in the world. The area of ginger harvested in the main countries in 2019 was dominated by India and Nigeria. More than 60% of ginger cultivation area is in these two countries. Followed by China (14.29%) and Nepal (5.75%). If the ten main producing countries (India, Nigeria, China, Nepal, Indonesia, Cameroon, Bangladesh, Thailand, Philippines, and Japan) are combined, they have a proportion of 95.37% of the total area of ginger in the world, leaving only around 4.73. % for the proportion in other countries.

With existing resources, Indonesia should be able to become one of the main ginger commodity market players in the global market. This statement refers to the fact that Indonesia is one of the countries with the largest ginger harvested area, but is not one of the world's main exporters. This indicates that the competitiveness of Indonesian ginger needs to be studied further. The study of the competitiveness of Indonesian ginger in the global market has been conducted by [10]. In this study, they revealed that ginger commodity has competitiveness in the international market and Indonesian ginger exports are influenced by ginger production, ginger export volume and the exchange rate of the rupiah to the USD. However, this study has not identified potential export

destinations for Indonesian ginger. Therefore, this study tries to fill this gap.

This research was conducted to: (1) describe the trend of ginger in the global market; (2) evaluate the competitiveness of Indonesian ginger in partner country markets; and (3) identify potential export markets for Indonesian ginger.

2. METHODOLOGY

2.1. Data

This study employed secondary data. The data were obtained from FAOSTAT and the World Bank's World Integrated Trade Solution (WITS) with commodity code HS091010. The data period from these two sources is the last 10 (ten) years (2010-2019). If some indicators, in a certain year, are not available, then data will be used in accordance with the availability of these sources.

2.2. Analysis

Revealed Comparative Advantage (RCA) is a method that can be used to measure the competitiveness or comparative advantage of a country's commodities. The variable used is the export variable, namely the export value of a commodity to the total exports in a country compared to the share of product value in international trade. This study adopted RCA formulation from Balasa [11] and modified it as:

$$RCA = \frac{(X_{aj})/(X_{tj})}{(W_{aj})/(W_{tj})} \quad (1)$$

where:

X_{aj} : Indonesia's ginger export value to partner country

X_{tj} : Indonesia's total export value to partner country

W_{aj} : World's ginger export value to partner country

W_{tj} : World's total export value to partner country

The results of the RCA analysis show two indications: (1) if the RCA value is more than one ($RCA > 1$), then the Indonesian ginger commodity has a comparative advantage or has a strong competitiveness and (2) if the value of RCA is less than one ($RCA < 1$), then the Indonesian ginger commodity is indicated to have weak competitiveness.

The export potential market of Indonesian ginger will be evaluated with Export Product Dynamic (EPD) and X-Model Potential Export Products (X-Model). The EPD method is used to determine the dynamic trend of ginger exports which indicates whether the export performance of ginger has a fast growth or not [12]. If Indonesia's ginger export growth is above the world's average and this situation continues in the long term, then this commodity can eventually become an important commodity to boost export revenues. EPD is formulated by the following two equations:

(a) Ginger export growth index

$$\frac{\sum_{t=1}^T \left(\frac{X_{ij}}{W_{ij}} \right)_t \times 100\% - \sum_{t=1}^T \left(\frac{X_{ij}}{W_{ij}} \right)_{t-1} \times 100\%}{T} \quad (2)$$

(b) Total export growth index

$$\frac{\sum_{t=1}^T \left(\frac{X_t}{W_t} \right)_t \times 100\% - \sum_{t=1}^T \left(\frac{X_t}{W_t} \right)_{t-1} \times 100\%}{T} \quad (3)$$

where:

- X_{ij} : Indonesia’s ginger export value to partner country
- W_{ij} : World’s ginger export value to partner country
- X_t : Indonesia’s total export value to partner country
- W_t : World’s total export value to partner country
- T : number of years (10)

Commodities from a country are considered competitive if the market share of that country continues to increase, and if the market share under study grows higher than the average growth of all commodities. In the EPD method, the ideal market position has a high export share, and is called rising stars. The rising star position indicates that the country's commodities have a fast-growing market share, while the lost opportunity position represents the loss of market share for products that are actually dynamic. This position is an unexpected position. Falling stars is an undesirable position, because this position is in a condition when market share is increasing but the product is not dynamic. This position is better than the lost opportunity position. Meanwhile, the retreat position is also an undesirable position, namely when market share is lost and the product is not dynamic.

X-Model Potential Export Products is a method that combines the RCA and EPD methods. The purpose of using this method is to cluster the potential for product development in certain areas. This clustering is done to focus the trading market.

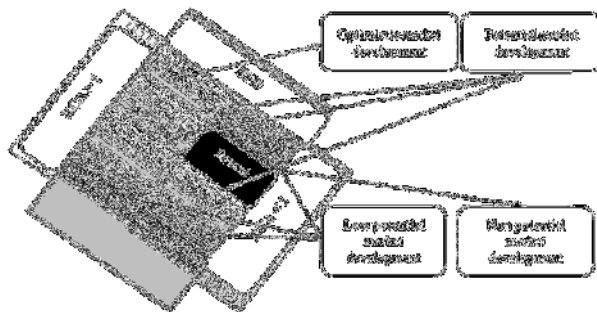


Figure 1. X-Model Potential Export Products

By using this method, the results of the analysis of the competitiveness of Indonesian ginger become more comprehensive because they look at competitiveness both statically and dynamically. From this analysis, it will be known the potential development of the

Indonesian ginger market in the main export destination countries of Indonesian ginger. The market development potential is divided into four clusters: (1) optimistic market development, (2) potential market development, (3) less potential market development, and (4) non-potential market development.

3. RESULT

3.1. Export – Import Overview

In 2019, the amount of ginger imported worldwide rose to 875,639 tonnes, an increase of 9.7% from the previous year. During the period in this study, total imports showed a strong expansion from 2010 to 2019: their volumes increased at an average annual rate of 9.15% during the analysis period. The trend pattern, however, shows fluctuations recorded during the analyzed period, namely in 2013-2014 which experienced a decline and then in 2015 it increased again. The most prominent growth rate was recorded in 2015 with an increase of 19.31% from the previous year. The increase in imports indicates an increase in demand from ginger importing countries.

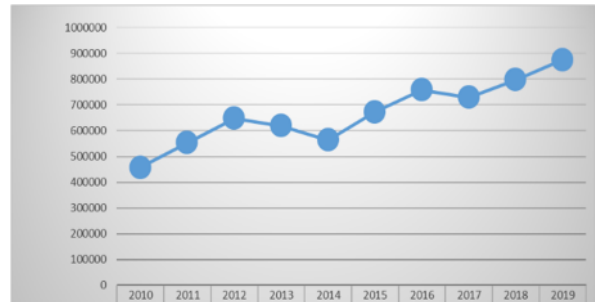


Figure 2. World's ginger export volume (ton)

In terms of value, ginger imports jumped to around 1.079 billion USD in 2019. In general, imports continued to show prominent growth with an average growth of 8.65% per year in the 2010-2019 period. The most notable growth rate was recorded in 2014 when imports increased by 32.68% from the previous year. As is the case with import volumes, during the period in this study, global imports fluctuated although overall they experienced significant growth from 2010-2019.

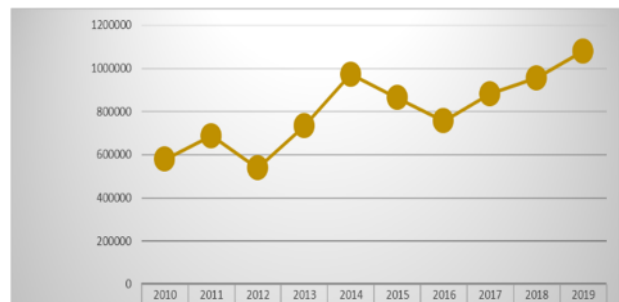


Figure 3. World's ginger import volume (ton)

In the 2010-2019 period, the performance of Indonesia's ginger trade was quite volatile. Overall, the export value of ginger experienced an increase at the end of the period (4.933 million USD) compared to the beginning of the period (3.467 million USD). Not only did the export value increase, the same condition also occurred in the import value of ginger, where the import value of ginger experienced a significant increase in 2019 (17,119 million USD) compared to 2010 (1.82 million USD). The export value of Indonesian ginger reached its peak in 2014, where the value reached 49.127 million USD. In that year, the ratio of exports to imports was 19.93, meaning that the export value of Indonesian ginger was equivalent to 19 times its imports. The condition of exports exceeding imports occurred from 2013 to 2018, and reversed in 2019. In 2019, the ratio of the export value of ginger to its imports was 0.29 which indicates that imports far exceed exports. The conditions in 2019 repeated the conditions in 2011 and 2012 where the import value of ginger far exceeded its exports. Conditions in 2019 indicated that the demand for ginger in Indonesia could not be met by domestic production, so it had to bring in large quantities of imported ginger.

In 2019, Bangladesh became the destination country for ginger exports with the largest trade value, where

ginger exports from Indonesia to the country were 1.949 million USD. The second and third largest export destinations for Indonesian ginger are Japan (650,000 USD) and Malaysia (619,000 USD). In the same year, other Asian countries also became major partners for Indonesian ginger exports, including Singapore (405,000 USD), India (339,000 USD) and Korea Republic (97,000 USD). Germany and the United Kingdom are non-Asian countries considered as the main destination markets for Indonesian ginger exports with export values of USD 242,000 and USD 242,000, respectively (Figure 5a).

Meanwhile, it can be seen in Figure 5b describing the main countries that are ginger import partners for Indonesia. In 2019, Indonesia's largest ginger import partner was ginger originating from Thailand with an import value of 1.949 million USD. This value is more than double the value of Indonesian ginger imports from China (3.901 million USD) and Vietnam (3.657 million USD). India and Myanmar are also countries that send ginger to Indonesia with a large value, the values are 364,000 USD and 180,000 USD, respectively. Nigeria, which is one of the world's main ginger producing countries, became a non-Asian country that became Indonesia's ginger import partner with a value of 347,000 USD.

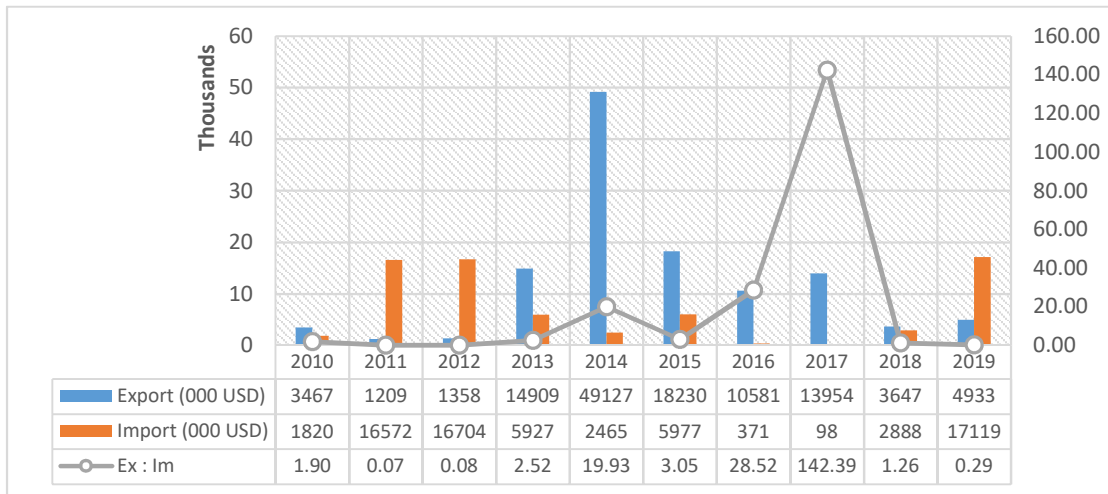


Figure 4. Indonesian ginger export import trend

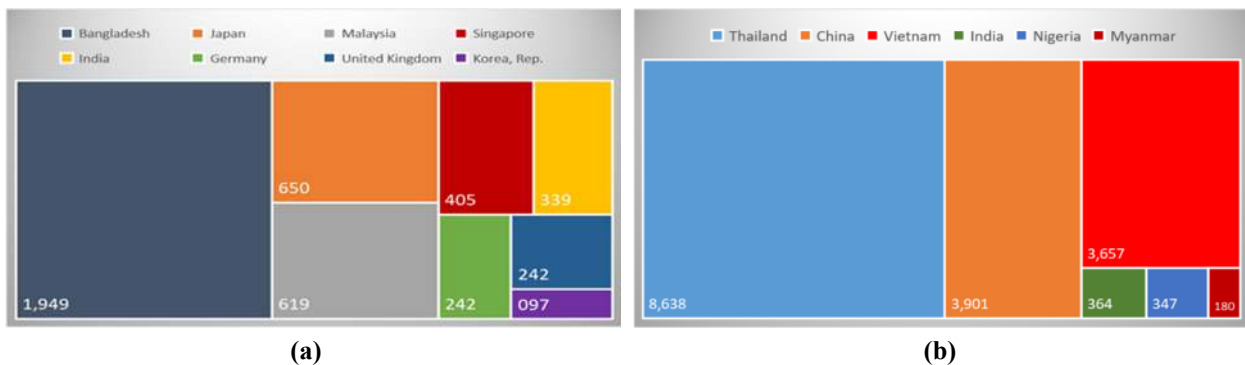


Figure 5. (a) Indonesian ginger import value by main destination; (b) Indonesian ginger import value by main destination (tonnes)

3.2. Competitiveness and Potential Market

The study of competitiveness and potential market for Indonesian ginger is focused on the main export destinations of Indonesian ginger in 2019, namely Bangladesh, Germany, India, Japan, Korea Republic, Malaysia, Singapore, and the United Kingdom. The competitiveness of Indonesian ginger in each export destination country was analysed by formulating RCA. The results of the RCA analysis show that Indonesian ginger is indicated to have competitiveness in the United Kingdom (RCA = 2.84) and Germany (RCA = 1.90). In these two countries, Indonesian ginger has a greater comparative advantage to continue to penetrate the market compared to other countries that export ginger to these two countries. Meanwhile, in the Asian market, the RCA value of Indonesian ginger is less than 1, meaning that Indonesian ginger is indicated to have weak competitiveness in seeking to increase exports in destination countries (Bangladesh, India, Japan, Malaysia, Korea Republic, and Singapore).

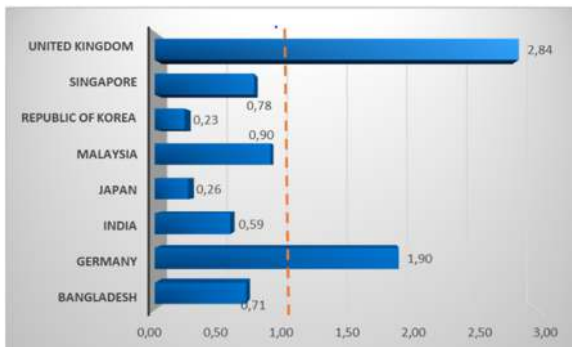


Figure 6. Indonesian RCA on ginger by main destination

Furthermore, Indonesia's ginger export potential will be evaluated with Export Product Dynamic (EPD) and X-Model Potential Export Products (X-Model). The EPD method is used to determine the dynamic trend of ginger exports which indicates whether the

export performance of ginger has a fast growth or not. If Indonesia's ginger export growth is above the world average and this situation continues in the long term, then this commodity can eventually become an important commodity to boost export revenues.

Based on the results of the EPD analysis, this study revealed that Indonesia's ginger exports which are in a rising star market position are in Bangladesh and Malaysia. These results indicate that the growth of the export market share of Indonesian ginger is positive and the growth of the trade share is positive. Thus, Indonesia's ginger exports are indicated to have a fast-growing market share in Bangladesh and Malaysia.

Meanwhile, Indonesian ginger exports which are classified as lost opportunities are in Germany, India, Japan, Korea Republic, Singapore, and the United Kingdom. These results indicate that the growth of ginger export market share is negative but the growth of trade share is positive. Facts like this indicate that Indonesian ginger in these countries has the potential to lose the opportunity to increase the share of ginger exports in the future.

Furthermore, after obtaining the results of the RCA and EPD analysis, the potential market development potential was clustered using the X-model potential export products method. This analysis was carried out by considering the results of the RCA and EPD analysis that had been obtained. By using this method, the results of the competitiveness analysis under study become more comprehensive because they see the competitiveness of Indonesian ginger commodities from two sides at once, namely from the RCA side and also the EPD. From this analysis, it will be known the potential for market development of ginger commodities. The market development potential is divided into four clusters, namely optimistic market development potential, potential market development potential, less potential market development potential, and non-potential market development potential.

Table 1. EPD Analysis on Indonesian Ginger by Major Export Destination

Export Destination	Bangladesh	Germany	India	Japan	Malaysia	Korea Rep.	Singapore	Unt. Kingdom
Ginger Export Growth Index	0.16	-0.04	-0.17	-0.01	0.01	-0.09	-0.12	-0.06
Total Export Growth Index	0.04	0.01	0.01	0.19	0.18	0.12	0.10	0.01
CLASSIFICATION	Rising Star	Lost Opportunity	Lost Opportunity	Lost Opportunity	Rising Star	Lost Opportunity	Lost Opportunity	Lost Opportunity

Based on the results of the X-Model analysis on Indonesian ginger, it is known that the export markets in Bangladesh, Germany, and Malaysia are classified as potential market development. Thus, to increase exports to these countries, Indonesia must still strive for market penetration to ensure a more stable share of ginger export dominance in the future. Meanwhile, Indonesia's ginger export market to India, Japan, Korea Republic, Singapore, and United Kingdom is classified as less potential market development status. This status indicates that market penetration is facing relatively tight competition to gain dominance of ginger exports in the future. As it is known, India and Japan are the top ten ginger producers in the world. This requires the differentiation of ginger products that do not intersect with the types of products of the two countries. On the other hand; namely in Korea Republic, Singapore, and United Kingdom; Indonesia does not face the challenge of domestic ginger products in the three countries but needs to identify the preferences of ginger products that are in demand and needed there.

4. CONCLUSION

The competitiveness of Indonesian ginger in export destination markets which are categorized as high is in the United Kingdom and Germany. In other export destination countries, Indonesian ginger has low competitiveness. Furthermore, the results of the analysis show that the high export of Indonesian ginger to destination countries does not always reflect high export competitiveness. The size of exports to destination countries does not always reflect the position of the commodity in the destination market, such as ginger exports in several partner countries which indicate that the market potential of Indonesian ginger is in the category of lost opportunity (Germany, India, Japan, Korea Republic, Singapore, and the United Kingdom). This means that even though this market is one of the main markets, the potential for ginger commodity development in that market is under pressure. Based on the results of the X-Model analysis on Indonesian ginger, it is known that the export markets in Bangladesh, Germany, and Malaysia are classified as potential market development. Thus, to increase exports to these countries, Indonesia must still strive for market penetration to ensure a more stable share of ginger export dominance in the future.

REFERENCES

[1] D. Cucinotta, and M. Vanelli, WHO Declares COVID-19 a Pandemic. *Acta Bio-Medica : Atenei Parmensis*, 91(1), 2020, 157–160.

[2] G. Tillu, S. Chaturvedi, A. Chopra and B. Patwardhan, *Public Health Approach of Ayurveda*

and Yoga for COVID-19 Prophylaxis. *The Journal of Alternative and Complementary Medicine*, 26(5), 2020, 360–364. <https://doi.org/10.1089/acm.2020.0129>

- [3] B. Vellingiri, K. Jayaramayya, M. Iyer, A. Narayanasamy, V. Govindasamy, B. Giridharan, M. D. Subramaniam, COVID-19: A promising cure for the global panic. *Science of The Total Environment*, 725, 2020, 138277. <https://doi.org/10.1016/j.scitotenv.2020.138277>
- [4] D. E. Wibowo, B. D. Madusari, and A. Ardianingsih, Pemberdayaan keluarga menghadapi pandemi COVID 19 dengan penanaman dan pemanfaatan tanaman obat keluarga di Kelurahan Degayu Kecamatan Pekalongan Utara, *Pena Abdimas: Jurnal Pengabdian Kepada Masyarakat*, 1(1), 2020, 16–19
- [5] E. R. Pribadi, Pasokan dan permintaan tanaman obat Indonesia serta arah penelitan dan pengembangannya, *Review Penelitian dan Tanaman Industri*, Vol.8 No.1, 2009, 52 - 64.
- [6] O. Rostiana, N. Bermawie dan M. Rahardjo, Standar prosedur operasional budidaya jahe, kenur, temulawak, kunyit, sambiloto dan pegagan, *Sirkuler No.1 1. Balitro*, 2005, 1-12.
- [7] Badan Pusat Statistik (BPS), *Produksi Tanaman Biofarmaka*, 2020, website: <https://www.bps.go.id/indicator/55/63/1/produksi-tanaman-biofarmaka-obat-.html>, Accessed on September 10th 2021.
- [8] WITS, *Giinger export in 2019*, website: <https://wits.worldbank.org/trade/comtrade/en/country/ALL/year/2019/tradeflow/Exports/partner/WLD/product/091010>, Accessed on September 10th 2021.
- [9] FAO, *Crops and livestock products trade, 2021*, Website: <http://www.fao.org/faostat/en/#data/TCL>, Accessed on May 12th 2021.
- [10] A. N. Utama, H. Erna, S. W. Hary, Analisis keunggulan kompetitif jahe Indonesia di pasar internasional, *Jurnal Ilmiah Sosioagribisnis*, 20(1), 2020, 41-53 <http://dx.doi.org/10.30742/jisa.v20i1.974>
- [11] Deardorff, A. V., *Globalisation, Comparative Advantage and the Changing Dynamics of Trade*. OECD, 2011.
- [12] Estherhuizen, *Measuring and Analyzing Competitiveness in the Agribusiness Sector: Methodological and Analytical Framework*, 2006, South Africa: University of Pretoria