AGRO PRODUCTIVIDAD

Colegio de Postgraduados

International positioning of Mexican mango, analysis of foreign trade competitiveness indices from 2005 to 2018

Luquez-Gaitan, Carlos E.[1]; Gómez-Gómez, Alma A.[2*]; Hernández-Mendoza, Natividad[3]

[1] Universidad Politécnica de Texcoco. Carretera Federal Los Reyes-Texcoco km 14.2, San Miguel Coatlinchán, Texcoco, Edo. de México, México. C. P. 56250.
[2] Universidad Autónoma Chapingo, División de Ciencias Económico-Administrativas. Carretera México-Texcoco km 38.5, Chapingo, Estado de México, México. C. P. 56230.
[3] Universidad Autónoma Chapingo. Doctorado en Economía de la División de Ciencias Económico-Administrativas. Carretera México-Texcoco km 38.5, Chapingo, Estado de México, México. C. P. 56230.
* Correspondence: almaaliciamx@yahoo.com

ABSTRACT

Objective: To analyze the commercial competitiveness of Mexican mango in the global market, through the determination of growth rates of mango exports, imports and production, as well as the commercial competitiveness indices.

Design/Methodology/Approach: The production data were obtained from the Agrifood and Fishing Information Service (*Servicio de Información Agroalimentaria y Pesquera*, SIAP), and those of exports and imports from the International Trade Center of UNCTAD/OMC through TRADEMAP. The relative trade balance, the transability index, the export openness index, and the import penetration index were measured.

Results: The relative trade balance in Mexico was very close to 1. The transability index had an average of 0.2. The export openness index was positive every year. The import penetration index had values very close to 0. The exports increased 97% and the imports 30%.

Study Limitations/Implications: The available statistical records for the period of 2005 to 2018 were taken into account, considering all the varieties of mango produced and exported.

Findings/Conclusions: Mango is a primary product highly valued globally and, therefore, demand for this product has increased. Exports had a growing behavior, while imports are very low compared to the exports. The commercial balance was positive every year. Mexico evidenced an increase of competitiveness at the international level.

Keywords: Relative trade balance, transability, export openness, import penetration.

Citation: Luquez-Gaitan, C. E., Gómez-Gómez, A. A., & Hernández-Mendoza, N. (2022). International positioning of Mexican mango, analysis of foreign trade competitiveness indices from 2005 to 2018. *Agro Productividad*. https://doi.org/10.32854/agrop.v15i4.2116

Academic Editors: Jorge Cadena Iñiguez and Libia Iris Trejo Téllez

Received: August 31, 2021.
Accepted: March 25, 2022.
Published on-line: May 9, 2022.

Agro Productividad, 15(4). April. 2022. pp: 33-40.

INTRODUCTION

The global production of mango represented more than half of the total production of the main tropical fruits in 2018, with a production volume of 100.2 million tons (FAO, 2020). In 2016, Mexico was the fifth world producer with a volume of 1.88 million tons, and one of 25 mangoes consumed in the world was of Mexican origin (SAGARPA, 2017). India has been the main mango producer since 1960 and Mexico is the main exporter at

Image by Madhulika Rawal at Pixabay

the global level since 2008, and in 2018 it was the main supplier at the global level. In 2018, the main exporters were: Mexico with 385 thousand tons, Thailand with 250 thousand tons, Peru with 205 thousand tons, Brazil with 195 thousand tons, and India with 155 thousand tons (FAOSTAT, 2021).

In 2018, a decrease in the growth of exports was found globally, which is attributed to a contraction of 5% in exports from Mexico; in some producing zones of Mexico the adverse meteorological conditions did not only cause a reduction of the mango supply for exports, but caused a general estimated decrease of 2.7% in Mexican production (FAOSTAT, 2021).

In Mexico different varieties of mango are produced which have a high demand in the international market: Criollo, Diplomático, Manila, Haden, Kent, Keitt, Tommy Atkins and Ataulfo (CIATEJ, 2016). In 2016, Mexican exports represented a very significant percentage of mango imports in the United States (65.41%), Canada (63.86%), and Japan (47.66%) (SAGARPA, 2017). Therefore, the main markets for Mexican mango are the United States, Canada and, to a lesser degree the European Union and Japan (FAOSTAT, 2014).

Mexican mango does not have export duty for the United States, Canada, the European Union or Japan (SIAVI, 2017). Mango has a duty tax classification established by the World Customs Organization (OMC, 2021). In Mexico the duty tax classification has eight digits (SE/SIICEX, 2021), being tax fraction 08045003, which refers to all the varieties of mango that can be produced and exported from Mexico (SIICEX/CAAAREM, 2020).

In Mexico there is lack of knowledge about mango's commercial positioning, despite it being a key agricultural product; therefore, its commercial position should be determined through the analysis of competitiveness applying commercial indices. In this context, the objective of this study was to analyze the commercial competitiveness of Mexican mango in the global market, through the determination of growth rates of exports, imports and production, as well as through commercial competitiveness indices during the period of 2005 to 2018. The research hypothesis is that Mexican mango has increased its competitiveness in the international market, despite it not being the main world producer and the contraction in exports found in year 2018.

MATERIALS AND METHODS

The study was based on a quantitative analysis of the statistics of international trade, domestic production and international prices. The documentation of data was conducted through the following sources of information: the Agrifood and Fishing Information Service (*Servicio de Información Agroalimentaria y Pesquera*, SIAP, 2017; SIAP, 2021) with its Consultation Agrifood Information System (*Sistema de Información Agroalimentaria de Consulta*, SIACON, 2020), and the TRADEMAP tool developed by the International Trade Center (INTRACEN, 2006; ITC/TRADEMAP, 2021).

The statistical records of the period from 2005 to 2018 were taken into account, considering all the mango varieties produced and exported from Mexico. The research implied analyzing 14 observations, and because of this the inference generated through the analysis is significant to determine the behavior of commercial competitiveness.

The Inter-American Development Bank connects the competitiveness of an economy to the creation of the necessary conditions for entrepreneurial development and the sustainable increase of productivity and *per capita* income (BID, 2004). Likewise, the competitiveness of a nation depends on the ability of its industry to innovate and be improved (Porter, 2007).

The capacity of a nation to provide a good standard of living to its population depends on the ability of its enterprises to attain high levels of productivity; that is, it doesn't matter how much they have in resources, but rather how those resources are used (Porter, 1999). In turn, competitiveness resides in having a competitive advantage in relation to the other competitors (Porter, 2002).

An assumption is established that a nation is more competitive when, in addition to satisfying the domestic demand without the need to resort to imports, a high proportion of production is destined to exports. The methodology by Schwartz *et al.* (2007) was used for calculations of the indices that allow defining competitiveness.

The following variables were used for all the indicators: X, Export volume in tons; M, Import volume in tons; and P, Production in tons.

1. Relative trade balance (A). This indicator measures the relationship between a product's trade balance and its total trade for a country in the global market, or in a specific market. It consists in giving an idea of the condition of the chain in the market. It is assumed that an export chain is more competitive when it has to import fundamentally its prime material or intermediate goods.

$$A=(X-M)/(X+M) \quad (1)$$

2. Transability (T). If the value of T is close to -1, the recipients of the products can be important, since they are countries that are totally dependent on imports of the goods being evaluated. The countries with T close to 0 indicate a capacity close to self-supply. And the positive values indicate that they are exporters.

$$T=(X-M)/(P+M-X) \quad (2)$$

3. Export openness index (A. E.). This indicator serves to demonstrate to what degree countries are good exporters in function of their domestic consumption; that is, taking into account the national apparent consumption, it also measures the export vocation of the country and its capacity to build permanent comparative advantages. It is obtained using the following formula:

$$A.\ E.=X/(P+M-X) \quad (3)$$

4. Import penetration index (P. I.). It measures the relationship between the imports of a country with regards to its apparent consumption. The higher the index, it will

represent a higher purchasing capacity and therefore it signals that this country is less competitive. It is estimated with the following formula:

$$P.\ I. = M/(P+M-X) \quad (4)$$

To the extent that this indicator is higher, the competitiveness of the product is lower.

RESULTS AND DISCUSSION

Exports, imports, trade balance and production

Figure 1 shows the behavior of the commercial variables. The imports show that they are not significant compared to the exports and as consequence of this, the trade surplus is almost equal to the exports. On average, the imports compared to the exports only represent 0.8%.

The growth rate of exports was 97.1%. The imports had a growth of 30%. The net trade balance increased 97.72%. The main destinations of mango exports were the United States with 246.8 thousand tons, Spain with 70.6 thousand tons, Canada with 30.1 thousand tons, and Japan with 3.4 thousand tons.

Figure 2 shows mango production in Mexico from 2005 to 2018. In 2004 the production was 1,368,090.8 tons and in 2018 it was 1,867,297.7 tons, which represents a percentage increase of 36.48%. The main mango producing states in Mexico in 2018 were: Guerrero with 20.6% production, Nayarit with 17.2%, Chiapas with 14.95%, Sinaloa with 10.5%, and Oaxaca with 10.1%. The five prior states concentrate 73% of domestic production.

Relative trade balance index

Figure 3 shows that Mexico has maintained a growing competitive advantage; the calculated value of the relative trade balance approaches 1; the importance of exports in relation to imports is higher; and the country demonstrates it is a net exporter of the fruit. This indicator shows the exporting potential for mango from Mexico.

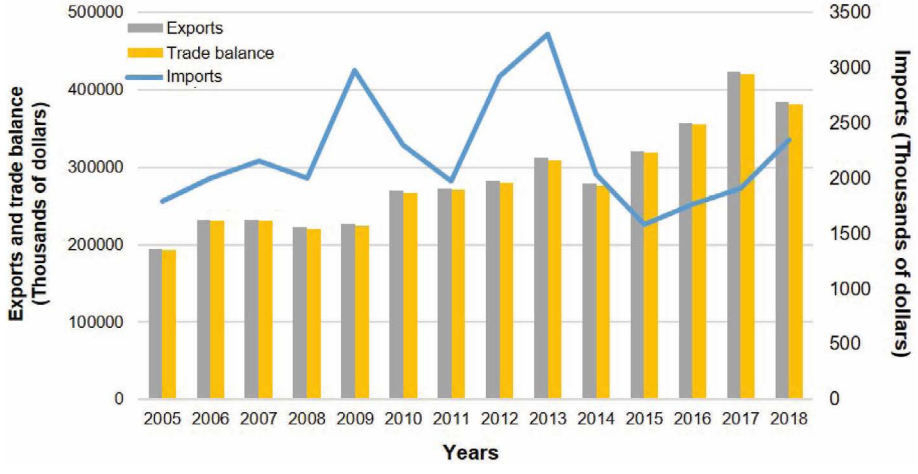

Figure 1. Behavior of mango exports, imports and trade balance in Mexico (thousands of dollars) in the period 2005 to 2018. Source: Prepared by the authors with TRADEMAP data (ITC/TRADEMAP, 2021).

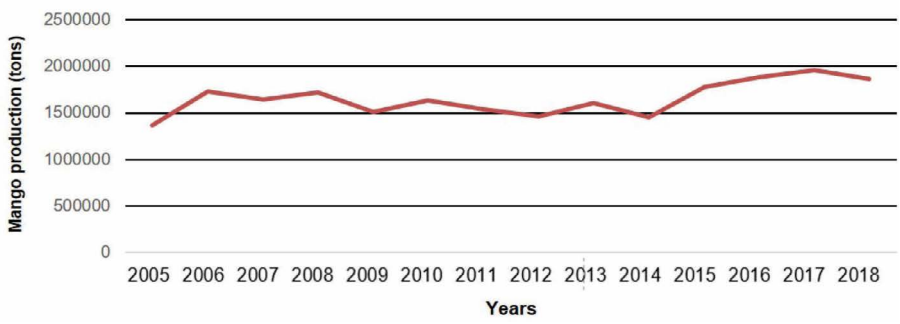

Figure 2. Mango production in Mexico in the period of 2005-2018. Source: Prepared by the authors with data from SIAP (2017; 2021).

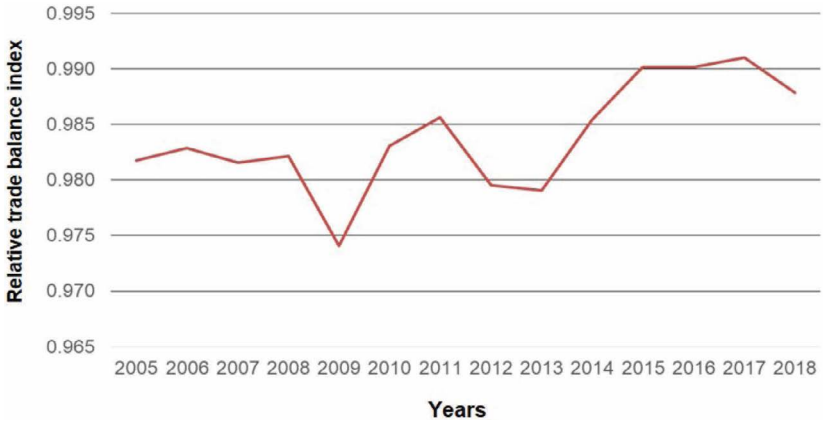

Figure 3. Relative trade balance index for mango from Mexico in 2005 to 2018. Source: Prepared by the authors with data from TRADEMAP (ITC/TRADEMAP, 2021) and SIAP (2017; 2021).

The year with the lowest relative trade balance index was 2009, with a value of 0.974 and the year that presented the highest index was 2017 with 0.991. In the study period, the average of relative trade balance index was 0.98.

Transability index

Figure 4 shows the evolution of transability which has advanced almost 10%; Mexico presents increasing competitiveness. The average transability index was 0.2, which reflects

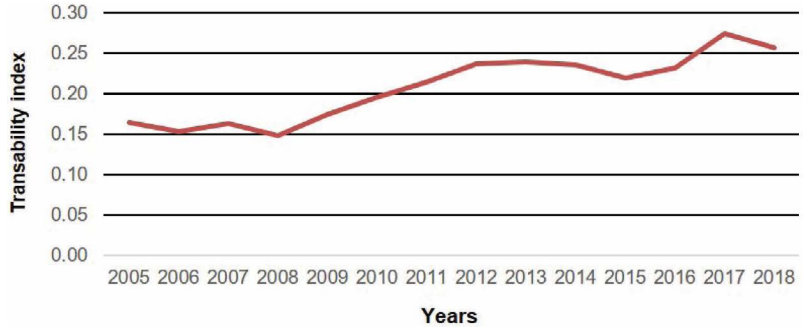

Figure 4. Mango transability index for Mexico in the period of 2005 to 2018. Source: Prepared by the authors with data from TRADEMAP (ITC/TRADEMAP, 2021) and SIAP (2017; 2021).

that mango production and trade is a competitive activity in the foreign market and shows an important growth and shows important growth. Likewise, it shows the local demand satisfied in general, despite the low imports, which shows the ability of mango producers to adapt to the new and more efficient forms of production.

Export openness index

The export openness index measures the participation of exports in the apparent consumption. Figure 5 shows that in each of the years analyzed this index is positive, which implies that the domestic demand in Mexico has been covered in each of the years.

The trend of the export openness index is positive and sustained. The findings show that Mexico has relative advantages in mango production for its export, and this is why it should be considered as a strategic product and its production and export should be promoted.

Import penetration index

Figure 6 shows that the import penetration index had values close to zero, which means that competitiveness of the productive sector of mango is higher; likewise, it indicates that the imports have a tendency to be zero meaning that they do not have an important position in the domestic consumption.

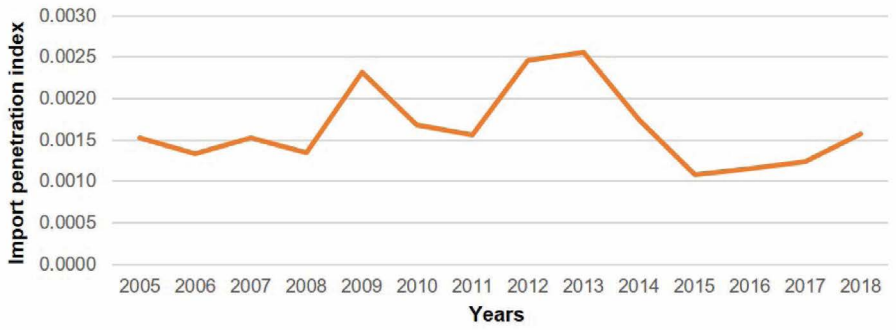

Figure 5. Export openness index of Mexican mango from 2005 to 2018. Source: Prepared by the authors with data from TRADEMAP (ITC/TRADEMAP, 2021) and SIAP (2017, 2021).

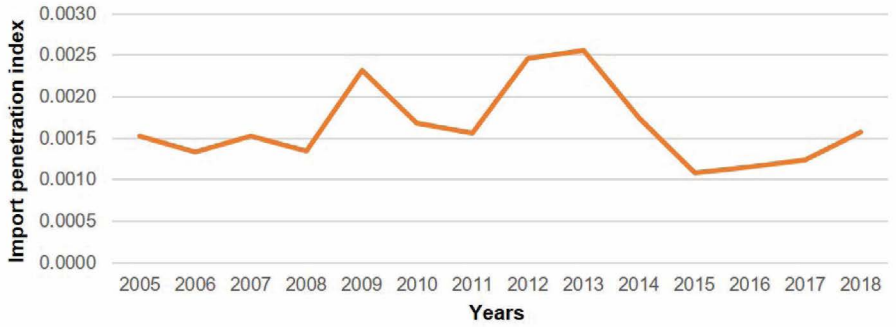

Figure 6. Import penetration index in the period 2005 to 2018. Source: Prepared by the authors with data from TRADEMAP (ITC/TRADEMAP, 2021) and SIAP (2017; 2021).

The mango product imports to satisfy the domestic consumption in Mexico are very low; the barely positive value of the index indicates that imports have existed throughout the analysis period, although such a small value evidences the low relevance of imports in the domestic market.

CONCLUSIONS

Mango has conserved its importance as an export product, and there is a wide range of production varieties, some of which originate in the country. Mexico remains as the number one exporter globally. Likewise, the relative trade balance index demonstrated that it is a competitive exporter with high exporting potential (exports increased), higher commercial positioning, and low importing potential. The transability index shows that the product is competitive and that the demand of the domestic market is widely satisfied, which is why there is no need to resort to imports. Export openness indicates that there is exporting vocation, and that there are permanent advantages in production and export due to the improvement in mango's production chain.

REFERENCES

BID. (2004). *Competitividad: Conceptos y Buenas Prácticas*. Washington, D. C.

CIATEJ (Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco A. C.). (2016). *Introducción a la tecnología del mango*. Recuperado el 1 de enero de 2016 de CIATEJ: https://ciatej.repositorioinstitucional.mx/jspui/bitstream/1023/388/1/Libro%20Mango.pdf

FAO. (2020). *Las principales frutas tropicales: análisis de mercado*. Organización de las Naciones Unidas para la Alimentación y la Agricultura. Recuperado el 02 de junio de 2021 de FAO: http://www.fao.org/3/ca5692es/CA5692ES.pdf

FAOSTAT. (2014). *Estadística de comercio/cultivos y productos de ganadería*. División de estadísticas de la Organización de las Naciones Unidas para la agricultura y la Alimentación. Recuperado el 24 de junio de 2014 de FAO: http:// faostat.fao.org

FAOSTAT. (2021). *Cultivos y productos de ganadería*. Organización de las Naciones Unidas para la Alimentación y la Agricultura. Recuperado el 11 de agosto de 2021 de FAO: http://www.fao.org/faostat/es/#data/TCL

INTRACEN. (2006). *Trade Map*: Estadísticas de comercio para el desarrollo de los negocios internacionales. Centro de comercio Internacional UNCTAD/OMC. Recuperado el 02 de junio de 2021 de INTRACEN: https://www.intracen.org/uploadedFiles/intracenorg/Content/Exporters/Market_Data_and_Information/Market_Analysis_Tools/TradeMap-userguide-SP.pdf

ITC/TRADEMAP. (2021). *Estadísticas del comercio para el desarrollo internacional de las empresas*. Consultado el 18 de marzo de 2021, en ITC/TRADEMAP: https://www.trademap.org/Country_SelProductCountry_TS.aspx?nvpm=3%

OMC. (2021). *Glosario; sistema armonizado*. Organización Mundial del Comercio. Recuperado el 02 de junio de 2021, de OMC: https://www.wto.org/spanish/thewto_s/glossary_s/glossary_s.htm

Porter, M. E. (1999). *La ventaja competitiva de las naciones*. *In*: Ser Competitivo. Nuevas aportaciones y conclusiones. Porter, M. E., ed.; Deusto: Bilbao, España. pp. 163-202.

Porter, M. E. (2002). *Ventaja Competitiva*. 2ª ed.: (Grupo Patria Cultural) Alay: Ciudad de México. 552 p.

Porter, M. E (2007). *The competitive advantage of the nations*. 1ª ed.; Harvard Business Review: Cambridge, Massachusetts, USA. 26 p.

SAGARPA. (2017). *Planeación agrícola nacional 2017-2030: mango mexicano*. Secretaría de Agricultura y Desarrollo Rural. Recuperado el 02 de junio de 2021, de SAGARPA: https://www.gob.mx/cms/uploads/attachment/file/257078/Potencial-Mango.pdf.

Schwartz, M., Ibarra, K., & Adam, C. W. (2007). *Indicadores de competitividad de la industria exportadora chilena de palta (aguacate)*. *In*: Actas del VI Congreso Mundial del Aguacate, Viña del Mar, Chile, 12-16 noviembre. 10 p.

SE/SIICEX. (2021). *La TIGIE*. Secretaría de Economía/Sistema Integral de Comercio Exterior. Recuperado el 28 de enero de 2021 de SE/SIICEX: http://www.siicex.gob.mx/portalSiicex/

actualiza/informacion_tarifa.htm#:~:text=En%20M%C3%A9xico%20la%20clasificaci%C3%B3n%20arancelaria,interpretaci%C3%B3n%20de%20las%20notas%20explicativas

SIACON. (2020). *Sistema de Información Agroalimentaria de Consulta*. Recuperado el 02 de junio de 2021 de SIACON: https://www.gob.mx/siap/documentos/siacon-ng-161430

SIAP. (2017). *Atlas agroalimentario 2016: el SIAP presenta los éxitos del campo mexicano*. Servicio de Información Agroalimentaria y Pesquera. Recuperado el 11 de agosto de 2021, de SIAP: https://www.gob.mx/siap/articulos/atlas-agroalimentario-2016-siap-presenta-los-exitos-del-campo-mexicano

SIAP. (2021). *Servicio de Información Agroalimentaria y Pesquera*. Recuperado el 08 de noviembre de 2021 de SIAP: https://www.agricultura.gob.mx/datos-abiertos/siap.

SIAVI. (2021). *Sistema de Información Arancelaria Vía Internet*. Recuperado el 04 de agosto de 2021 de SIAVI: https://www.snice.gob.mx/cs/avi/snice/informacionarancelaria.html

SIICEX/CAAAREM. (2020). *Tarifa de la ley de impuestos generales de importación y de exportación*. Asociación Latinoamericana de Integración. Sistema Integral de Comercio Exterior. Recuperado el 06 de febrero de 2020 de SIICEX: http://www.siicex-caaarem.org.mx/Bases/TIGIE2002.nsf/d58945443a3d19d886256bab00510b2e/1 9198818f170c59986256f7e0055b99b?OpenDocument