Article

Analysis of the competitiveness and commercialization of the Mexican pecan nut in the international market

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Abstract

The production, process and industrialization of the Mexican walnut are a topic of great importance for the economy and development of the country (particularly for the producing states), as well as the commercialization and behavior of the market, local and international. Given the above, the main objective of this document is to analyze various aspects of the pecan nut (hereinafter it will be referred to with the generic term: walnut) in the international market, such as competitiveness, production and marketing. Using data from the Food and Agriculture Organization of the United Nations (FAO), the Agri-Food and Fisheries Information Service (SIAP), the United States Department of Agriculture (USDA) and the National Institute of Statistics and Geography (INEGI), relevant results were obtained where it was identified that the largest buyers and trading partners of this product are Mexico, the United States of America and China, the latter being the main competitor of pecan nuts in the international market, despite the fact that Mexico's competitiveness It has increased in recent years.

Keywords: competitiveness, production, walnut.

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Introduction

In recent years in Mexican agriculture, and particularly in the states of Chihuahua, Coahuila, Durango and Nuevo León, the planting of pecan walnut (*Carya illinoinensis*) has increased, whose seed, the pecan nut, has observed a notable increase in production. However, currently particularly the Chihuahuan pecan nut has been affected by its competitiveness in international markets by competing with products considered similar, such is the case of almonds, which have also had an extensive demand for changes in lifestyle of consumers.

This has directly affected the market price and the final consumers, mainly of pecan nuts (Rodríguez *et al.*, 2007). In this sense, the efforts made by national producers in increasing not only planting but also pecan nut production has not been an easy process, since the establishment of walnut orchards in inappropriate soils, as well as the introduction of a countless varieties of walnut in the regions caused a complicated adaptation process due to the little or no research and studies required for the correct development process of these plantations (Usabiaga, 2003).

Walnut cultivation is one of the most important and profitable in northern Mexico (Ojeda *et al*., 2010). The yield of this crop is not only a function of the age and maturity of the tree, but also of other factors and conditions to which it is exposed, taking its production of 9-27 kg per tree between 8-10 years, up to 45-68 kg at 16 years (Reyes and Urrea, 2016).

In general terms, it can be affirmed that Mexico has an international participation of 20% of the production, of which the state that contributes the most is Chihuahua with a production of 65 500 t of walnut in shell, while the United States of America participates with 75% (SAGARPA, 2016). According to the data provided by the Agri-Food and Fisheries Information Service (SIAP), the planted area extends over 116 thousand hectares distributed in 16 states and the state of Chihuahua is the most important region.

The state of Chihuahua is characterized by the quality of its walnut as it has a thin shell that facilitates breaking, as well as being recognized for its pleasant taste and aroma. Chihuahua has approximately 70 thousand hectares of walnut planting, where the municipalities of Camargo and Jiménez added 30% of the area planted at the state level (SIAP, 2017).

On the other hand, it is important to comment that the process and the pecan nut industry has been pressured in recent years by the world market of competing walnuts that satisfy food uses and similar industrial needs, such as almonds, pistachios, walnuts and Indian walnut. Of these, the main competitor is the almond, because it has reached record productions and a lower price in recent years. On the other hand, the change in consumer tastes and preferences, as well as in quality standards, has modified the value of production. Furthermore, there is now the possibility of commercializing the pecan nut in Asian and European countries looking for new markets (Rodríguez *et al*., 2007).

However, this process of compliance with quality and safety standards was reflected in developed countries from the 1980s onwards, this average allowed for commercial relations between countries concerned with introducing food without toxic substances for human consumption (Schwentesius, 2010). According to the author, this process began when various foreign countries requested improvements in their production from Mexico, where even some North American companies influenced Mexican producers to carry out this production mechanism to comply with the quality and safety standards requested by the international markets and thus be able to increase to a certain extent the competitiveness of national products.

The previous scenarios provoked efforts by the Mexican government, which indicates that the Mexican economy has free trade agreements with 46 countries, 32 agreements for the promotion and protection of investments with 33 countries and 9 agreements with limited scope, within the framework of the Latin American Integration Association (ALADI) (Promexico, 2017). Mexico's commercial efforts to export pecan nuts have been guided following three strategies, which seek to consolidate markets in the United States of America, Canada, countries of the European Union and China, while it plans to expand and develop the market in Turkey and South Korea (SAGARPA, 2017).

Like American consumers, French citizens appreciate innovative international food of high nutritional quality. Recently, the French market has shown interest in a wide variety of agricultural products, among which are nuts and walnuts (almonds, hazelnuts, pecan nuts, Indian walnuts and pistachios) to be used in snack food industries, from such that it could be a potential market for the Mexican walnut (SAGARPA, 2016).

Under the previous scenario, this work's main objective is to analyze the competitiveness and commercialization of the Mexican pecan nut in the international market, in addition to identifying the potential of new walnut markets where value and price are distinguished by their competitiveness. The agricultural sector represents an important part of the gross domestic product (GDP) in the Mexican economy, highlighting agriculture as the most important activity in this sector, where around 20 to 30 million hectares per year are cultivated throughout the country, showing growth of around 3% per year and a contribution to GDP of 10% (Méndez, 2008). In the same sense, Mexican agri-food products are an important factor for the country's economy and it is above and exceeding the income from remittances and the sale of oil, in August 2016 exports were over 15 billion dollars and had an annual increase of 5.2% (SAGARPA, 2016).

Contextualization of the walnut market

The pecan nut is an important factor in the food group with international competitiveness of products similar to the pecan nut, such as nutmeg, Indian walnut, walnut and coconut. In Mexico there are food products of great importance in the international market, one of them is walnuts and other nuts such as almonds and pistachios, without forgetting that Mexico has a greater production of dried fruits that represent a relevant participation in the country's exports, where the main destination of said exports are to the United States of America market, as shown in Figure 1 (SIAP, 2017).

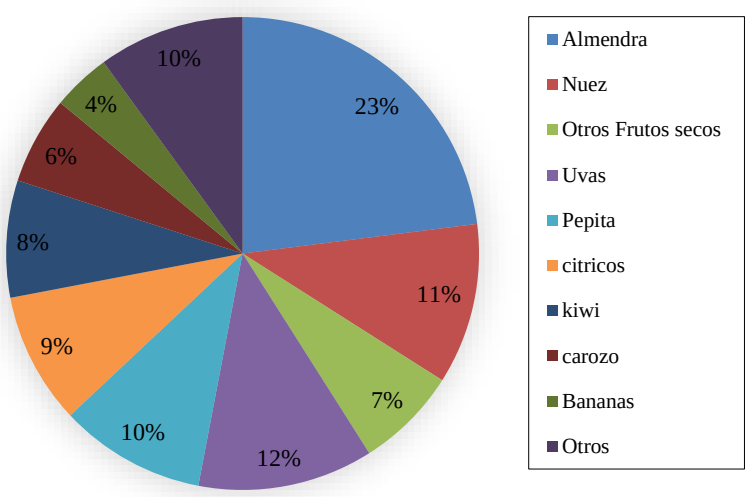

Figure 1. Main fruit exports to the United States of America. Compiled with USDA database, 2017.

The commercialization of walnuts in the world can be considered as a growth factor for countries where agro-food goods interact. In this sense, one of the important countries in the international walnut market is Mexico, since it has a high production and a diversification of trade, occupying the first places in the pecan nut treaties, as observed in Figure 2.

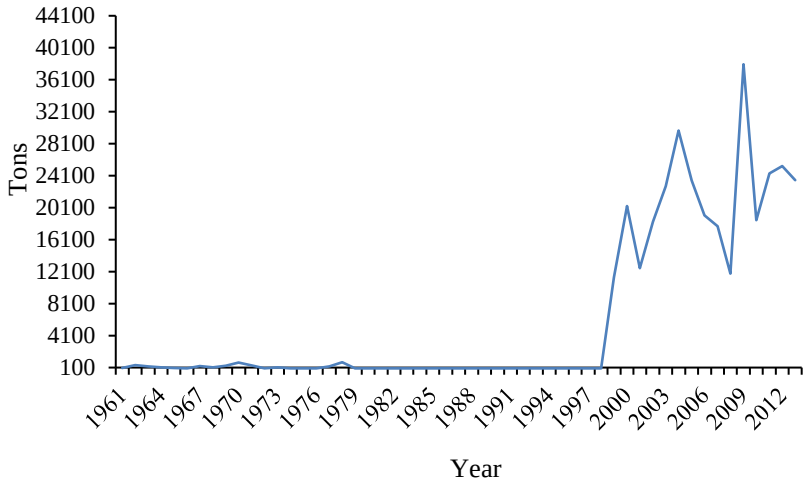

Figure 2. Mexico: exports of walnut in shell, year (tons). Elaboration with FAO database, 2017.

In the same sense, based on information from the Agri-Food and Fisheries Information Service (SIAP), certain results were obtained with respect to walnut production in Mexico and Chihuahua; through a timeline where it indicates the most participative states in this product.

Mexico is one of the main producers in the world and marketer that coexist, as can be seen in Figure 3, for the year 2014 it has had a historical figure of production reaching 120 000 t of walnut per year, this due, among other factors, to the biggest domains that have been sown; in other words, more hectares planted and the notable growth in recent years.

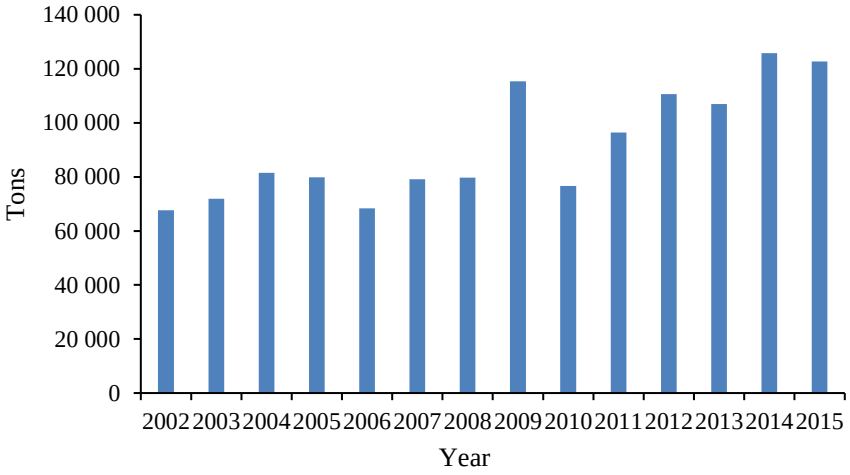

Figure 3. Walnut production in Mexico. Elaboration with SIAP database, 2017.

While, as shown in Figure 4, at the state level since the 1990s, Chihuahua has positioned itself as the largest walnut producer in the country. However, since 2000, the increase in trees cultivated on Chihuahuan areas has led to the boom that gives it an advantage over the rest of the other producing states.

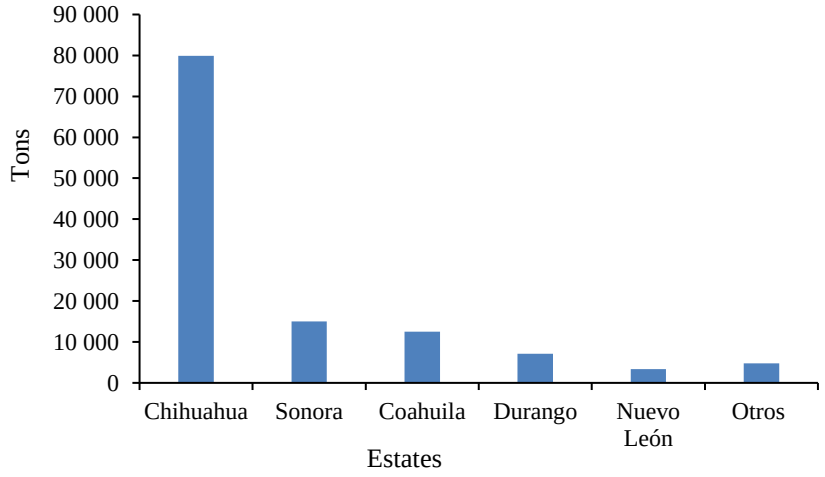

Figure 4. Walnut production by states. Elaboration with SIAP database, 2017.

In recent years, a historical production was obtained, exceeding 80 000 t of walnuts, 2014 being the year with the highest yield in this crop, as shown in Figure 5. It is in the southwest of the state where most of the hectares planted by walnut are concentrated and where the greatest production of the state is obtained, the largest participants in the state are Jiménez and Camargo reaching 15 000 t annually.

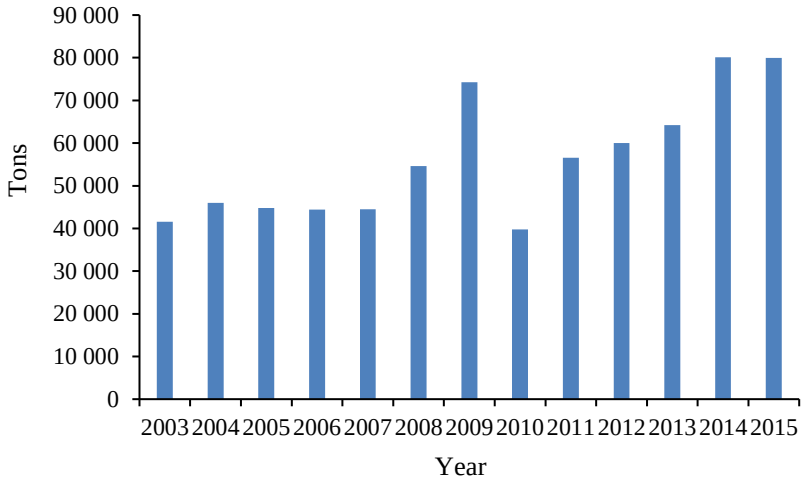

Figure 5. Nut production in the state of Chihuahua, 2003-2015 (tons). Elaboration with information from SIAP (2017).

Materials and methods

The research methods that were taken into account during the analysis process were descriptive statistics, compiling information from the Food and Agriculture Organization of the United Nations (FAO) being the main source of information for this research, as well as The database of the Agri-Food and Fisheries Information System (SIAP), the United States Department of Agriculture (USDA) and the National Institute of Statistics and Geography (INEGI) were used.

Constant market share

The first models of market share analysis were proposed by Richardson (1971); Leamer and Stern (1979), although they have some limitations, especially in the interpretation of the residual component or in the predictive capacity of the model. After these first contributions, other authors such as Fagerberg and Sollie (1987); Ahmadi-Esfahani (1995) have revised and improved the methodology to apply it to the agricultural sector.

Avendaño (2008) follows the constant market share (CMS) analysis model proposed by Ahmadi-Esfahani (1995), which is an index that allows identifying a change in production of a country and its effects on its trade, mainly on exports. The change in the share of the pecan nut (Δq) that represents the structural change of the market share derived from an entity or a country will be analyzed.

The process that is carried out is relatively simple and is extremely important since it separates and identifies the commercial pattern with respect to a product in a time series and is represented through an index. The main idea of this methodology is to show how the market share of a country varies over time, and if that country maintains the market share constant (Ávila and González, 2012).

The variation in exports is made up of the sum of three effects: structural effect, competitiveness effect and interaction effect, which are determined by expression. $\Delta q= S_{j0}\Delta Q_j+\Delta S_j Q_{j0}+\Delta S_j \Delta Q_j$; where: Δq= variation in exports. The next part of the model is the independent variables where the main effects of change in exports are found, such as the structural effect, which describes the variation in exports, maintaining a constant market share.

A positive value indicates that the demand for exports is higher. $S_{j0}\Delta Q_j$= structural effect. Another part of the model is the competitiveness effect, which is responsible for quantifying changes in exports attributable to changes in competitiveness over a period of time. The positive or negative sign is an indicator of a loss or gain in competitiveness in the period analyzed, formally defined as: $\Delta S_j Q_{j0}$= competitiveness effect.

The last part of the model analyzed is the interaction or second-order effect that is responsible for determining the influence of variation in market share with respect to changes in demand, $\Delta S_j \Delta Q_j$= interaction effect.

For the analysis of the effects and the changes that the exports have, the exports to China, the exports of competing countries of that product and world exports were taken into account, as well as the participation that each of these has in the Chinese market.

Although some authors such as Bonanno (2015); Ahmadi-Esfahani, (1995) have commented that the model has some limitations such as the possible causal relationship between the variables used, the limited predictive power of the model or the fact of inferring about the competitiveness of a product based on price variations, without considering other factors, such as improvement in product quality, among others. Still, the model serves as a valid statistical reference framework for competitiveness analysis and remains a relevant method, as shown Artige and Leif (2014); Aisha *et al*. (2018).

Results and discussion

With the information of the Food and Agriculture Organization of the United Nations (FAO) the analysis of the change to exports was carried out taking into account the Chinese market and all its regions such as Hong Kong and China of Macao, since it is the country that has the most commercialization of whole and shelled walnuts in the world, with Mexico and the United States being its main partners.

The period from 1998 to 2013 was taken into account (due to the availability of information); however, it is from 2006 that Mexico started its exports to the Chinese market and they have been increasing until today. As can be seen in Table 1, the results through the first level of decomposition confirm with a positive structural effect.

Table 1. Composition of the change in exports for the main exporting countries to the Chinese pecan nut market, 1998-2013 (tons).

Approaches	Mexico	USA	Other countries
$S_{j0}\Delta Q_j$ = Structural Effect	105.70168	3 685 707.2	220 472.34
$\Delta S_j Q_{j0}$ = Competitiveness Effect	1.3761661	67 722.902	4 507.82089
$\Delta S_j \Delta Q_j$ = Interaction effect	92.435876	8 177 180.7	2 475 419.7

Elaboration with information from FAO (2017).

That the growth in demand for pecan nuts positively affects the growth of exports of this product. Furthermore, although there is competitiveness, the US economy is Mexico's main competitor in walnut exports to the Chinese market. The results also indicate that Mexico it has little participation in the Chinese market because the United States has most of the covered market, but the largest participation of the United States market is completely covered or supplied by the Mexican economy, on the other hand, when observing the behavior of exports, it can detect that the countries of the rest of the world have decreased their participation and Mexico has constantly increased both competitiveness and participation through its exports.

Finally, the walnut producing countries of the world and competing countries of walnuts in shell and peeled tend to increase constantly and those with the highest participation in recent years are the United States of America, Mexico, Chile, France, India and Brazil. Graphically and in relation to the results of the effects of Table 1, it can be verified that the change in walnut exports it has had certain falls and booms over time, but mainly for the 2000s there is an increase for all competing countries. Figures (6 and 7) show the participation of competing countries in the Chinese market and the world market for walnuts in shell and peeled.

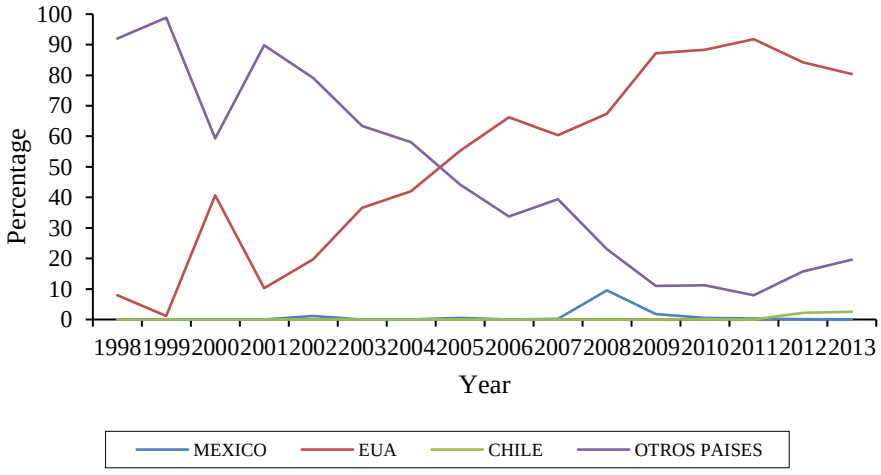

Figure 6. Share of exports to the Chinese market. Elaboration with FAO database, 2017.

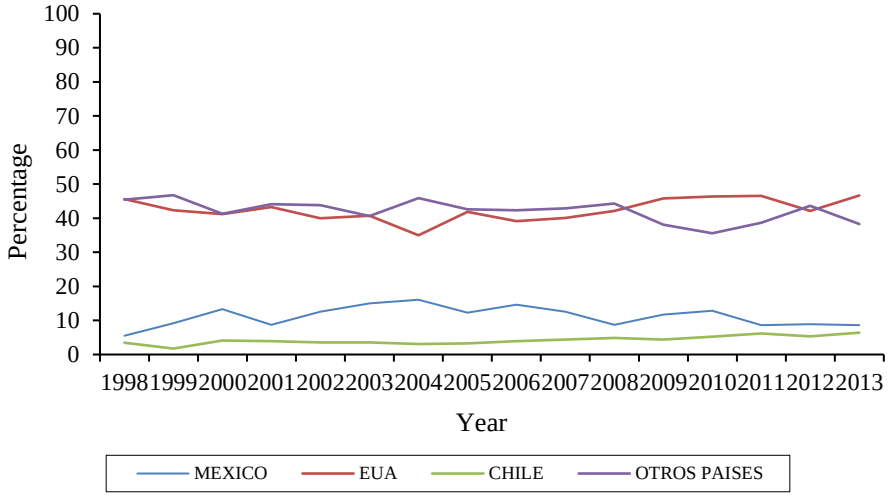

Figure 7. Share of exports to the world market. Elaboration with FAO database, 2017.

Conclusions

Mexican agri-food products are distinguished for being recognized for their quality in the international market, where the pecan nut has had significant growth in its production, supply and demand in recent years. However, the United States of America also has an important market share worldwide, both in production and in commercial participation. The main results of this work allowed us to identify that around 80% of Mexican pecan exports.

It is destined for the United States of America, while statistics show that among the largest walnut marketers is the Chinese economy, but with production and marketing destined for different countries such as New Zealand and France, among others. It is possible to confirm through the estimation of the Constant Market Share that although the competitiveness of the Mexican pecan nut is positive.

Efforts should be made mainly in commercialization, to prevent the US market from meeting the demands of large markets such as the Chinese economy, where Mexico has a direct presence for the time being, but this being the main exporter to the US market, it can be inferred that the Mexican pecan nut is being distributed in the international market through an intermediary.

Finally, it is necessary to look for marketing alternatives that diversify market share, strengthening the processes that generate added value, which would allow greater economic benefits and growth for the sector in Mexico and particularly for the state of Chihuahua, in addition to increasing its importance to national level for its generation of foreign currency, since it is an export product.

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