

**FOOD SAFETY AND GLOBALIZATION:  
MEXICAN PRODUCE IN THE UNITED STATES**

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**ABSTRACT**

This paper analyzes the growth of the US demand for imported fresh produce, in spite of a negative consumer perception regarding food imports; as well as the actions undertaken by the government of Mexico to help the United States ensure the safety of its food supply and help American consumers recognize its commitment to food safety. To do this, data from the United States Department of Agriculture was used to look at how produce imports have increased in the last 35 years and how Mexico has established itself as the US largest supplier of fresh fruits and vegetables. Then, it looks at consumer perceptions and how American consumers are still wary about imported food, followed by a discussion about the Mexican Food Safety System, highlighting actions that showcase the Mexican government and industry's commitment to food safety. Finally, there will be a brief discussion of the meaning of the Food Safety Modernization Act (FSMA) for the produce industry, the challenges it represents and the opportunities for those who have invested in food safety. All these elements will help to recognize that, in today's globalized world, no single agency or country can ensure food safety on its own. The safety of the US food supply is the responsibility of all the players along the production and distribution chain no matter where they are located.

## INTRODUCTION

The world is smaller than ever before. It only takes a trip to the supermarket to find Indian spices and French gourmet sauces, Mexican avocados, Chinese litchi and a variety of products demanded by American consumers that have grown accustomed to new flavors. No matter how cold or warm it is outside, Americans want traditional fresh produce all year long and are now demanding avocados, papayas and exotic fruits that, only a few years back, were special treats during a vacation to a remote destination. Not too long ago, quality used to be the “golden” standard to export and producers focused their energy on producing “high quality products” with consistent shapes and sizes. As consumers’ palates evolve and the XXI century arrived, food safety became the new “hot” topic producers had to focus on to succeed.

Governments also started to pay closer attention and grew more careful as they try to open new markets to boost their countries’ economic growth. The North American Free Trade Agreement (NAFTA) brought Mexico and the United States closer than ever before, especially when talking about the agricultural sector. Nowadays, farmers and ranchers on each side of the border depend on the regional market to grow and thrive. Since the implementation of the NAFTA, the Mexican produce industry has evolved and specialized to fulfill American consumers’ demands. Yet, specialization was not enough for Mexico to increase its market share; food safety became a crucial element needed to conquer a very demanding US market.

Today, one of the worst things that can happen to any producer, is to be linked to a foodborne illness outbreak. The mere suspicion of a product being associated with an outbreak is enough to lose consumer confidence and undo years of hard work. The 2008

*Salmonella* Saint Paul outbreak taught producers a very important lesson: food safety concerns will affect your business no matter if you are responsible for it or not. This was true for US and Mexican tomato producers, who up until that point, had invested heavily to improve quality and increase yields to meet consumer demand. At the beginning of the investigations, the Center for Disease Control (CDC) and the Food and Drug Administration (FDA), suggested that tomatoes were a likely source of contamination; later on, it was determined that the contamination came from other produce, jalapeño and serrano peppers, from Mexican origin. The first announcement resulted in the loss of millions of dollars and market share to the tomato industry as a whole. A few years after the outbreak, 17 tomato growers from Florida, Georgia and South Carolina, sued the federal government arguing that the initial accusation had cost them \$40 million dollars in damages (Flynn, 2013). Mexican tomato producers also reported it took them several years and considerable resources to restore confidence in Mexican fresh tomatoes. This case exemplifies the importance of food safety in a globalized world. The purpose of this paper is to analyze the growth of the US demand for imported fresh produce, in spite of a negative consumer perception regarding food imports; as well as the actions undertaken by the government of Mexico to help the United States ensure the safety of its food supply and help American consumers recognize its commitment to food safety.

## **A Globalized World: Importance of Mexican Fresh Produce in the US Market**

As the United States' population grew in size and ethnic diversity, the volume and variety of imported food consumed has increased considerably. In 2013, U.S. food consumption totaled 635 billion pounds, equivalent to 2,000 pounds per capita. Of this amount, food imports accounted for 19 percent of total consumption, equivalent to 123 billion pounds or 390 pounds per capita. One of the drivers behind the growth in food imports is the increasing demand for fresh produce. With Americans trying to eat healthier, consumption of fruits and vegetables has increased significantly. According to the United States Department of Agriculture (USDA), US per capita consumption of fruits has increased 25% in the last 35 years, increasing from 88 pounds in 1980 to 110 pounds in 2013 (ERS, 2014). Per capita consumption of vegetables increased almost 50% percent in the same period of time, increasing from 95 pounds in 1980 to 141 pounds in 2014 (ERS, 2015).

To satisfy this increasing demand, the US needs to rely on foreign suppliers of fresh produce, especially during the winter months when domestic production slows down and imports fill supermarket shelves. According to the USDA's Economic Research Service (ERS), in 2014, 50% of all fresh fruits consumed in the US were imported, up from 27% in 1980 (see Table 1), while almost 30% of all fresh vegetables were imported in 2015, up from only 8% in 1980 (see Table 2). To illustrate this tendency, one only needs to look at a few examples. In 1980, only 11% of asparagus consumed in the US were imported. Fast-forward 34 years and, in 2014, almost all asparagus (91%) consumed in the US were of foreign origin. Another striking example is avocados. In 1980, avocado imports were practically non-existent. In 2014, 82% of avocados consumed by Americans

come mainly from Mexico, but also from Peru, Chile or the Dominican Republic (ERS, 2016).

**Table 1**

**IMPORTS AS A SHARE OF DOMESTIC FRESH FRUIT CONSUMPTION**

<b>YEAR</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>	<b>2014</b>
Avocados	0.4	10.5	25.7	73.4	<b>82.1</b>
Bananas	100.0	99.8	99.6	99.8	<b>99.8</b>
Blueberries	--	--	50.0	48.8	47.7
Grapes	13.6	37.0	45.2	51.9	49.1
Mangoes*	75.8	97.4	99.9	99.9	<b>99.9</b>
Papayas	3.4	26.0	79.9	93.9	<b>96.7</b>
Pears	3.2	12.5	19.5	19.2	21.7
Pineapples	44.3	49.0	76.1	99.9	<b>99.9</b>
Raspberries	--	--	34.9	50.8	<b>59.4</b>
Strawberries	2.8	4.0	5.6	8.9	14.0
Lemons	0.0	3.6	5.4	10.7	9.0
Limes	42.8	53.0	90.9	99.9	<b>99.9</b>
<b>All Fresh Fruits</b>	<b>26.7</b>	<b>34.9</b>	<b>42.4</b>	<b>49.1</b>	<b>50.4</b>

\* Includes mangoes, mangosteens and guavas

Source: Adopted from Fruits and Tree Nuts Yearbook 2015 (Table H-1), ERS, USDA.

**Table 2**

**IMPORTS AS A SHARE OF DOMESTIC FRESH VEGETABLES CONSUMPTION**

<b>YEAR</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>	<b>2015p</b>
Asparagus	10.8	29.8	59.0	89.1	<b>91.2</b>
Broccoli	0.2	2.5	6.6	14.7	21.7
Bell peppers*	26.5	38.9	33.8	53.1	<b>57.0</b>
Onions	5.5	10.1	9.1	14.7	16.7
Tomatoes	22.3	20.5	30.0	53.1	<b>52.2</b>
Cucumbers	36.0	33.7	42.6	61.9	<b>73.5</b>
Artichokes*	43.8	50.4	72.9	81.4	<b>81.2</b>
Eggplants*	33.9	36.0	37.7	61.7	<b>55.3</b>
Garlic*	12.5	17.4	29.0	59.4	<b>53.3</b>
Lettuce Head	0.3	0.2	0.5	4.5	6.9
Leaf/romain lettuce	--	1.3	1.4	2.8	5.4
Squash	16.5	21.9	30.9	52.3	<b>61.4</b>
<b>All Vegetables (excluding melons)</b>	<b>8.0</b>	<b>10.3</b>	<b>13.2</b>	<b>24.4</b>	<b>28.7</b>

\* Includes fresh and processing.

Source: Adopted from Vegetable and Pulses Yearbook 2016 (Table 10), ERS, USDA.

Some countries, especially in the Western Hemisphere, have seized the opportunity to supply the US market with the fruits and vegetables American consumers are demanding. One of those countries is Mexico. As seen on Table 3, the growth of US imports of Mexican fresh produce has outpaced the growth of US global imports of fresh produce. Mexico's soil, climate and labor force characteristics give it a comparative advantage in the production of fresh produce. Together with its strategic location and a 2,000-mile long border with the United States with 47 Ports of Entry, these characteristics have made Mexico the main supplier of fresh fruits and vegetables to the US. In 2015, Mexico supplied 31% and 64% of all US imports of fresh fruits and vegetables (see Figure 1), equivalent to 3.8 million tons of fruits and 5.1 million tons of vegetables, for a total of almost 9 million tons of fresh produce (see Figure 2).

**Table 3**

**US Imports of Fruits and Vegetables  
World vs Mexico**  
Volume (Metric tons)

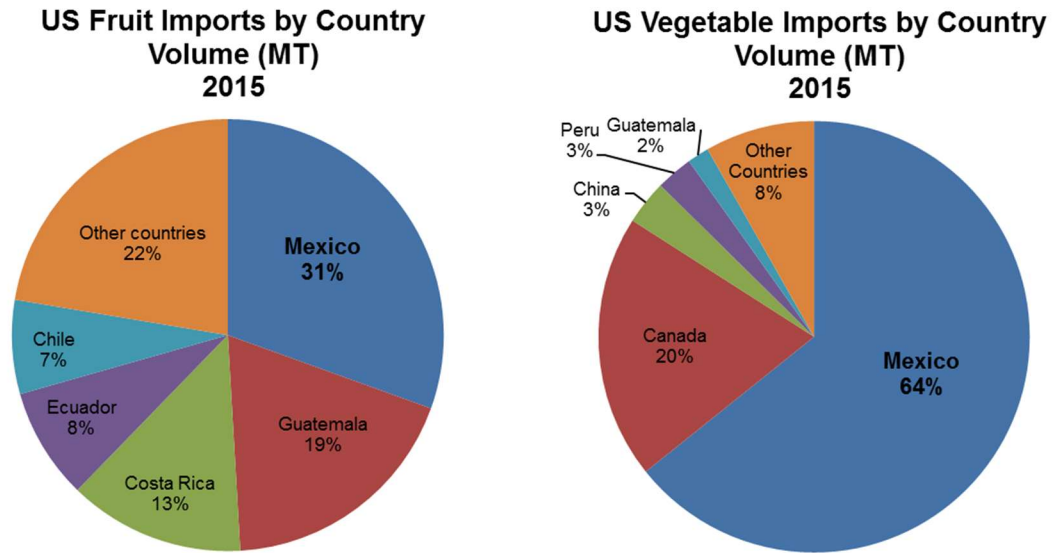
Country of Origin	Fruits			Vegetables		
	2000	2015	Percentage Change 2000/2015	2000	2015	Percentage Change 2000/2015
World	7,562,099	12,317,683	63%	3,570,361	7,912,203	122%
Mexico	1,188,241	3,758,120	216%	2,097,081	5,084,006	142%

Table showcases how US imports of Mexican fruits & vegetables outpace the growth rate of US total imports of fruits and vegetables. Growth rate was calculated using the following equation  $\text{Growth Rate} = \frac{(\text{2015 Total} - \text{2000 Total})}{\text{2000 Total}} * 100$

Source: Data from Global Agricultural Trade System (GATS), FAS, USDA. Own Analysis.



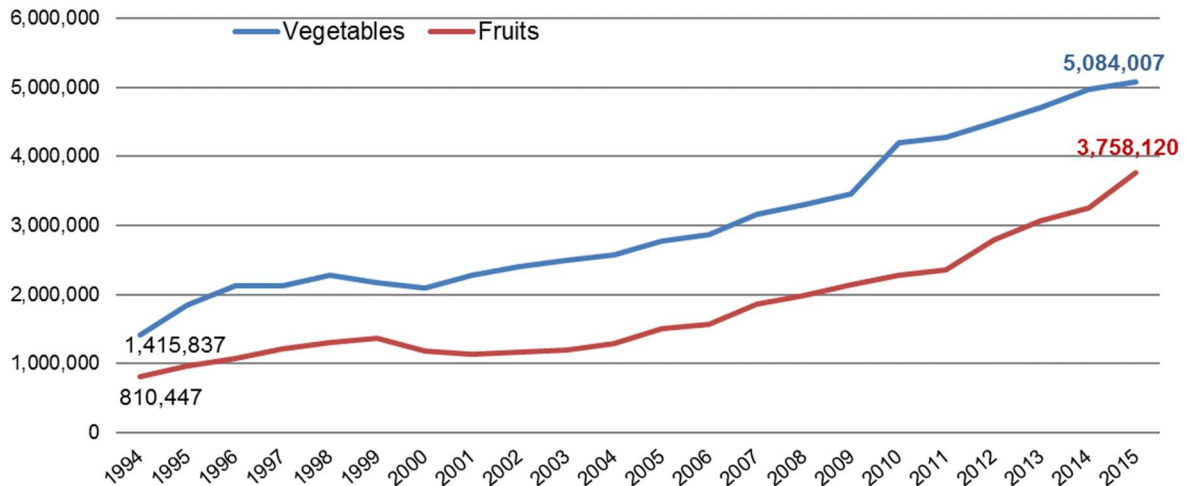
**Figure 1**



Piecharts depict Top suppliers of US Fruit and Vegetable Imports in 2015, showing Mexico providing one third (1/3) of fruit imports and two thirds (2/3) of vegetable imports.  
 Source: USDA Global Agricultural Trade System with data from the U.S. Census Bureau. Own Analysis.

**Figure 2**

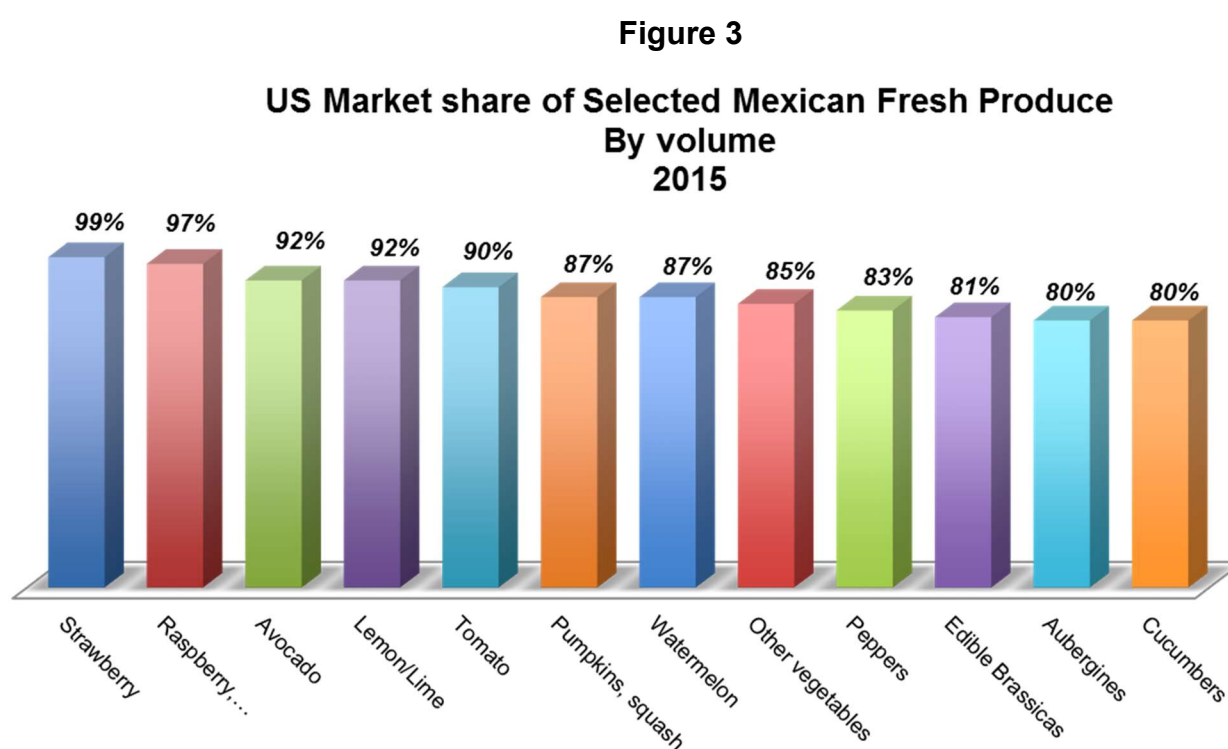
**US Imports of Mexican Fruits and Vegetables 1994-2015**



Graph illustrates growth of US imports fresh produce by volume since the implementation of NAFTA (1994-2015).  
 Source: Global Agricultural Trade System (GATS), FAS, USDA. Own Analysis.

The implementation of the North American Free Trade Agreement (NAFTA) played a key role in opening up the US market to Mexican products. With lower tariffs, Mexico was able to focus on increasing productivity to supply the products American consumers

demand. From 2000 to 2015, US imports of fresh fruits and vegetables from Mexico increased 218% and 142% respectively, compared to the increase of only 63% and 122% of total world imports of fresh fruits and vegetables during the same period (see Table 3). The implementation of food safety programs and the close cooperation between US and Mexican authorities have also contributed to Mexico' success. As of 2015, Mexico supplied 90% of tomatoes and pumpkins, 84% of bell peppers and 81% of cucumbers imported into the US; as well as 99.8% of strawberries, 95% of raspberries and blackberries, 94% of limes, 87% of watermelons and 83% of avocados imported into the US (see Figure 3). Using this data, we can conclude that half of all tomatoes, a third of raspberries and 4 out of 5 avocados sold in US supermarkets are of Mexican origin.



Top fruits and vegetables supplied by Mexico in 2015 (e.g. Mexico supplies 99% of imported strawberries).  
Source: Global Agricultural Trade System (GATS), FAS, USDA. Own Analysis.

This data helps to recognize the crucial role that foreign countries, in this case Mexico, need to play in the implementation and success of the Food and Drug Administration's (FDA) Food Safety Modernization Act, better known as FSMA. Both Mexican producers and government need to understand the rules and what will be required from them to avoid problems. This is especially important for the produce industry, as any issue arising from the new set of rules could result in unnecessary delays at the border that may damage the quality of the products or render them inedible. FDA needs to work with international stakeholders and make sure that both US and foreign producers have a level playing field and that they comply with the same standards to enhance the safety of the US food supply. It is also important that the rules and mandates do not become barriers to trade and that they comply with the United States' World Trade Organization (WTO) commitments as well as any commitments under all Free Trade Agreements. Moreover, FDA should take into account what is already been done regarding third party audits and private certification programs, used by many foreign producers, to avoid becoming redundant and burdensome. Very small and small producers, both domestic and foreign, will be the ones that will need the most training; therefore, significant amounts of resources will have to be spent in developing training courses, capacity building, and other programs that will ensure that no producer is left behind and can conduct his/her business while ensuring food safety.

### **Imported Produce: Consumers Perception in the United States**

In spite of the fact that Americans are eating a lot more imported food, including 80% of seafood, 50% of fruits and 30% of vegetables, consumers in the US remain wary about the safety of imported food products. The Ambar Waves' report entitled "Patterns in FDA Food Imports Refusals Highlight Most Frequently Detected Problems" by John Bovay is a good example of how data can sometimes be misleading and fuel people's negative perception regarding imported foods. In this article, FDA refusal data from 143,000 violations reported between 2005 and 2013 was analyzed to find patterns of the most refused products, most prevalent violations and the origin of most refusals, and compare the results with an earlier study (Bovay, 2016). In both studies, the first study conducted between 1998-2004 study and Bovay's 2005-2013 study, the three categories with the largest number of refusals were fishery/seafood products, vegetables/vegetable products and fruits/fruit products. In the first study, refusals of fruits and vegetables and related products were 32.2% of total refusals (20.6% vegetables/vegetable products and 11.7% fruit and fruit products), while in the second study, refusals of these types of products dropped to 26.6% (16.1% vegetables/vegetable products and 10.5% fruit and fruit products) (Bovay, 2016). Regarding the most common violations, the study found that the most common cause for refusal was "adulteration" with a pathogen or toxin, chemical and/or other substance. In the case of fruits and vegetables, adulteration was responsible for over 70% of refusals. The most common adulteration was the presence of *Salmonella*, while the second most common was chemical in the form of unsafe pesticide residues. Finally, the study highlights, without giving more context, that the three countries with the most refusals were Mexico, India and China. According to the data,

Mexico's top refusals were vegetables/vegetable products (30.3% of Mexico's refusals), candy (19.3%) and fruits/fruit products (15.3%). The information provided in the Amber Waves article, was later used in subsequent articles published in specialized media that reinforce consumers' wariness about imported foods. Articles such as "More than a fourth of FDA import refusals are for fruits, vegetables" published in the site FoodSafetyNews.com, provide no context or background information and make statements that may be misleading and help increase consumers' concerns about the safety of imported fresh produce.

It is important to remember that Mexico is the US' largest supplier of fruits and vegetables; therefore, it is only logical that most refusals of fresh produce come from that country. When looking at the bigger picture, although the goal would be not to have one single refusal, the number of refusals is very small compared to the actual volume of Mexican produce coming into the US every year. During peak season, 1,800 trucks cross the border daily, carrying approximately 20 tons of fresh produce each. In 2015, 2.9 million tons of fresh fruits and vegetables entered the US through Nogales (FPAA, 2016). It is important to recognize that Bovay's Amber Wave report does point out that, although the volume of imported food has risen, refusals have declined compared to the first study and emphasizes the need for further research on specific products coming into the US. Yet, in most cases, this information does not reach consumers, therefore, they are left with questions and concerns regarding foreign products.

A paper that helps to understand consumers' biased perception regarding food imports is entitled "Our Apples are Healthier Than Your Apples: Deciphering the Healthiness Bias for Domestic and Foreign Products" by Justina Gineikiene, Bodo B.

Schlegelmilch and Ruta Ruzevuciute. The purpose of this study was to understand how country of origin is related to a “healthiness bias” and perception of domestic vs foreign food products (Gineikiene et al, 2016). This bias refers to the tendency to evaluate domestic food products as “healthier” than equivalent foreign products. The authors conducted four case studies: the first tested the hypothesis that domestic food is healthier than foreign food; the second was aimed at understanding how perception of healthiness is related to preference formation from foreign and domestic food products; the third study explored how presenting products in a negative or positive light alters the healthiness bias; and the fourth one tested the boundary conditions by introducing products with dual identity. The findings indicate that domestic products are usually seen in a more positive light, leading to the association of domestic with “healthier”. This increases the willingness of consumers to buy domestic. An unexpected finding was the fact that quality did not alter the perception of “healthier”. Additionally, the study revealed that the healthiness bias “may be at least partly altered through a social categorization process” (Gineikiene, et al., 2016). Finally, the study provided evidence that suggests that the healthiness bias may disappear in the presence of dual identity. In spite of limitations and room for further research, these case studies provide important information for marketers and policy makers. First of all, international companies have to understand that quality is not everything and that it is almost impossible to remove the inherent disadvantages of foreign products. There are ways in which these disadvantages can be minimized, such as conducting a localization strategy or acquiring a dual identity (e.g. chocolate produced by a domestic company in a foreign country). Labeling is another important issue that needs to be addressed, as many countries are debating the need for more information

disclosure, which can lead to discrimination of foreign food products. Third, domestic producers could use the “healthiness bias” in their advantage, especially small and medium companies, which can use it as leverage to increase sales. Finally, it is very important for policy makers to understand that, in spite of the “healthiness bias”, domestic products are not better than their foreign counterparts just because they are produced locally.

This bias is clearly reflected in the 2012 Food & Health Survey published by the International Food Information Council Foundation (IFICF), which indicated that half of Americans felt that imported foods are less safe than domestic products (IFIC, 2012). The 2012 IFIC Survey is a web survey conducted among 1,057 respondents that mirror the distribution of age, gender, education and race/ethnicity of Americans between the ages of 18 and 80 and included questions regarding different topics including Health and Diet, Information Sources & Influences, Dietary Components, Food Safety and Sustainability. In regards to Food Safety, the survey found that, although three out of four respondents are confident in the safety of the U.S. food supply, half of respondents (48%) felt that imported foods are less safe than those produced in the United States (IFICF, 2012). Sixty-one percent of respondents said that imported foods are “less safe” when compared to the previous year and only 3% indicated they felt that imported foods were “more safe” (IFICF, 2012). Among the 509 respondents that believed imported foods are “less safe”, 77% believed there are fewer regulations and inspections in other countries than those required in the US, 61% believed other countries have less sanitary conditions and 60% believed that imported food could become contaminated or spoiled during transportation to the US (IFICF, 2012). From those who believed that imported foods are equally safe

(295 respondents), 58% believed that foodborne illnesses can come from both US and imported foods alike, 53% believed that the US food supply also has food safety issues, 47% have not had a bad experience with imported food and another 46% believed that imported foods are regulated and inspected to the same extent as domestically produced foods.

As these articles, studies and surveys demonstrate, Americans have many concerns and continue to question the safety of imported food products. These doubts and negative perceptions, in addition to various foodborne illness outbreaks associated with foreign foods, were amongst the reasons why FDA decided to craft a new law that would help to protect the safety of the U.S. food supply and make sure that food importers “achieve the same level of food safety as domestic growers and processors.” (Food Safety Magazine, 2013). After more than three years in the making, FDA’s Food Safety Modernization Act was the first major food safety legislation in over 70 years. FSMA includes a specific rule that, for the first time, regulates the production of fruits and vegetables as well as other two rules that deal specifically with imports (the Foreign Supplier Verification Program or FSVP and the Voluntary Qualified Importer Program or VQIP), meant to level the playing field and make sure that imported foods are as safe as domestic products. A following section will discuss FSMA and how it could affect imports, especially fresh fruit and vegetables coming from Mexico.



## **A Renewed Commitment to Food Safety**

Given the importance of exports to both the government and the agricultural industry of Mexico, efforts have doubled to continue improving food safety and provide safe and healthy products to consumers in both sides of the border. As discussed before, Mexico is the United States' main supplier of fresh fruits and vegetables, a market that is extremely important for Mexican exporters, accounting for over 80% of total agricultural exports.

For a few decades, food safety has been one of the greatest challenges for producers and governments around the world. In Mexico, there are two entities in charge of ensuring that food products are safe and wholesome. First, the Secretary of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) and second, the Secretary of Health (SSA). Within SAGARPA, the National Service of Animal and Plant Health, Food Safety and Quality (SENASICA) is in charge of ensuring food safety during primary production while the Federal Commission for the Protection against Sanitary Risks (COFEPRIS), within SSA, is in charge of ensuring food safety of processed foods.

To minimize risks during primary production and answer consumers' demands for safe and wholesome food, in 2007, SENASICA modified the legal framework needed to establish a food safety system that "minimizes risks of physical, biological or chemical contamination of food products, including fruits and vegetables, through good practices" (Claridades, 2013). This updated system (known in Spanish as *Sistema para la Reduccion de Riesgos de Contaminacion* or SRRC), made the necessary changes to the Plant Health, Animal Health and Aquaculture Federal Laws needed to establish strict guidelines for Mexican producers to follow during primary production and packaging. This

system has helped to increase consumers' confidence, both at home and abroad (SENASICA, 2013). The basis of this system is the compliance with good agricultural practices (GAPs), good handling practices (GHPs) and best aquaculture practices (BAPs). When producers fulfill the necessary requirements, SENASICA issues a certificate recognizing producers' efforts to minimize risks. According to official statistics, in 2015, SENASICA issued almost 4,000 SRRC Certificates, 3,137 to agricultural producers, 600 to livestock producers, and 198 for aquaculture producers. Since its inception in 2007, SENASICA has issued more than 20,000 certificates to the same number of producers nationwide, including avocado, guava, mango, citrus, tomato, grape and papaya producers who export to more than 33 countries, including the United States, Canada, Japan, South Korea, the European Union, Russia, New Zealand, and the United Arab Emirates (SENASICA, 2013).

In addition to this official certification, there are also private Food Safety Certifications and Standards that have become popular among exporting companies. Certifications such as GLOBAL GAP, PrimusGFS, SQF, BRC and IFS have been sought by exporting companies to demonstrate to foreign clients their commitment to food safety. These voluntary certifications set very high standards during the production of fruits and vegetables, livestock and aquaculture products, some of which were not even mandatory in the United States (at least up until the enactment of FSMA). According to the Global Food Safety Initiative (GFSI), there are different fresh produce certifications, but all GFSI standards must include the following basic components: risk assessment, management commitment, internal audits, facility conditions, employee hygiene and training, control of incoming products, traceability and recall, pest control and recordkeeping and

documentation (NSF, p.2). The different schemes give producers a choice - depending on their specific product and the market they are trying to enter, but they all have to comply with the same high standards providing certainty and reliability. In the case of Mexico, many exporting companies use these types of certifications as the corner stone of their food safety plans and many importers, especially large U.S. companies use these private certifications as prerequisites to buy from foreign suppliers. For example, since 2013, Wegmans requests GAPs certification from all potential suppliers no matter where they are located (FMI, 2015). Together with land grant universities and USDA, Wegmans has developed a Food Safety Program to help small and medium farmers and ranchers obtain the required certification to become new suppliers. Mexican subsidiaries of American companies also use private certification to ensure that Mexican growers comply with the same standards as American growers. This is the case of many berry companies, who purchase berries from certified Mexican farmers, which helps ensure the berries were produced using the same high standards as those produced in the US.

According to SENASICA, as of November 2016, approximately 4,000 private certifications have been issued to Mexican producers, including 2,914 GAPs certificates and 569 GMPs to an equal number of Mexican producers issued by Primus GSF (SENASICA, 2016), which is the most popular scheme in Mexico.

As one can see, the Mexican government and the agricultural sector understand that they have to work hard to prevent food safety issues to compete in the global arena. Consumers around the world are more demanding than ever, and if companies cannot ensure high food safety standards, they could lose their share of domestic market and will not be able to open new ones.

### **FSMA: Big Challenges, Great Opportunities**

Since approved by Congress and signed into law by President Obama on January 4, 2011, the Food Safety Modernization Act has raised mixed feelings about its ability to ensure the safety of the U.S. food supply. On one hand, FSMA supporters, including big businesses, academia, public health, the media and the Obama Administration, claim that FSMA better protects public health by strengthening the food safety system; on the other, its critics call it burdensome, costly and ineffective (Linnekin, 2013). One thing that all seemed to agree on, was the need for a new food safety law that would reflected the reality of the industry in the XXI century. As previously mentioned, FSMA came into being after several foodborne illnesses outbreaks that shook the core of the food industry, from melamine-tainted child formula from China to American cantaloupes contaminated with *Salmonella*.

Since the mid 1990's there has been a significant increase in the number of foodborne illness outbreaks associated with the consumption of fresh fruits and vegetables. In some instances, these outbreaks have made headlines as contaminated produce caused hundreds of illnesses and even casualties in multistate outbreaks. In 1970, less than 1% of all reported outbreaks with known food vehicle were caused by produce. In the 1990's, this percentage increased to 6% (Lynch, 2009) and by 2005, it already surpassed 13% (Dewaal, 2007). For example, between 1995 and 2005, in spite of all the efforts made by leafy green producers, FDA reported at least 18 outbreaks associated with California lettuce and one more with spinach contaminated with *Escherichia coli* O157:H7 (FDA, 2005). In 1996, Guatemalan raspberries were linked to

an outbreak caused by the parasite *Cyclospora* that caused 1,465 illnesses in the USA and Canada (Calvin, 2003). More recently in 2008, an outbreak of *Salmonella* Saint Paul associated with contaminated jalapeño and serrano peppers from Mexico caused 1,442 illnesses, in 43 states, the District of Columbia and Canada, at least 286 people were hospitalized and the infection might have contributed to two casualties (MMWR, 2008).

The nature of the produce industry makes it very challenging for producers, packers, distributors and retailers to eradicate all risk factors that may cause illnesses. Although there is no definite reason behind the increase in the number of outbreaks linked to produce, there are a few factors that may have contributed to it, including the increase in consumption of fresh produce as well as the increase in surveillance and scientific improvements and diagnostics mechanisms that make it possible to link illnesses that happen in different states and even in different countries and pinpoint the likely source of contamination based on the pathogen's serotype.

One of the main arguments supporting the need of a new law was that, according to FDA, "every year, 1 out of 6 people in the United States — 48 million people — suffers from a foodborne illness, more than a hundred thousand are hospitalized, and thousands die." (FDA, 2011). Hence, the need for a food safety law that was science-based and focuses on prevention, rather than reacting to possible contamination or an outbreak. Other key aspects of FSMA now include: more inspections and compliance, importer food safety, recall authority and enhanced partnerships at every level to maximize limited resources (FDA, 2011).

For the produce industry, FSMA was a game changer as it turned voluntary guidelines into mandatory requirements. The Produce Safety Final Rule, published in

November 2015, establishes science-based minimum standards for the safe growing, harvesting, packing and holding of fruits and vegetables grown for human consumption including: agricultural water standards and testing, biological soil amendments, a specific section for sprouts as they have been involved in a series of deathly outbreaks, domesticated and wild animals, worker training and health and hygiene, equipment tools and buildings and sets exceptions and variances for companies of different sizes (FDA, 2015). As mentioned, voluntary good agricultural practices or GAPs, are now mandatory and all domestic and foreign farms, with only a few exemptions, must comply with all requirements in a period of 3 years or less (November 2018).

As previously mentioned, there are many critics of FSMA and the real impact of its rules on food safety and some requirements have proven very controversial. For example, a particularly challenging requirement for the produce industry, even after the revisions made to the final rule, is agricultural water standards and testing. According to Roy E. Costa in the article "Current issues in Produce Safety: Growing Areas", the new standards and tests will present a problem for farmers, not only because water quality used in agriculture varies depending on the state, region or country it comes from, but also because although farmers know the physical characteristics of their water source, they lack the microbiological and expert knowledge needed to determine the safest and most effective way to use antimicrobial agents when needed, which may result in water contamination (Roy, 2015).

Another major challenge FDA is facing is keeping up with FSMA's foreign inspections mandate. According to a report of the Government Accountability Office (GAO) published back in March 2015, FDA was not only experiencing challenges to fill

its foreign posts but also could not meet FSMA's foreign inspections mandate (GAO, 2015). According to initial estimates, FDA should have inspected 4,800 facilities by 2014. In reality, GAO reported that, by 2014, it had only conducted 1,323 inspections, a little over 1/3 of the inspections FDA was supposed to conduct when FSMA was signed into law.

With great challenges come great opportunities. FSMA provide opportunities to producers and companies that have invested time and resources to develop a sound food safety plan. As discussed above, companies that have gone beyond the standard requirements and who have obtained private certifications, are now a few steps ahead in regards to compliance. These companies, no matter where they are located, are already complying with high standards set by certification schemes, including annual audits. Therefore, certified companies, both domestic and foreign, are very close to full FSMA compliance, with only minor tweaks needed. With this in mind, those companies can focus on attracting more consumers while the rest have to spend time and energy to comply with the new requirements. It is interesting to note that some of FSMA's new requirements have been prerequisites for farmers in other countries. For example, Mexican growers have been complying with water standards and rigorous testing programs that help to ensure the safety of the water used to irrigate fields for many years. This could open a window of opportunity for those exporters to increase their market share and aggressively compete not only with products from other countries but also with domestic products.

To help farmers, ranchers and producers of all sizes to comply with FSMA's requirements, the Mexican government has conducted a series of seminars and workshops regarding food safety. To date, there have been over 60 workshops and

seminars about FSMA not only for producers but also for government officials. Another effort of the government of Mexico to improve food safety is the signing, in July 2014, of a statement of intent to form a partnership to promote the safety of fresh and minimally processed agricultural products between FDA, COFEPRIS and SENASICA. In a statement, former Commissioner Margaret Hamburg said that “FDA is working with our Mexican government counterparts as well as stakeholders from industry, commerce, agriculture and academia to ensure the safety of products for American and Mexican consumers” (FDA, July 24, 2014). According to FDA’s press release, the Produce Safety Partnership would focus on preventive practices and verification measures for the production of safe produce including:

- *Exchanging information to better understand each other’s produce safety systems;*
- *Developing effective culturally-specific education and outreach materials that support industry compliance with produce safety standards;*
- *Identifying common approaches for training auditors who will verify compliance with such standards; and*
- *Enhancing collaboration on laboratory activities as well as outbreak response and traceback activities. (FDA, 2014)*

Michael Taylor, FDA’s former Deputy Commissioner for Food and Veterinary Medicine, said “Food safety partnerships must extend well beyond government, so we are engaging the private sector as well because their food safety practices, coupled with government standards, are what make food safe” (FDA, 2014), emphasizing the need to engage not only producers but all those along the production and distribution chains, because everyone has a crucial role to play to ensure food safety. As the saying goes, a chain is only as strong as its weakest link, so no matter how strict government standards are,



contamination can happen at any point along the production chain so everyone has to play its part to minimize risks. Finally, Mexico is working closely with FDA and is providing all the require documentation so that FDA can complete its assessment of the Mexican Food Safety system so that, in the near future, it can be recognized as comparable to that of the US (SENASICA, 2016).

## **CONCLUSION**

It is hard to deny that we are living in a world with a global food supply, in which every meal we eat comes from several different countries, especially if that meal includes fruits and vegetables. It is also undeniable that food safety has been a major concern for American consumers, so everybody, from foreign governments to the last member of the distribution chain, has to work together to reach a common goal: a safe food supply. People in the industry say that one of the areas where there is no competition is food safety, as all producers strive to achieve the same goal: minimize risks to ensure food safety. Nobody wants to see others failing because any food safety issue can affect the entire industry. No agency or country on its own will be able to ensure the safety of its food supply; food safety requires the active engagement of all governments and players along the farm-to-fork supply chain. The Mexican government is an important ally in FDA's efforts to ensure the US food supply. Both countries must continue to work together to avoid duplicity and focus their limited resources in high risk products. They also need to work with industry to achieve the ultimate goal: protect American consumers' health by ensuring a food supply that is safe and nutritious no matter where products come from.

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