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Implications of Non-Compliance with Technical Non-Tariff Measures: The Case of Chilean Food Related Export Refusals at the United States Border

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Summary

The requirements for food quality and safety for imports are rising and this is reflected in an increasing number of technical NTMs. In extreme cases, non-compliance leads to the refusal of shipments at the border, representing a loss of both the revenue expected from the sale of the goods and the costs of their transportation. The objective of this chapter is to analyse the implications of non-compliance with technical NTMs by assessing cases of export refusals. For this, we focus on the case of Chilean exports of fruit and vegetables to the United States of America (US). Data on fruit and vegetables shipped from Chile to the US between January 2002 and December 2015 were examined, with cases of refusals of specific products and the reasons invokedin such refusals being recorded. The information was extracted from the US's Food and Drug Administration's Operational and Administrative System for Import Support. To evaluate the importance of refusals of this nature, we first related Latin American countries' share of shipments refused by the US to their share of all fruit and vegetable exports to the US. We also assessed the economic value of refused exports from Chile. To contextualize the results, details of the composition and operation of the Chilean and US food quality and safety control systems are given. Additionally, comparisons are drawn between the situation in Chile and that in other Latin American exporters with regard to the relevant public policies. This analysis shows that Chile has the lowest level of refusals in the region, representing a negligible economic value. This suggests that its public policy on quality and safety, which is based on a system that promotes collaboration among agencies, might be a key reason for the good performance.

1 Introduction

Non-tariff measures (NTMs) include a wide range of policy instruments that have potential effects on different aspects of trade (WTO, 2012). Specifically, technical NTMs focus on the characteristics of products and on production processes. According to UNCTAD (2015) these measures are mainly of two types: sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT). Both are strongly related to food products[1], and are aimed at safeguarding human, animal and plant life and health against the consumption of hazardous imports. At the end of the Uruguay Round of trade negotiations, the members of the World Trade Organization (WTO) signed the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) and the Agreement on Technical Barriers to Trade (the TBT Agreement), which entered into force in 1995. Both agreements aim to protect the right of countries to guarantee the quality and safety of imports by avoiding risks, but they do not allow this to be trade protectionism in disguise.

One of the principles in the SPS Agreement and the TBT Agreement is transparency, and this requires countries to undertake to make public their intention to introduce a measure. The technical NTMs notified by countries have dramatically increased over years. The number of notifications differs widely depending on economic level, with high-income countries much more active than middle- and mainly low-income countries (Boza & Fernández, 2016). High-income markets thus seem to be particularly stringent, which makes it necessary for exporting countries (and, among these, developing countries in particular) to improve the safety conditions throughout their food supply chains if they wish to sell their products there.

In those cases where non-compliance with technical requirements is detected at the port of entry, the shipment involved can be refused. This implies a loss of both the revenue expected from the sale of the goods and the costs of their transportation, especially when the goods have to be destroyed. Moreover, repeated export refusals damage the image of the exporting country and, one would expect, its trade performance (Jouanjean, 2012).

For Chile, the sales of food and forestry products represent a half of the value of its non-copper exports. Within this, fresh products, and mainly

[1] For the purposes of this document we shall refer to food products as those between the chapters 1 and 24 of the Harmonized Commodity Description and Coding System, although some of them are not edible.

fruits (as apples, grapes and berries) are essential. One of the most important markets to which Chile has directed its exports is the United States; leader in number of NTMs notified. Therefore, it is very useful to evaluate Chilean performance in the fulfillment of United States technical requirements.

As a consequence, the objective of this chapter is to analyse the implications of non-compliance with technical NTMs by assessing export refusals. For this, we will consider the case of Chilean exports of fruit and vegetables to the United States of America. In addition, details of the Chilean institutional framework for the promotion of food safety will be presented, as well as an explanation of the United States control system. Comparisons will be drawn between the situation in Chile and that in other exporters in the same region with regard to border refusals by the United States and related public policies.

2 Conceptual framework: food security, food safety, trade and public policies

The concept of food security emerged in the 1970s as a result of the links between food production and availability. In the 1980s, the need to guarantee economic and physical access to food was added. Finally, in the 1990s the current concept was reached; this incorporates food safety and cultural preferences (FAO, 2011). At the Second International Conference on Nutrition, held in Rome, Italy, in 2014, access to healthy and nutritious food was held to be a basic right, and food safety was recognized as necessary for the reduction of hunger and malnutrition (Uyttendaeleet et al., 2016).

However, the relation between food security and the protection of food safety has different implications. On the one hand, compliance with food safety regulations contributes to food security through the prevention and reduction of foodborne diseases in vulnerable populations, higher efficiency in food production, lower food losses and waste and better conditions for market access to producers that fulfill requirements, among others. On the other hand, compliance with food safety requirements is often related to an increase in costs, making it difficult for some producers. This can lead some types of food producers, such as family farms, to suffer. In addition, developing countries have frequently explained that they do not have sufficient resources to deal properly with food quality and safety control (Larach, 2003). Meanwhile, the importance of international trade makes food safety, and also food security, a supranational issue (Uyttendaele et al., 2016).

In any case, access to food export markets will depend on the ability to meet the requirements of importing countries, which is especially difficult when there are dramatic gaps in capabilities (technical and legal). For most developing countries, agriculture is central to the economy, and food exports are an important source of revenue and income generation. For instance, in Africa agricultural products represent 11.5 per cent of total export value, and the figure is 6.7 per cent for Asia, but the most prominent case is Latin America, where the figure is 30.6 per cent (WTO, 2015). As a consequence, the long-term solution for developing countries wishing to sustain the demand for their products in the global markets is to increase the confidence of importers in the quality and safety of their supply systems.

In this context, the concept of a national food control system (NFCS) emerges. NFCS refers to an institutional and regulatory framework imposed by the national authorities that integrates the following objectives: (i) protecting public health by reducing the prevalence of foodborne diseases; (ii) protecting consumers from unsafe, mislabelled or adulterated food; and (iii) contributing to economic development by establishing a solid base for national and international trade. The third objective mentioned is the most obviously related with countries' exporting performance, but the different functions at the NFCS mutually reinforce. That is the reason why is interesting to consider NFCS as part of our conceptual framework.

There is no such thing as an ideal food control system that is suitable for all countries. In fact, the Food and Agriculture Organization of the United Nations (FAO) and WHO suggested at a joint document developed in 2012 at least three possible ways of organizing an NFCS:

Multiple agency system: This is a system with multiple agencies that are responsible for food control. The roles are clearly divided among government ministries – those of health, agriculture, trade, environment, industry and tourism. This method of organization has some disadvantages, such as duplication of regulatory activity, high bureaucracy, fragmentation and lack of coordination among the different agencies involved. However, it also has certain advantages, such as increased competence derived from specialization.

Single body system: In this type of system there is a concentration of all responsibilities for protecting public health and food safety in a single agency whose mandate is clearly defined. This system presents some advantages, such as the uniform application of measures, greater efficiency in terms of costs and the effective utilization of resources and expertise, harmonization of food standards, the ability to respond quickly to new challenges and demands of the domestic and international markets, and the provision of more standardized services. The main disadvantage is that decision-making is concentrated, which reduces the exchange of ideas and leads to the institution itself becoming enclosed and less transparent.

Integrated system: An embedded system for food control exists when there is the aim and determination to achieve effective collaboration and coordination among all agencies in a continuum "from farm to table". Typically, the organization of an integrated system has several levels of operation:

- Level 1: Formulation of policies and regulations, risk assessment and management.
- Level 2: Coordination of food control, monitoring and auditing.
- Level 3: Inspection and enforcement.
- Level 4: Education and training.

According to the FAO and the WHO document mentioned, the advantages of this system are that it is politically more acceptable because it keeps the inspection and enforcement roles separate, it facilitates the uniform application of control measures throughout the food chain, it separates the functions of risk assessment and risk management, and, as a consequence of all these features, it encourages transparency in the decision-making processes and accountability in the application, which can affect cost efficiency.

3 General review of food safety control in Latin America

In Latin America, food production systems tend to be heterogeneous, with numerous independent farmers, small-scale unstructured markets and minimal support for the application of new technologies. Likewise, the agroindustry is fragmented and insufficiently funded, and the purchasing power of local consumers is relatively low in relation to demands for greater food safety. In contrast, there is an important group of companies that are focused on exports and that seek to comply with the requirements of the developed market, being aware that this is necessary to gain access; some of them become even multinationals.

Additionally, the performance of the institutions in the region is diverse and still in the process of being completely defined; it means of creation and empowerment. There are significant differences in the complexity and scope of the NFCS. The institutions for the protection of animal and plant health were created as a support for producers, with the key mandate of focusing on the control of diseases of animals and plants. In that context, the responsibility for monitoring food safety for the local and foreign consumer is, in many countries, distributed among several entities in a multi-agency system. Food control systems also differ among countries according to whether their agricultural production focuses on local or international markets, given the differing stringency of the requirements in the two cases.

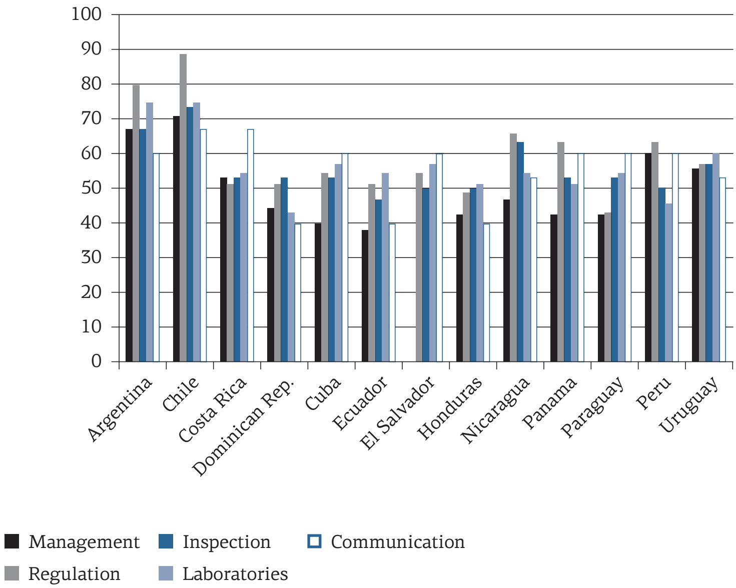
For more information comparing the different systems, it is interesting to consider the main results of the project entitled "Assistance for the design and/or strengthening of food safety policies in Latin American countries" (TCP/RLA/3213), which was run by FAO from 2010 to 2011; these results are summarized in Boza et al. (2014). During this project different NFCS were evaluated under the following five dimensions: management, regulation, inspection, laboratories and communication. The countries studied were: Argentina, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Honduras, Nicaragua, Panama, Paraguay, Peru and Uruguay (unfortunately there is no data at the study for some major exporters as Brazil and Colombia; which would have enriched the comparison with the Chilean case).

The average food control capacity was estimated at 54.2 per cent (the ideal situation being 100 per cent). The sub region of South America scored highest in all the items. The countries with the highest scores for food control capacity were Chile (75 per cent) and Argentina (70 per cent). Ecuador, Cuba, Honduras and El Salvador scored below the regional average.

The score achieved by each country seems to vary according to their economic level. If we consider the World Bank countries' classification, those Latin American countries at the sample with high income scored an average capacity of 65.67 per cent, upper-middle income countries 55.67 per cent and low-middle income countries 49.48 per cent.

The results in Boza (2016) show that there are also relevant differences between Latin American countries in the number of SPS measures notified to WTO. These differences are significantly related to the countries' technical and legal capabilities, and are less related to trade variables. From 1995 to 2012, eight Latin American countries – Brazil, Chile, Peru, Colombia, Mexico, Argentina, Costa Rica and El Salvador – were among the twenty WTO members with a higher number of notifications in the period. In this context, the leading countries were Brazil (1132 notifications), Chile (516), Peru (481), Colombia (405) and Mexico (304).

Figure 1: Evaluation of Latin American food control systems (food control capacity, per cent)



Source: Own preparation based on Boza, Rivers and Rozas (2014).

Composition and functioning of the Chilean food control system

The food safety strategy in place in Chile is part of an integrated system of the type mentioned above. An autonomous national institution is responsible for the implementation of levels 1 (formulation of policies and regulations) and 2 (coordination). Meanwhile, the activities of level 3 (inspection and enforcement) are within the charge of other public and private bodies. An agency created in 2012 has been responsible, among its other functions, for the actions of level 4 (education and training), and also for improving the coordination of the institutions responsible for level 3.

In Chile, the Health Code determines the characteristics of food products for human consumption, and establishes that health authorities are in charge of approving the installation and controlling the operation of facilities for the production, processing, packaging, storage, distribution and sale of food, in addition to slaughterhouses and refrigeration plants. The Health Code also gives the health authorities the power to oversee the control and certification of laboratories and to order the closure of facilities as well as the destruction of hazardous products.

For the operation of food safety inspections, there are Regional Ministerial Secretaries throughout the national territory. They oversee compliance with food safety regulations and the application of pesticides. Meanwhile, the Agricultural and Livestock Service (SAG) is in charge of giving support to agriculture, forestry and livestock through the protection of animal and plant health. Its activities include certification programmes for primary and secondary production.

The National Fisheries Service (SERNAPESCA) is a public entity whose mission is to monitor compliance with fishing, aquaculture, health and environmental regulations, as well as with international agreements that regulate these activities, in order to preserve aquatic resources and help to ensure the sustainable development of the sector.

Nowadays, Chile also has an Agency for Food Quality and Safety (ACHIPIA), which started functioning in 2005 as a Presidential Advisory Commission composed of the Ministerial Secretaries of the Finance, Fisheries, Agriculture and Public Health, the Presidency and the Direction of International Relations at the Ministry of Foreign Affairs. The agency's mission is to advise national authorities on issues related to the identification, definition and execution of policies, plans, programmes and measures on food safety, as well as to support the development of a national system on these matters and to coordinate the competent agencies.

In 2011, ACHIPIA was transferred to the Ministry of Agriculture. One of its central aims is to improve not only food safety, but also food quality, and to transform Chile into a "food exporting power". Additional functions are acting as Contact Point and National Secretary of the Codex Alimentarius in Chile, and proposing a national system for the management and provision of information on food alerts. In 2012 and 2013 the areas of work of the agency were strengthened through an agreement between FAO and the Chilean Agriculture Secretariat.

With regard to inspections and the enforcement of regulations in Chile, there are public and private institutions to fulfil those functions. Specifically, public laboratories test food (fresh, processed and in any other state) by monitoring programmes (for national consumption) or by official verification (for exports). The Ministry of Health has a network of laboratories throughout the country. For this purpose, the Public Health Institute acts as a national reference center, standardizing, supervising, training and advising these facilities; and, with the Regional Secretaries, it also certifies private laboratories. Meanwhile, SAG tests the sanitary and phytosanitary conditions of exports in its national and regional laboratories. Furthermore, through its accreditation system to third parties, SAG authorizes private laboratories to carry out analysis/testing and gives support for the implementation of activities under its official programmes. Currently SAG has accredited more than 20 laboratories for the analysis of residues of veterinary drugs that had been used for microbiological purposes in livestock products and of pesticides and fertilizers in fruits, vegetables and wine.

For fisheries, SERNAPESCA is the institution responsible for issuing official health certifications. It can delegate sampling and analysis to private laboratories authorized by the Ministry of Health and the National Standards Institute. Today it has about 37 laboratories, which are distributed throughout the country but with a particular concentration in the south.

4 Exports of Chilean food-related products at the United States border

In general, improvements in the operation of food control systems have an impact on access to international markets. To support the design, implementation and monitoring of national safety policies, countries can develop indicators to assess and quantify the effects of these policies. Given that export refusals result from the failure by the supply chain to comply with the requirements imposed by importers, the economic evaluation of the losses arising from export refusals is one possible way to approach the food safety policies' performance.

In section 4.4 we will present the results of a practical assessment in this context, examining the case of Chilean fruit and vegetable refusals at the United States border. To contextualize these results, we will first present: a) the latest developments in food quality and safety regulation in the United States; b) the functioning of the United Sates border control and inspection system; and c) the general position of agricultural trade from Chile to the United States.

4.1. Food safety and quality regulation in the United States

Three agencies compose the food safety regulatory system in the United States: the United States Food and Drug Administration (FDA), the United States Department of Agriculture (USDA) and the United States Environmental Protection Agency (EPA). FDA is responsible for the regulation of all food products except meat (pork, beef and poultry) and processed eggs, which are under the authority of USDA. Meanwhile, EPA controls the limits on pesticides.

Until now, the general functioning of FDA on food safety was governed by the 1938 Federal Food, Drug, and Cosmetic Act. However, in 2011 the United States President signed a new law: the Food Safety Modernization Act (FSMA). The entry into force of FSMA was a recognition of the need to provide public bodies with further means to ensure that foods that are consumed do not pose health risks. In fact, these risks are understood to be a public health problem, considering the high number of cases of foodborne diseases in the United States every year. According to Scallan et al. (2011) there are 9.4 million episodes of foodborne illnesses annually due to the most common pathogens (e.g. Norovirus, *Salmonella* spp., *Clostridium perfringens, Campylobacter* spp., *Ampylobacter* spp. and *Toxoplasma gondii*).

The emphasis of FSMA is essentially on preventive actions. The focus has therefore moved from punitive actions against incorrect procedures to incentives for appropriate ones. The competences of FDA have been strengthened so that it has better control over the growth, harvesting, manufacture, processing, packaging and storage of foods intended for the United States market. To facilitate this, a budgetary increase has been granted to the FDA. In 2015 the FDA budget increased in US$ 24 million, in 2016 in US$ 104.5 million and in 2017 in US$ 25.3 million, all in order to invest in the implementation of the FSMA.

A point of special interest in FSMA is related to imports of food products. FSMA entrusts to importers the responsibility of ensuring that their providers have put in place preventive controls to safeguard the safety of their products and to ensure that they are not adulterated or misbranded. FSMA established the Foreign Supplier Verification Program, mandatory for import firms (except some specific exemptions) which therefore have to verify that their foreign providers are respecting United States food safety standards throughout their production and distribution channels (Countryman, 2016).

Additionally, FSMA established the Voluntary Qualified Importer Program for the inspection and certification of products. Importers can adhere to this if they agree to exert control over food safety in their supply chains. Membership of the programme results in the expedited review of products at their entry into the United States, which is an incentive for foreign providers to implement better food safety practices.

FSMA also highlights the need to strengthen national and international collaboration to foster the appropriate functioning of the system. Within this coordination FSMA is given a primary role in building the capacity of major exporting countries. For instance, some United States entities (public and private), as the FDA or NSF International, have co-organized with the Chilean Ministry of Agriculture several informative seminars open to the public focused on the FSMA. In relation to this, Belden and Orden (2011) state that compliance with the regulations derived from FSMA can mainly be expected to present difficulties for developing countries. However, compliance can also be an opportunity to improve a country's national food safety regulations because of the technical assistance that is given. Similarly, Saltsman and Gordon (2015) see FSMA as being challenging for those producers who cannot comply with its requirements, but also motivating for those who are able to upgrade their standards.

The entry into force of FSMA, as well as the high number of food quality and safety measures imposed by the United States, can therefore be seen either as an obstacle to trade or as an opportunity. The view depends, inter alia, on the ability of producers to adapt to the new requirements. In summary, the FSMA aims to force United States importers to purchase from qualified exporters from countries/regions proved to have quality controls in place. The analysis of export refusals can suggest an approach to the assessment of those capabilities. On the other hand, the number of SPS yearly informed by the United Stated to the WTO, has not significantly increased – except for 2011 and 2012 – after the entrance into force of the FSMA, which reinforces the conclusion that the purpose is to adjust the control system.

4.2. The United States border control and inspection system

In the United States, two federal agencies are the main parties responsible for food border inspection: the Food Safety and Inspection Service (FSIS) and FDA. FSIS controls compliance with food quality and safety requirements for domestic and imported meat products (except for exotic species) and eggs. FDA, meanwhile, oversees all other domestic and imported food products, as well as meat from exotic species, additives, feeds, tobacco, cosmetics and veterinary drugs. In this section we are going to focus on the functioning of FDA, as this research emphases on some of the products covered by this agency, also because they concentrate the highest value of food exports from Chile to the United States.

FDA oversees most food inspections at the United States border (GAO, 1998). However, because of constraints on resources, FDA staff is able to check only 1 per cent of all shipments (Artecona and Flores, 2009), so they give priority to those considered to be at the highest risk (Elder, 2010). To do this, it is essential that the inspections follow the guide provided by the Operational and Administrative System for Import Support (OASIS). This system records the entrance notifications for every shipment containing food products that is intended for import to the United States and identifies those that represent a higher potential risk. The criteria to define the risk level depend on a combination of the country of origin, type of product and exporter. Using this information, FDA decides whether to admit the shipment without an (a priori) border inspection or to order that an inspection be carried out (Grundke and Moser, 2014). The United States control system operates in such a way that, in spite of the fact that a very low percentage of shipments are inspected at the ports of entrance, OASIS ensures that every food import is at least electronically checked (Bayliset et al., 2009).

FDA inspections are of two types: field examinations and laboratory tests. In the first case, the officers check the shipment by organoleptic tests, observing the product's appearance and smell. For a laboratory inspection, field officers collect a sample that laboratory technicians analyse to determine product safety. In neither case can the contents of the shipment be distributed on the market until the inspection has been finished and the results are available and positive. If FDA detects a violation of food quality and safety requirements, there are two possible consequences. If the consumption of the refused products is considered hazardous, FDA can order the destruction of the shipment. On the other hand, if there is a violation of the requirements but public, animal or plant health would not be seriously compromised, the exporter can divert the shipment to another market or can recondition it and try again to import it to the United States (Artecona and Flores, 2009; Buzbyet et al., 2008; Grundke and Moser, 2014).

Despite their important role, inspections are not absolutely necessary if a dangerous shipment is to be stopped from entering the United States. In some specific cases FDA can order the refusal of an import even without a physical inspection. This happens if there is a history that raises a suspicion of a probable violation of the requirements, such as past experience for a particular country and a particular type of product. The exporter is then required to prove to FDA that their shipment has been handled safely (Becker, 2010). Although this procedure reduces the number of inspections and as a result saves resources, it can also lead to arbitrary results. This situation is even more worrying bearing in mind that some authors have shown that the frequency of import refusals at the United States border for a given product and/or country is not unaffected by economic and political pressures (Baylis et al., 2009; Nguyenet et al., 2015).

In any case, FDA is transparent about food import refusals, publishing an up--to-date database of information online. This database identifies, for each refused shipment, the type of products contained in the shipment, the date of the refusal, the company and country of origin and the type of violation. There are 262 possible categories of violation, which can be grouped into: (i) the presence of pesticides; (ii) the product being filthy or decomposed; (iii) manufacturing failures; (iv) the product not having appropriate entrance permission to the United States; (v) the product being poisonous; (vi) the presence of unsafe additives; and (vii) non-compliance with labeling formalities.

The information in the FDA database will be the main source for the assessment of Chilean export refusals that will be presented in section 4.4.

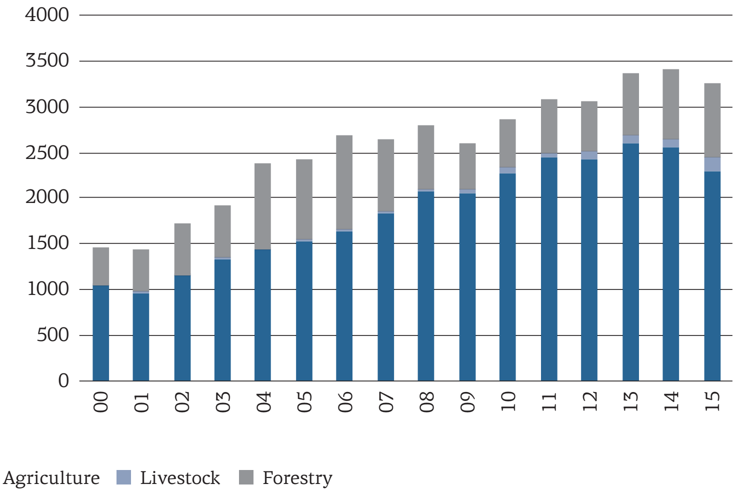
4.3. General characterization of food trade from Chile to the United States

In 2015, the value of exports of Chilean food and forestry products to the United States was US$ 3.2 billion. Since the entry into force of the Free Trade Agreement (FTA) between the United States and Chile in 2004, the value of food and forestry exports from Chile to the United States has exceeded US$ 2 billion every year (a 3 per cent average). In fact, United States is the main destination of Chilean food and forestry products, concentrating a 21.98 per cent of total exports in 2015. Meanwhile, except in 2009, imports of food products from the United States experienced significant increases every year after 2006, before which the increases had been marginal. However they have always been kept well below exports, resulting in a significantly positive balance of trade for Chile in this sector.

Accordingly, the FTA between Chile and United States signed in 2004 was a milestone in the trade relations. The objectives of this FTA were: to expand and diversify trade, to facilitate the movement of goods, to stimulate competition, to increase investment, to protect intellectual property rights and to encourage bilateral cooperation.

The Chile–United States FTA contains a chapter on SPS and another on TBT. In respect of both of these areas, the parties agreed to form joint committees to promote cooperation, mainly through the exchange of information and technical assistance. Two principles lay beneath this intention to cooperate: transparency and equivalence. To meet the first of these, deadlines are set for each party to inform the other about new measures, enabling the receipt of comments. For equivalence, each party should promote, whenever possible, recognition of the measures taken by the other party.

Figure 2: Evolution of Chile–United States food and forestry exports by subsector (millions of United States dollars)



Source: Own preparation based on ODEPA database.

According to data from USDA for 2014, Chile is the sixth most important provider of food and forestry products to the United States in terms of value of imports. The main products that Chile exports to the United States are agricultural (primary and processed), with a 72 per cent from 2000 to 2015. Exports of meat products are negligible, with less than 2 per cent of the total value for the same period. Forestry products, such as wood and cellulose, have maintained an average share of around 25 per cent during the same period.

If we consider only exports of agricultural products, fruits form a high proportion. The most important products have been fresh grapes (which have more than doubled their traded value from 2000 to 2015), fresh apples and berries. The quantity of berries has grown dramatically. Wine is also a very important Chilean agricultural export, and wine exports have increased significantly. In this sense, in 2015 a 35 per cent of fresh grapes, 39 per cent of berries, 26 per cent of fresh apples and 11 per cent of wine Chilean total exports went to the United States.

Table 1: Main agricultural products exported from Chile to the United States (thousands of United States dollars and percentage change)

Product	2000	2015	Change (%)
Fresh grapes	662 476	1 346 788	103.29
Wine with designation of origin	434 662	1 444 512	232.32
Fresh apples	202 151	555 995	175.03
Corn for planting	68 085	92 884	36.42
Other wines with capacity higher than 2 liters	66 291	292 509	341.25
Fresh plums	64 848	131 092	102.15
Red and blue cranberries, bilberries and other fruits of the genus Vaccinium	29 494	526 162	1683.96
Other frozen fruits	6 668	164 189	2362.34

Source: Own preparation based on ODEPA database.

4.4. Recent trends and current situation relating to export refusals

Agricultural products are, as already mentioned, the largest sector in Chilean food exports to the United States, with fruit in the lead. Different studies provide evidence that (not specifically for Chile but in general) together with vegetables, fruits have experienced the highest number of refusals (Allenet et al., 2008; Artecona and Flores, 2009; Brookset et al., 2009; Buzby and Regmi, 2009; Buzby et al., 2008; Bovay, 2016). For these reasons, we are going to focus our analysis on the evolution of refusals of Chilean exports of vegetables, fresh fruit and their derivatives, according to the categories contained in chapters 07 and 08 of the Harmonized System (HS). Considering data for 2015, a 31 per cent of Chilean products in chapter 07 and in chapter 08 a 74 per cent are sent to the United States. In order to have an up--to-date but comprehensive view the period under study is the 14 years from 2002 to 2015.

With these criteria, the number of violations registered by FDA for the products and period under study was 288, which resulted in the refusal of 277 shipments. The types of violations detected are presented in table 2.

Table 2: Number of Chilean shipments refused at the United States border, by type of violation

	2002	2003	2004	2005	2006	2007	2008
Pesticides	6	7	11	5	5	9	3
Filth/Decomposition	7	6	7	4	1	1	8
Manufacturing failure	-	2	3	-	3	1	1
Needs FCE[2]	-	2	2	-	4	1	1
Poisonous	1	-	-	1	-	-	-
Unsafe additives	-	-	-	-	-	-	-
Label	-	-	1	-	2	1	1
Total	14	17	24	10	15	13	14
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Pesticides	2	2	12	12	17	37	5
Filth/Decomposition	35	5	34	1	2	8	-
Manufacturing failure	-	-	-	-	-	-	-
Needs FCE	-	-	-	-	-	-	-
Poisonous	-	1	-	-	-	-	-
Unsafe additives	-	-	1	1	-	-	-
Label	-	-	-	-	2	2	2
Total	37	8	47	14	21	47	7

Source: Own preparation based on FDA database.
Note: FCE: Food Canning Establishment Registration.

In accordance with the results presented at Table 2, the principal causes of Chilean fruit and vegetable product refusals are a high presence of pesticides and the detection of filth and decomposition, with 133 and 119 violations, respectively. Other causes are rare. These results are consistent with the data given by Buzby and Roberts (2011), who found that, for upper middle-income countries (such as Chile until 2012), the most common violations detected at the United States border are filth and pesticide residues. Similar results were obtained by Artecona and Flores (2009) for Latin American exporters. However, another recurrent violation for fruit and vegetable exports from this region, but not Chilean exports, is that a product is considered poisonous (as will be mentioned later).

Regarding the products, fruits were refused much more often than vegetables, which is not surprising given the distribution of the value of agricultural exports from Chile to the United States; with vegetables being less relevant. In this context, the most common types of fruit to be refused were: raisins (80 detentions), stone fruits (63), fresh berries (45) and nuts (33). Meanwhile, for vegetables, 24 of the 37 refused shipments contained fresh peppers.

Despite the level of detail of the data presented, it is difficult to measure the position of Chile concerning refusals without comparing with similar countries. Therefore, we decided to explore the relative position of Chile in comparison with the main Latin American fruit and vegetable exporters to the United States: Argentina, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico and Peru. For this, we calculated an index (T_i), which we defined as:

(1) $$T_i = \left(N_i / \sum_{j=1}^{10} N_j\right) / \left(X_i / \sum_{j=1}^{10} X_j\right)$$

where N_i is the number of refusals at the United States border for fruit and vegetable products from country i during the period 2002–2015; ($\sum_{j=1}^{10} N_j$) is the total number of refusals for all the 10 countries considered; X_i is the value of fruit and vegetable exports from country i to the United States during the period 2002–2015; and ($\sum_{j=1}^{10} X_j$) is the total value of exports for all 10 countries considered.

The data used for the calculation of this index were extracted, in first place, from the World Bank World Integrated Trade Solution website for the value of fruit and vegetable exports to the United States. For this, we considered all the products under HS chapters 07 and 08. The number of refusals was extracted, as in the case of Chile, from the FDA Import Refusal Report, which is public information and is available online.

The results obtained show that Chile is the Latin American country with the lowest share of refusals when compared with its contribution to regional exports, with a T_i value equal to 0.16. The values of the index for the other countries (in order from highest to lowest) are: Mexico (1.47), Peru (1.02), Brazil (0.99), Colombia (0.8), Argentina (0.78), Guatemala (0.76), Honduras (0.44), Ecuador (0.42) and Costa Rica (0.21).

Table 3: Latin American countries' participation in fruit and vegetable exports to the United States and percentage of refused shipments (2002–2015)

Country	Refusals (%)	Exports (%)	T_i
Argentina	0.98	1.25	0.78
Brazil	1.73	1.75	0.99
Chile	2.25	14.34	0.16
Colombia	1.85	2.30	0.80
Costa Rica	1.73	8.21	0.21
Ecuador	1.93	4.59	0.42
Guatemala	5.55	7.27	0.76
Honduras	1.13	2.59	0.44
Mexico	78.49	53.44	1.47
Peru	4.35	4.25	1.02

Source: Own preparation based on WITS and FDA database.

In conclusion we can say that Chile is in a very positive position, within the Latin American context, if we consider export refusals to be an indicator of compliance with the sanitary, phytosanitary, and technical requirements imposed by the United States. This means that economic losses associated with refusals are expected to be relatively low. In order to have a specific estimate, the value of these losses will be studied in section 5.

However, we might ask whether a lower level of refusals really means greater compliance with the SPS measures established by the United States. As previously mentioned, FDA is not able to inspect at the ports every shipment that arrives in the United States. Accordingly, it selects beforehand where the controls should be targeted. The level of risk that is assumed for a shipment is an essential criterion. In this context, the history of refusals for the country of origin is relevant. As a consequence, the low level of refusals of Chile may be influenced by there being fewer site inspections, given what we might call a "reputation effect". However, the above does not pretend to ignore Chile's efforts to improve its food control system

An additional reason that could be suggested is that Chile's SPS measures and control requirements are significantly harmonized (made compatible) with those of the United States. In fact, the FTA between Chile and the United States that has been in place since 2004 includes cooperation on SPS. In relation to this, Hejaziet et al. (2016) analysed the situation and the effects of the homogeneity and heterogeneity of SPS measures between TPP and Transatlantic Trade and Investment Partnership parties (the United States and the European Union), looking at the case of the regulations on maximum residue levels in fruit and vegetables. First, the authors show that the homogeneity in maximum residue levels is much greater between the TPP parties than between the United States and the European Union, as the latter has the most stringent regulations within the sample. For the specific case of Chile, these results are consistent with those obtained by Engler et al. et al. (2012); these authors calculated an SPS stringency index for Chile's main destination markets, based on the opinions of a sample of managers of 40 fruit exporting companies located throughout the central area of the country. The level of stringency for United States SPS was classified as intermediate, since there were especially severe quality requirements. The authors suggested that USDA in situ certification along with SAG makes compliance less complex for exporters.

Another interesting point comes from a comparison not only of the total number of refusals among countries in the region but also of the reasons behind these refusals. At a general level, the main violations by Latin American fruit and vegetable products detected at the United States border are high levels of pesticides, filth or decomposition, and that the product is considered poisonous because of the presence of pathogens. However, if we look at the violations at a disaggregated level, we see that there are some differences by country. For instance, for Argentina, Brazil and Colombia, failures in manufacturing and lack of Food Canning Establishment registration are the reason behind around 40 per cent of refusals. In Mexico, an important number of the refusals are related to the products being poisonous. Meanwhile, in Costa Rica, Ecuador and Guatemala, violations for excess quantities of pesticides are especially frequent. In Argentina and Chile refusals due to decomposition and filth are significant, and for both countries there are minimal findings of poisonous products. Of course these results might be quite biased by the kind of fruits and vegetables sent to the United States, for instance if they are processed or not. However, these results have clear implications from the point of view of public policy, as strategies should focus on those links in the production and commercialization chain where non-compliance can be detected. In the case of Chile that would be the application of pesticides and the post-harvest period.

5 Economic assessment of export refusals

The economic assessment of export refusals is challenging. In the case of the United States, the FDA database in many cases does not specify the physical characteristics (volume, weight, size) of the refused shipment. Additionally, there is no indication of the form in which the products were imported, let alone their quality (for example if they were premium goods).

On the other hand, we cannot be sure whether products were destroyed after the refusal, reconditioned for the United States or sent to a third country market. As a consequence, in this section we have had to make some assumptions based on secondary information and consultations with national experts about the logistical aspects of the export process from Chile to the United States for agricultural products.

5.1. Preliminary considerations

We can affirm that most fruit and vegetable exports from Chile to the United States are transported by sea (INIA, 2010). The main ports of entry are located on the east coast, and are Wilmington (North Carolina), Gloucester (New Jersey) and Tioga (Pennsylvania). On the west coast the port of Los Angeles (California) is relevant. The containers used for the transportation of fruit and vegetables are 20 or 40 feet long. The smaller of these are more frequently used for products that do not need refrigeration during the journey.

According to standardized metric measures (International Organization for Standardization (ISO) 6346) the 20-foot containers are 5.86 meters long, 2.33 meters wide and 2.35 meters high. The 40-foot containers have the same width and height, but are 12 meters long (CAN, 2013). Inside the containers, boxes are stacked on wooden pallets certified under international standards. The dimensions of the pallets are often 1.2 meters long by 1 meter wide and 0.145 meters high. Additionally, there has to be enough free space in the container for loading and unloading the goods (which is commonly done by a crane fork) and for the circulation of air.

For our assessment of refusals we assumed that the shipments were all transported by sea in containers. Each refused shipment was considered to be either a 20-foot container (if the product was of a type that has to be refrigerated) or a 40-foot container (if it was not). The fruit and vegetable boxes were assumed to occupy the entire volume of the container, except for the area needed for the pallets, loading and unloading, and ventilation. Also, we did not count any possible income for the re-export of refused products to a third country or for ultimate entry to the United States after reconditioning, owing to the lack of certainty.

5.2. Evaluation methodology

In the first place, we estimated the weight of a regular container transporting product k from Chile to the United States (k being a type of fruit or vegetable contained in a shipment that was refused at the United States border). Using the dimensions of the containers and of the regular boxes for each product, the maximum capacity of a container was calculated in each case. This was multiplied by the average weight of a box containing the product k. Finally, a correction of 20 per cent was applied, because, as mentioned, containers are usually not completely full.

Once we had the regular weight of a container, we multiplied it by the average free on board (FOB) value of a kilogram of product k exported from Chile to the United States in the year when the refusal occurred.

The estimation of the economic value of a refused shipment ($\$R_{kt}$) can therefore be expressed by the following equation:

(2) $$\$R_{kt} = \left[0.8\left[\left(CV_f / BV_k\right) BW_k\right]\right] * FOB_{kt}$$

where CV_f is the volume of a regular container used for the transportation of product k (20- or 40-foot container depending on refrigeration), BV_k is the volume of a regular box used for the transportation of product k, BW_k is the weight of a regular box used for the transportation of product k and FOB_{kt} is the average FOB value per kilogram of exports from Chile to the United States of product k in the year t.

For the calculation of CV_f we used the standardized measures of containers under ISO 6346. Length, height and width were multiplied together. As a result, the volume we used for 20-foot containers was 32,086 cubic meters and for 40-foot containers it was 65,607 cubic meters. Data on the dimensions and weight of regular boxes were obtained for each type of refused product from the websites of the most important fruit and vegetable exporting companies in Chile and from emails and personal consultations to key informants with relevant experience (detailed information on this is contained in annex 1). The volume of each box was calculated by multiplying its recorded length, height and width.

In some specific cases where we had more than one consistent reference for volume or weight, we calculated an average. Moreover, when it was not possible to find reliable data for any component of the equation, alternative variables from primary and secondary sources were considered, such as the stowage factor or the number of boxes per container.

Data on the FOB value of exports (FOB_{kt}) were extracted from the Chilean Office for Studies and Agrarian Policies database for each type of product in the year when the shipment was refused.

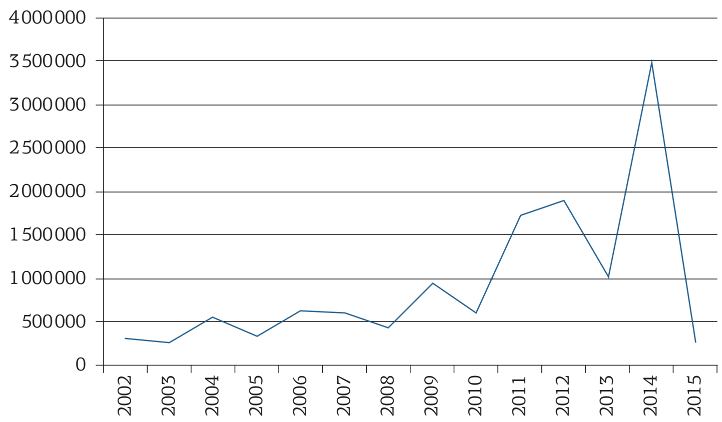
5.3. Results

After applying the methodology set out above, we estimated that the value of the shipments that were refused at the United States border was US$ 13,059,655. This represents 0.064 per cent of the total FOB value of the fruit and vegetables exported from Chile to the United States from 2002 to 2015.

From 2002 to 2009 the tendency is a slow but progressive increase in the value of refused shipments. After 2010 there is one major peak in 2014, which is coincident with one year during the period of the study when there was a higher number of shipments refused (there was also a higher number in 2011). In 2014, a total of 37 shipments were refused because of excessive pesticides; of these, 19 were nectarines and 16 were berries, with berries having a high FOB value per kilogram exported. In any case, the peaks are very noticeable because the general level of refusals is relatively low.

From the information available, we cannot be sure of the final destination of the refused products, as they could be reconditioned, re-exported to a third country or destroyed. Consequently, we do not know whether the value of the refused shipments corresponds to a total loss, or whether

Figure 3: Evolution of the estimated value shipments of Chilean fruit and vegetables refused at the United States border (United States dollars)



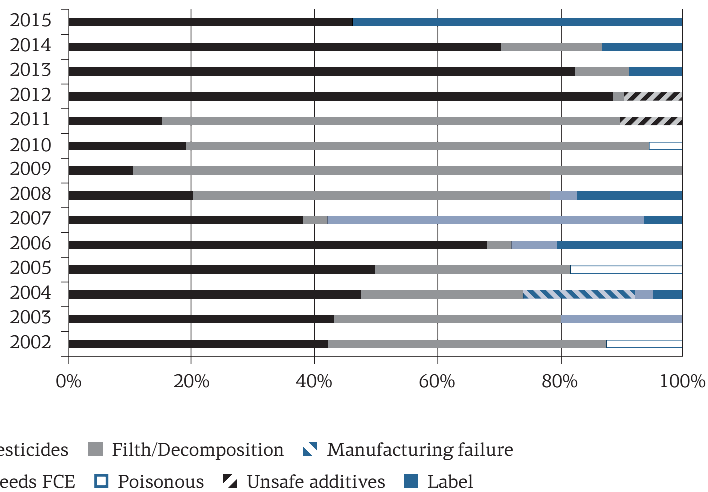
Source: Own preparation based on FDA, ODEPA and other information.

the exporter was able to recover part of the value. One way to approach this issue is to disaggregate the value of refused goods by the type of violation detected. In the same way as for the number of refusals, the violations with higher value denote a larger presence of pesticide residues and the detection of filth and decomposition, for which the total values are US$ 6,986,066 and US$ 4,065,984, respectively.

In the case of pesticides, it might be possible that the shipment is re-exported to a nearby country with less stringent requirements. It also might be possible to recondition filthy products and try again to obtain permission for them to enter the United States, but it is more difficult to correct decomposition. However, when fruit and vegetable products are exported fresh (which happens very frequently in this case) their post-harvest life limits these possibilities.

To reduce the number of refusals for excess pesticides, one potential solution is to extend the period between the application of the last dose and the harvest. This allows the existing residues to decrease. On the other hand, for filth and decomposition in products it is important to consider post-harvest techniques and transport quality. However, in any case the value of shipments refused from Chile is relatively very low.

Figure 4: Proportions of the estimated value of shipments of Chilean fruit and vegetables refused at the United States border, by type of violation



Source: Own preparation based on FDA and ODEPA data and other information

6 Concluding remarks

Greater demand for quality and safety of imported foods is a trend that has become common in international markets through the proliferation of technical requirements. Research conducted in this area has focused on identifying the impact that such requirements have on the value of trade flows. However, few authors have studied the dynamics of border refusals; and fewer still have focused on the specific case of Latin America. This is despite the fact that the region is a net food exporter, with especially stringent markets (such as the United States) as its main trade partners.

In this context, our research shows that the number of shipments refused at the United States border differs widely between Latin American countries, and not just according to the relative value of their exports. Chile stands out as the country with the lowest number of refusals as a proportion of its exports. In fact, the estimated value of such refusals represents much less than 0.1 per cent of the total value of its fruit and vegetable exports to the United States.

Among the reasons that can be suggested for this low level of refusals is Chile's "good reputation", which leads to fewer border inspections. Also, a possible harmonization between Chilean and United States technical requirements and control methodologies can be mentioned, as well as the existing cooperation between the food safety institutions of the two countries. In fact, Chile is especially open to international trade, with a large number of trade agreements, including agreements with the United States. The Chile–United States FTA includes mechanisms to improve coordination, assistance and communication in SPS/TBT.

In spite of the fact that a low number of export refusals is not ultimately an indicator of the efficiency of public policies on food safety or the efficiency of the production and commercialization chain, we can say that it seems that Chile has performed positively in both areas compared with other countries in the region. In particular, Chile has an integrated NFCS, with a network of specialized institutions in charge of different functions, issues or products, and the capabilities of these bodies stand out within the region. Chile has also been very active in the number of technical measures notified to WTO, which suggest the presence of the necessary capabilities to use them. However, the country should be concerned about maintaining these levels and ensure that the measures also apply to small producers, who are the leading providers to local consumers, so cost-benefit considerations are necessary.

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Annex

Table 4: Standard dimensions and weight of boxes by refused product

Product	Dimensions (length x width x height, all in mm)	Weight
Raisins, dried or paste	386 x 248 x 156	10 kg
	394 x 254 x 190	13.6 kg/30 lb
Nectarine (pit fruit)	305 x 508 x 158	8 kg
	305 x 508 x 158	9 kg
Raisins (dried grapes) (berry)	386 x 248 x 156	10 kg
	394 x 254 x 190	30 lb
Pear (core fruit)	400 x 600 x 90	6/6.5 kg
	330 x 500 x 140	9/10 kg
	400 x 600 x 150	12/13 kg
	300 x 500 x 232	18 kg
Raspberries, red (berry)	402 x 256 x 88	2.04 kg
Plum (pit fruit)	300 x 400 x 133	5 kg
	305 x 508 x 133	7kg
	300 x 508 x 148	9 kg
	400 x 600 x 130	12.3 kg
Peach (pit fruit)	305 x 508 x 148	8 kg
	305 x 508 x 148	9 kg
Blackberries (berry)	330 x 243 x 100	1.5 kg
	400 x 300 x 109	2.7 kg

Table 4: Standard dimensions and weight of boxes by refused product

Product	Dimensions (length x width x height, all in mm)	Weight
Almonds, shelled	388 x 248 x 177 385 x 289 x 158	10 kg
Blueberries (berry)	330 x 240 x 86 400 x 250 x 140 400 x 300 x 118 600 x 400 x 119	1.5 kg 3.74 kg 4.08 kg 8.16 kg
Grapes (berry)	400 x 600 x 117	8.2 kg
Apricot (pit fruit)	300 x 500 x 83 300 x 500 x 140 300 x 500 x 125 300 x 500 x 150	3.2 kg 4.5 kg 6.5 kg 9.6 kg
Boysenberries (berry)	445 x 250 x 250	13.62 kg/30 lb
Strawberries, dried or paste	390 x 260 x 220	10 kg
Artichoke (leaf and stem vegetable)	2.77–2.83 m3/t (SF)	
Celery, dried or paste	380 x 380 x 650	8 kg
Olives (pit fruit)	20 pallets of 72 boxes with 24 jars (200 g dry, 330 g net weight each) per container	4.8 kg
Papaya (papaw) (subtropical and tropical fruit)	3600 boxes per container	4.5 kg/10 lb
Quince, dried or paste	80 plastic barrels per container	230 kg
Tamarind, dried or paste	290 x 440 x 340 290 x 440 x 340	8 kg 10 kg
Apple, dried	480 boxes per container	18.1 kg/40 lb
Asparagus (leaf and stem vegetable)	10 kg: 2.5 m3/ton (SF)	
Avocado (pit fruit)	440 x 338 x 186	11.2 kg
Capsicums (cayenne chilli, hot peppers), whole	490 x 332 x 250 418 x 270 x 229	18.14 kg 12 kg
Cherimoya (subtropical and tropical fruit)	400 x 300 x 90	5 kg
Cherry fruit (pit fruit)	300 x 250 x 88 300 x 500 x 96 400 x 600 x 117	2.5 kg 5 kg 10 kg
Chicory leaf (cichorium intybus) (leaf and stem vegetable)	980 boxes per container	16 kg/box
Currants, black (berry)	400 x 300 x 80	1.44 kg
Fig (subtropical and tropical fruit)	300 x 500 x 83	3.2 kg

Table 4: Standard dimensions and weight of boxes by refused product

Product	Dimensions (length x width x height, all in mm)	Weight
Garlic bulb (root and tuber vegetable)	400 x 300 x 265	13.6 kg/30 lb
Kiwi fruit (subtropical and tropical fruit)	300 x 500 x 148 300 x 500 x 148 600 x 400 x 140 595 x 395 x 150	9 kg 10 kg 11 kg 15 kg
Loquat (pit fruit)	300 x 500 x 83	3.2 kg
Mushrooms and other fungi products, whole (button)	80 plastic barrels per container	200 kg
Onion bulb (yellow, white, red, etc.) (root & tuber vegetable)	2.4 m3/t (SF)	23 kg/50 lb
Orange (citrus)	388 x 240 x 158 508 x 406 x 187	12 lb/5 kg 15 kg
Peach, dried	1600 boxes per container	10 kg
Peach: jam, jelly, preserves, marmalade, butter or candied	1850 boxes of 24 units per container 1750 boxes of 24 units per container 1800 boxes of 24 units per container 1700 boxes of 12 units per container 1008 boxes of 6 units per container 756 boxes of 6 units per container	240/400 g 255/425 g 460/820 g 470/850 g 1800/3000 g 2400/4250 g
Pepper, hot	490 x 332 x 250 418 x 270 x 229	18.14 kg 12 kg
Pepper, sweet (fruit used as vegetable)	490 x 332 x 250 418 x 270 x 229	18.14 kg 12 kg
Persimmon (other fruit)	4960 boxes per container	3 kg
Pimiento pepper (fruit used as vegetable)	490 x 332 x 250 418 x 270 x 229	18.14 kg 12 kg
Plum (pit fruit)	300 x 400 x 133 305 x 508 x 133 300 x 508 x 148 400 x 600 x 130	5 kg 7kg 9 kg 12.3 kg
Quince: jam, jelly, preserves, marmalade, butter and candied	373 x 296 x 119	9.6 kg
Radicchio (leaf and stem vegetable)	980 boxes per container	16 kg/box
Strawberries (berry)	295 x 240 x 90	2 kg

Source: Own preparation based on collected information.