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Seafood products notifications in the EU Rapid Alert System for Food and Feed (RASFF) database: Data analysis during the period 2011–2015

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ABSTRACT

Through the analysis of the EU Rapid Alert System for Food and Feed (RASFF) portal, this study aimed at highlighting the most relevant noncompliance affecting seafood and explore possible relationships between variables characterizing notified products. Trends in RASFF notifications can be useful to improve controls and audits of official authority and the safety management of fishery products from Food Business Operators. During the five-year period analyzed (2011–2015), 16304 original notifications were logged on the RASFF database, of which 16.6% (2713) involved seafood. Seafood notifications were issued in most of the cases by Italy (35.7%) and Spain (19.3%) that were also the countries with the highest number of notified products (15.37%), followed by Vietnam and Morocco. Notifications were mainly triggered during official control activities on the market (43%) and border checks (42.8%) and in the 39.3% of cases they were classified as serious. The first two reasons that led to notifications were non-compliant content of heavy metals (fish and cephalopods) and pathogenic microorganisms (bivalve molluscs). At border level, seafood was rejected in 37% of cases, especially (41.1%) because of poor temperature control, unsuitable transport conditions or fraudulent/absence of health certificate. Patterns emerged in this study give a and 'up-to-date' evidence of those that are current issues of the sector. However, even though the RASFF represent a useful “data mine” essential for risk assessment process, limitation arises since, despite the legal obligation for all members, regulatory non-compliant products are not always notified.

1. Introduction

Over the years, the EU has sought to strengthen its food safety policy by reorganizing and enforcing official control activities within its territory and throughout the food chain (Alemanno & Gabbi, 2016; Enchen, 2010; Kleter, Prandini, Filippi, & Marvin, 2009; Trevisani & Rosmini, 2008). Official control bodies represent a key element to ensure the correct application of regulatory requirements and, it is of pivotal importance that their activities are well structured, organized and coordinated (Broberg, 2010; Iurato, 2017). At the Community level, Regulations (EC) n. 882/2004 and 854/2004 currently define principles and tools of official checks on food and animal feed, however starting from 14th December 2019 they will be repealed by the new Regulation (EU) 625/2017.

To support a close cooperation and communication between Control Authorities (CAs) of the Member States (MSs), EU has set up an alert network, the Rapid Alert System for Food and Feed (RASFF), involving all EU MSs, Iceland, Liechtenstein, Norway and Switzerland as well as the European Commission (EC) and the European Food Safety Authority (EFSA). The RASFF was put in place to provide CAs with an effective tool to exchange information rapidly and act coordinately in response to serious food and feed safety risks (Kleter et al., 2009; Pigłowski, 2015). The establishment of the RASFF was formalized through a Proposal for a Council Decision (COM/79/725 FINAL), followed by an Amended proposal in 1982 and the Council Decision 84/133/EEC in 1984. Currently, the RASFF legal basis are laid down in the Article 50 of the Regulation (EC) n. 178/2002 (the European General Food Law) while its implementing measures are set in the Commission Regulation (EU) n. 16/2011.

At the beginning, the RASFF was used as a short-term surveillance and it only covered products destined for consumers (European Commission, 2009). Over the years it has undergone a deep change and nowadays it is even expanding on a global scale, working together with the International Network of Food Safety Authorities (INFOSAN),

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jointly managed by the Food and Agricultural Organization and the World Health Organization (European Commission, 2009). The RASFF has become increasingly efficient and effective, following the development of internet based IT tools (such as cloud based services and biga data management), which have sped up the exchange of information on food recall within the Community (European Commission, 2009). Since June 2014, the EC has also set up an interactive searchable database, the RASFF portal, to keep information as transparent as possible to consumers, Food Business Operators (FBOs) and CAs worldwide (European Commission, 2018). The RASFF portal is a consumer-friendly internet tool giving public access to summary information about the most recently transmitted notifications as well as allowing to search for information on any notification issued in the past.

Most of the notifications issued by the system involve foods of animal origin and, among these, seafood represents the first cause of alert (Parisi, Barone, & Sharma, 2016; Pigłowski, 2015). The number of notified fishery products has considerably increased (+7.7%) since the RASFF was established (Parisi et al., 2016) and this is probably linked to their growing trade and consumption within the EU and worldwide (World Bank, 2013; EUMOFA, 2016; Chan et al., 2017. Currently, EU citizens consume on average 25.1 Kg per capita of seafood annually, 8% more than in the last decade. Therefore, the EU must necessarily import seafood from abroad. In 2016, the EU trade of seafood amounted to 14.1 million tones, for a value of 54.3 billion euros of which about 24.4 billion came from imported products (EUMOFA, 2017).

Given the importance of fishery products in the global and EU market and their primacy as the foodstuff of animal origin most affected by safety issues, this study aimed at carrying out an overall evaluation of data concerning non-compliant seafood notified through the RASFF, during the period 2011–2015 and, by exploring possible associations between variables, highlighting the main hazards affecting different product categories.

2. Materials and methods

2.1. Data collection and analysis

A RASFF notification that has never been notified to the EC is called 'original' notification. According to the seriousness of the identified risks and to the distribution of the product on the market, the EC contact point classifies the original notification as an alert, an information (for follow up or for attention) or a border rejection (European Commission, 2009). For the purposes of this study, all notifications issued during the period 01/01/2011–31/12/2015 under the product categories "Bivalve molluscs and products thereof (p.t.)", "Cephalopods and p.t.", "Crustaceans and p.t." and "Fish and fish products" were extracted from the RASFF portal (European Commission, 2018). The search was performed by selecting one or more items of the 6 main sections (Notification, Type, Date, Product, Hazard, Keywords) in which the portal is divided. Data have been subsequently parsed into an Excel spreadsheet file and the following attributes were analyzed for notifications pertaining to each product category: total original notifications; type of notification, notifying country, country of origin, notifications basis and distribution status, category of hazard, risk decision, action taken. Associations among attributes were investigated using chi-square test for proportion comparison by using Epi Info® version 7.2 for windows. Significance level was set to $p < 0,05$ for all comparisons. These analyses were performed on proportions in order to compare and assess the differences even when calculated on different samples sizes. The significance level was set to 0.05 instead of 0.1 even if multiple proportions were compared, in order to minimize for the increase in type I error rate given the unequal sample sizes.

3. Results and discussions

3.1. Total number of original notifications

During the period 2011–2015, a total of 16304 original notifications were logged on the RASFF database, of which 16.6% (2713) involved seafood. However, it should be pointed out that RASFF analysis may lead to an overestimation of notifications of food safety incidents, especially when the non-compliance is detected after foodstuffs have been distributed on the markets of several MSs (Bouzembrak & Marvin, 2016; Kleter et al., 2009). In fact, the same non-compliant product may be notified by more than one MS. Considering that information about product identity, such as the name of the producer or the importer or the lot, is not available on the RASFF portal, it is impossible to surely identify notifications resulting from the same food safety incident (Bouzembrak & Marvin, 2016; Kleter et al., 2009; Riviere, Buckley, & Committee on Strengthening Core Elements of Regulatory Systems in Developing Countries, 2012). Conversely, in other cases, RASFF notifications may underestimate issues as incidents may not always be notified to the EC (Pigłowski, 2017; Taylor, Petróczi, Nepusz, & Naughton, 2013).

"Fish and fish products" was the product category with the highest number of notifications (1776; 65.5%), followed by "Bivalve mollusks and p.t." (431; 15.8%), "Crustaceans and p.t." (318; 11.7%) and "Cephalopods and p.t." (188; 7%). Probably, these differences are mostly linked to their relative quantities marketed at European level. In fact, fish and fish products is the most traded category (80.1% of EU seafood trade by volume), followed by bivalve mollusks (8.7%), crustaceans (7.1%) and cephalopods (4.1%) (EUMOFA, 2017) (see also Table 1). Statistical analyses revealed differences of proportion of notifications across years for all categories, but crustaceans and product thereof (p.t. in table).

3.2. Type of notifications

Of the 2713 notifications referring to seafood, 37.0% were Border rejections (the most represented in cephalopods, crustaceans and fish), 26.2% Info for attention, 23.0% Alerts (the most represented in bivalve mollusks), 9.6% Info for follow-up and 4.2% was not classified/reported (Fig. 1). These percentages are not homogeneously distributed over the most representative hazard categories (see section 3.6).

Table 2 shows the distribution of proportions of each RAFFS type of notification across food category and the significant differences associated. All classified types of notification were statistically different across product categories.

In general, border rejection notifications have been issued especially (41.1%) because of poor or insufficient controls (which is the third hazard category by number of notifications), such as poor temperature

Table 1
Comparison across years of non compliances for each product category. Superscript letters identify significant differences across columns: identical letters indicate proportions which are not statistically different. The bold statistical values refer to the overall significance for each food category across years. N.s. indicates non significant differences across years.

Year	Product Category			
	Fish and fish products	Bivalve mollusks and p.t.	Crustaceans and p.t.	Cephalopods and p.t.
2011	68,42% ^{A}	9,82%^{A}	10,67%^{A}	11,10%^{A}
2012	69,49%^{A}	10,17%^{AC}	11,3%^{A}	9,04%^{A}
2013	61,1%^{B}	24,17%^{B}	10,41%^{A}	4,32%^{B}
2014	59,67%^{B}	23,23%^{B}	13,20%^{A}	3,90%^{B}
2015	68,06%^{A}	13,89%^{C}	13,66%^{A}	4,40%^{B}
chi square	***20***	***81,5***	**n.s.**	***39,9***
P	***< 0,001***	***< 0,001***		***< 0,001***