HAZARD ANALYSIS FOR FOOD AND FEED THROUGH THE RASFF ANNUAL REPORTS

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Abstract: *The aim of this paper was to make an analysis of the Rapid Alert System for Food and Feed (RASFF) 2016-2019 annual reports. The information regarding the notifications by hazard category have been discussed in this paper*.

Key words*: food safety, hazards, RASFF, notifications*

INTRODUCTION

The Rapid Alert System for Food and Feed (RASFF) members are: EU Member States, the countries of the EEA (European Economic Area) - Norway, Liechtenstein and Iceland, European Food Safety Authority (EFSA) and European Commission as system administrator [16].

The frequently notified hazards category in food are: mycotoxins (aflatoxins, ochratoxin A and fumonisins), pathogenic microorganisms (*Salmonella spp., Listeria monocytogenes, Bacillus cereus, Escherichia coli, Vibrio spp., Campylobacter spp*., and noroviruses), pesticide residues (chlorpyrifos, methomyl, dimethoate, carbendazim, methamidophos, omethoate and oxamyl), heavy metals (mercury, cadmium, lead, chromium, arsenic, tin and nickel).

Another notified hazard are allergens (milk, soya, gluten and nuts), food composition, foreign bodies, food additives, biocontaminants and industrial contaminants [3,10,11,12,13].

Many authors, often pointed out that mycotoxins are the most frequently notified hazard. So, Pigłowski M. in his study [7], concluded that 96 % of RASFF notifications on mycotoxins concerned food and about 4% referred to feed, in 1981-2017 period. The most toxic and carcinogenic mycotoxins found in food are the aflatoxins [2].

The most reported notifications on food composition are related to unauthorized colors, unauthorized substances, high content of aluminum, iodine, morphine; nitrate, vitamins, and carbon monoxide treatment. Regarding foreign bodies, the most frequently notified types are metal, plastic and glass [4].

Another hazard is representing by migration of chemicals (formaldehyde, melamine, primary aromatic hydrocarbons, lead, cadmium, cobalt) from packages (melamine, nylon, ceramics, decorated glass, silicone, plasticizers) into food.

In conformity with the Marcin Pigłowski study [8] the main hazards percentage shares of the RASFF notifications in 1979–2017 period had: mycotoxins - 23.0 %; pathogenic microorganisms - 18.2 %; pesticide residues - 8.7%; heavy metals - 6.0 %; composition - 5.8 %; food additives and flavorings - 5.6%; residues of veterinary medicinal products - 4.4%; foreign bodies - 3.7%; poor or insufficient controls - 2.9%; adulteration/fraud - 2.6%; non-pathogenic microorganisms - 2.4%; allergens - 2.3%.

The exchange of information through RASFF helps Member States to act rapidly and coordinated in response to a health threat.

The notifications through RASFF can be: information notifications, alert notifications, border rejection, original and follow-up notifications [1].

The exceedance of a legal limit, does not systematically trigger a RASFF notification on chemical contaminants. European Food Safety Authority proposed a risk evaluation methodology able to transform quantities found into a quantifiable risk [5, 14].

The purpose of this study was to make an analysis of frequently notified hazards in food using the information provided by RASFF annual reports (2016-2019).

MATERIALS AND METHODS

The basis of this study consisted in using information from the 2016 - 2019 annual reports of RASFF [10,11,12,13,15], legislation and literature in order to make an analysis of the notified hazards.

RESEARCH RESULTS

The evolution of the RASFF notifications made by Romania is presented in Table 1.

Table 1.

RASFF notifications made by Romania

Year	2010	1011	2012	2013	2014	2015	2016	2017	2018	2019
No.	25	21	14	14	17	23	16	19	9	15

The category of risk decisions can be undecided, serious and not serious [15]. The 2016 predominantly notifications with Serious risk decision are shown in Figure 1.

The RASFF annual report [10] shows that the largest number of serious risk decisions was taken for mycotoxins (527), followed by pathogenic micro-organisms (498), pesticide residues (182), heavy metals (146) and allergens (102).

In Table 2 are presented the predominantly notifications by country of origin, in 2016. The most predominant hazards were represented by pesticide residues (fruits and vegetables from Turkey), followed by aflatoxins (nuts, nut products and seeds from Turkey) and mercury (fish and fish products from Spain).

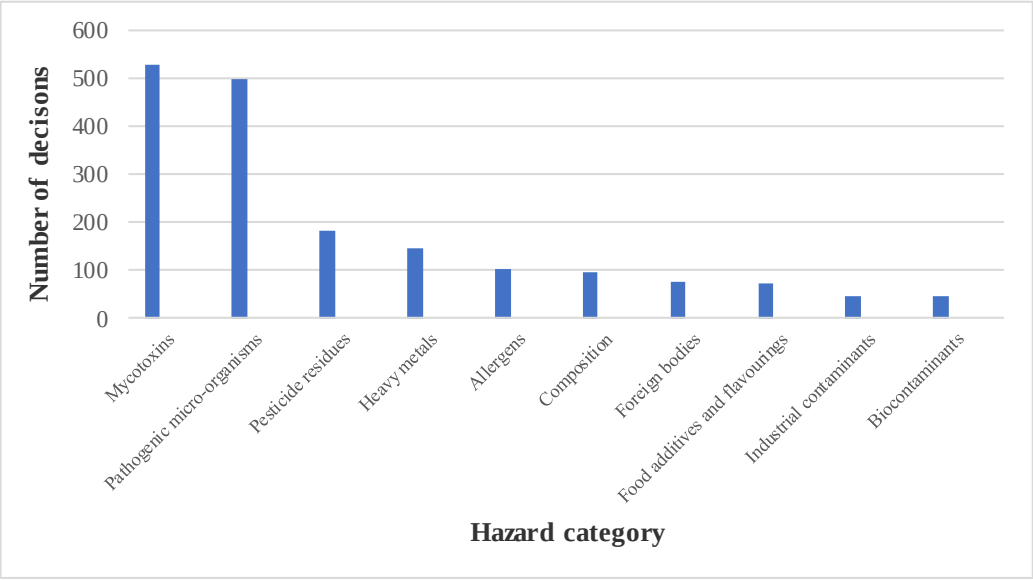

Figure 1. The predominantly notifications with serious risk decision, in 2016 [10]

Table 2.

Predominantly notifications by origin, in 2016 [10]

No	Hazard	Product category	Origin	Notif.
1	Pesticide residues	Fruits and vegetables	Turkey	77
2	Aflatoxins	Nuts, nut products and seeds	Turkey	68
3	Mercury	Fish and fish products	Spain	62
4	Aflatoxins	Nuts, nut products and seeds	Iran	56
5	Aflatoxins	Nuts, nut products and seeds	China	50
6	Salmonella	Fruits and vegetables	India	46
7	Aflatoxins	Nuts, nut products and seeds	United States	45
8	Aflatoxins	Fruits and vegetables	Turkey	40
9	Aflatoxins	Nuts, nut products and seeds	Egypt	33
10	Aflatoxins	Herbs and spices	India	33

The pathogenic micro-organisms, with 845 serious risk decisions was the most important hazard in 2017, followed by mycotoxins, heavy metals and pesticides residues (figure 2).

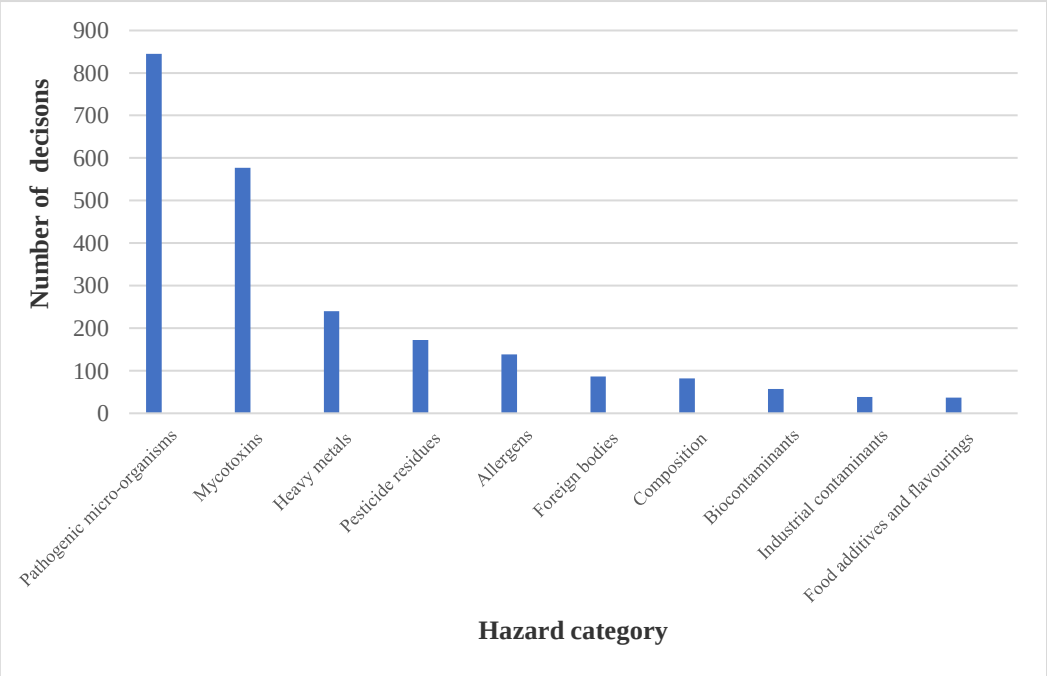

Figure 2. The predominantly notifications with Serious risk decision, in 2017[11]

In Table 3 is presented the 2017 - top 10 number of notifications by country of origin.

So, Brazil took the first place with 320 notifications for Salmonella, followed by Turkey with pesticide residues and China with 81 notifications for aflatoxins.

Table 3.

Predominantly notifications by origin, in 2017[11]

No	Hazard	Product category	Origin	Notif.
1	*Salmonella*	Poultry meat and poultry meat products	Brazil	320
2	Pesticide residues	Fruits and vegetables	Turkey	83
3	Aflatoxins	Nuts, nut products and seeds	China	81
4	Mercury	Fish and fish products	Spain	80
5	Unauthorised novel food (ingredient)	Dietetic foods, food supplements, fortified foods	United States	77
6	Aflatoxins	Fruits and vegetables	Turkey	70
7	Fipronil	Eggs and egg products	Italy	66
8	Aflatoxins	Nuts, nut products and seeds	Turkey	65
9	Aflatoxins	Nuts, nut products and seeds	Iran	50
10	Salmonella	Poultry meat and poultry meat products	Poland	50

Also, the RASFF 2018 report shows that mycotoxins had the highest number of total notifications (542) followed by pathogenic micro-organisms (488), pesticide residues (180) and allergens (147)(figure 3).

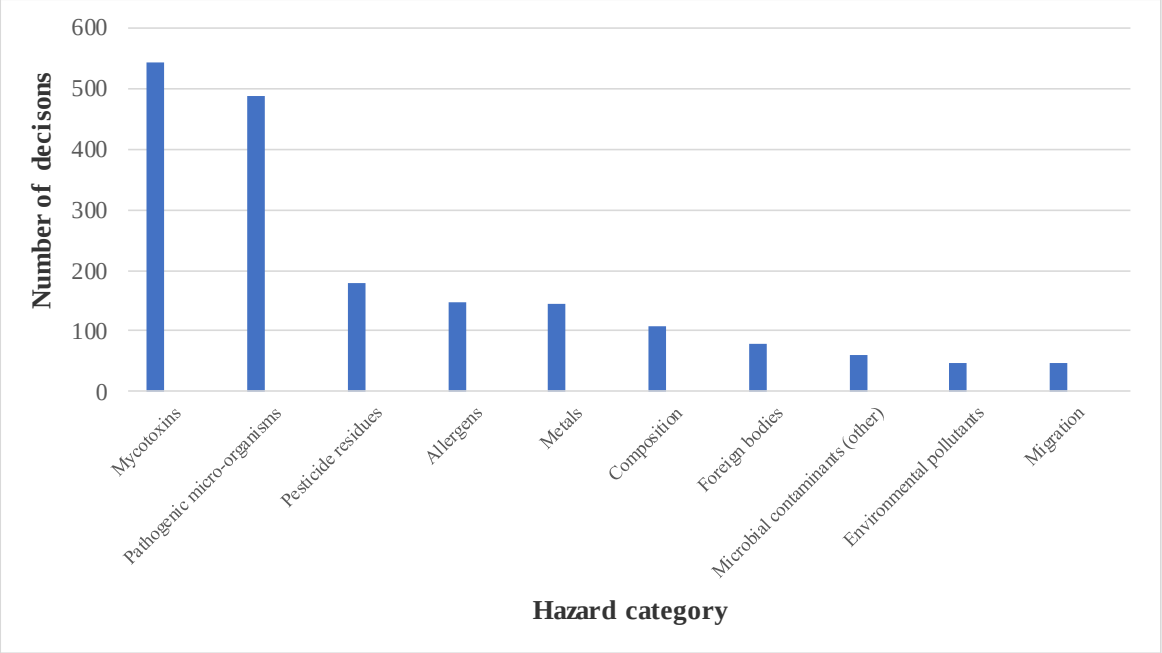

Figure 3.The predominantly notifications with Serious risk decision, in 2018[12]

In Table 4 is presented the 2018 - top 10 number of notifications by country of origin. On the first three places were United States, Turkey and Argentina with the same hazard: aflatoxins.

The predominantly notifications with Serious risk decision, in 2019 was in descending order, for pathogenic micro-organisms (794), mycotoxins (574) and food composition (252) (figure 4).

In 2019, Poland made the the most number of notifications for Salmonella (181), followed by Sudan, also for Salmonella (99) and the United States who made 80 of notifications for Aflatoxins (Table 5).

Table 4.

Predominantly notifications by origin, in 2018 [12]

No	Hazard	Product category	Origin	Notif.
1	Aflatoxins	Nuts, nut products and seeds	United States	85
2	Aflatoxins	Nuts, nut products and seeds	Turkey	77
3	Aflatoxins	Nuts, nut products and seeds	Argentina	60
4	Salmonella	Poultry meat	Brazil	58
5	Ochratoxin A	Fruits and vegetables	Turkey	40
6	Mercury	Fish and fish products	Spain	39
7	Aflatoxins	Nuts, nut products and seeds	China	39
8	Norovirus	Bivalve molluscs	France	35
9	Aflatoxins	Nuts, nut products and seeds	Egypt	35
10	Salmonella enterica ser. Enteritidis	Poultry meat and poultry meat products	Poland	34
11	Salmonella	nuts, nut products and seeds	Sudan	34

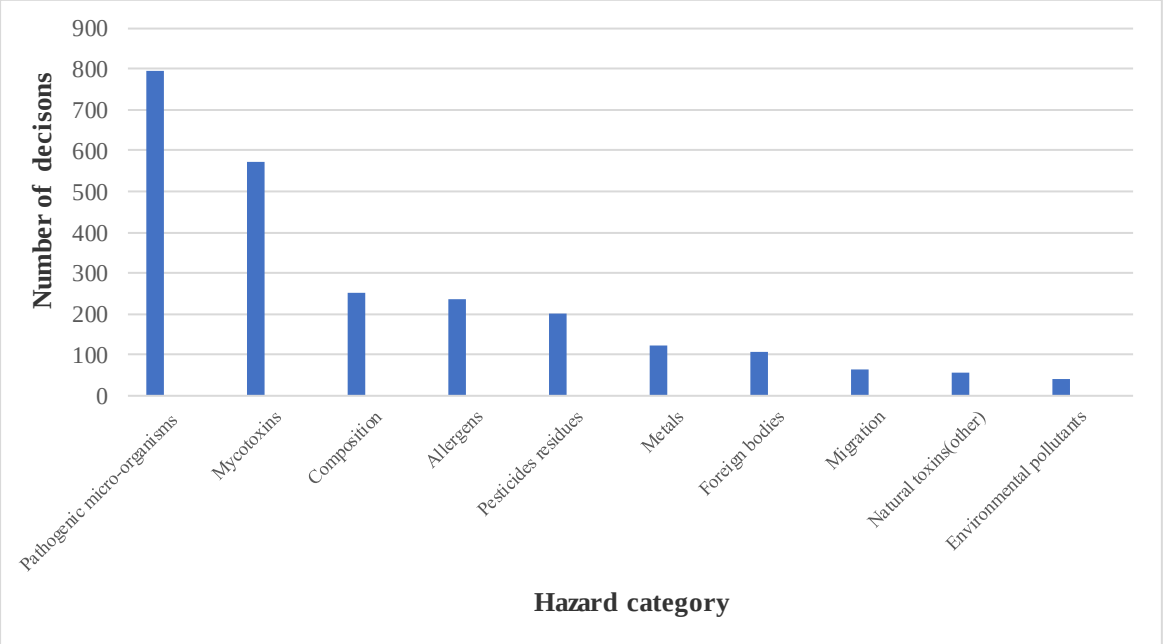

Figure 4. The predominantly notifications with Serious risk decision, in 2019[13]

Table 5.

Predominantly notifications by origin, in 2019 [13]

No	Hazard	Product category	Origin	Notif.
1	*Salmonella*	Poultry meat and poultry meat products	Poland	181
2	*Salmonella*	Nuts, nut products and seeds	Sudan	99
3	Aflatoxins	Nuts, nut products and seeds	United States	80
4	*Salmonella*	Herbs and spices	Brazil	67
5	Aflatoxins	Nuts, nut products and seeds	Argentina	63
6	Aflatoxins	Nuts, nut products and seeds	Turkey	55
7	Aflatoxins	Fruits and vegetables	Turkey	49
8	Mercury	Fish and fish products	Spain	38
9	Ochratoxin A	Fruits and vegetables	Turkey	36
10	Migration of formaldehyde	Food contact materials	China	36

CONCLUSIONS

The five predominantly notifications with Serious risk decisions in 2016-2019 period were related to the following hazards: mycotoxins, pathogenic micro-organisms, pesticide residues, heavy metals and allergens. In 2019, the food composition took the third place, after pathogenic micro-organisms and mycotoxins.

In 2016-2019 period, aflatoxins are the most frequently reported mycotoxins in food (particularly in nuts) and *Salmonella* is the most reported pathogenic microorganisms (found in meat and fresh poultry meat).

Even if the RASFF is not able to avoid contaminated food from entering the market, but it is useful in product recalls and detention of imports.

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