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ANALYSIS OF RASFF NOTIFICATIONS: 2021 FOOD AND FOOD CONTACT MATERIAL DATA REVIEW

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ABSTRACT
Rapid Alert System for Food and Feed (RASFF) is a system that provides rapid information exchange to ascertain food safety. The aim of the current study is to prepare a detailed report of food and food contact material notifications of the year 2021 in RASFF portal. The related data in the internet tool were extracted and analyzed for subject, notification basis, notification type, products, notifying country, risk level, distribution status and measures taken. A total of 4438 notifications were identified and the most frequent hazard was pesticides. Alert, border rejection, information notification for attention, information notification for follow-up and news notification classes contained 1455, 1433, 972, 564 and 13 notices, respectively. The most frequently notifying country was Germany, followed by Spain. The mostly notified product category was fruits and vegetables and the majority of the cases had serious risk degree.
Keywords: Food safety, Rapid Alert System for Food and Feed (RASFF), RASFF notifications, pesticide

RASFF BİLDİRİMLERİNİN ANALİZİ: 2021 YILI GIDA VE GIDA İLE TEMAS EDEN MADDE VERİLERİNİN İNCELENMESİ

ÖZ
Gıda ve Yem için Hızlı Alarm Sistemi (RASFF), gıda güvenliğinin tespiti için hızlı bilgi alışverişi sağlayan bir sistemdir. Mevcut çalışmanın amacı, RASFF portalında yer alan 2021 yılı gıda ve gıda ile temas eden madde kaynaklı bildirimlerin ayrıntılı bir raporunun hazırlanmasıdır. İnternet ortamındaki ilgili veriler konu, bildirim kaynağı, bildirim türü, ürün kategorisi, bildirimde bulunan ülke, risk derecesi, dağıtım bilgileri ve uygulanan yaptırımlar açısından sınıflandırılarak analiz edilmiştir. Toplam 4438 bildirim tespit edilmiştir ve ürünlerde en sık görülen tehlike pestisitler olmuştur. Alarm, sınır iadesi, dikkat gerektiren bilgi, takip gerektiren bilgi ve haber bildirim türleri sırasıyla 1455, 1433, 972, 564 ve 13 bildirimden oluşmaktadır. En sık bildirimde bulunan ülke Almanya olurken, onu İspanya izlemiştir. Hakkında en çok bildirimde bulunulan ürün kategorisi meyve ve sebzeler olmuştur ve bildirimlerin büyük bir bölümü ciddi risk derecesine sahiptir.
Anahtar kelimeler: Gıda güvenliği, Gıda ve Yem için Hızlı Alarm Sistemi (RASFF), pestisit, RASFF bildirimleri

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INTRODUCTION

Rapid Alert System for Food and Feed (RASFF) is a system established by European Union in 1979. The main purpose of the system is to provide rapid information exchange between member states for problems that may arise from risks in food and feed products, to take necessary precautions and to protect consumers. The member institutions and countries of the system include European Union countries, European Union Commission, European Food Safety Authority, European Space Agency, Norway, Liechtenstein, Iceland and Switzerland. RASFF notifications are the reports of the results found by examining the samples taken from food that are considered to pose a risk to food safety. There are four types of notifications: alert, information, border rejection and news (RASFF, 2021). An alert notification is sent when food product pose a significant risk to consumer health and rapid action is required. Information notifications do not require immediate action because the product is not available on the market at the time of notification. Information notifications are divided into two groups as information notification for follow-up and information notification for attention. Border rejection notifications are recorded when the product is rejected at the borders of EU. News include notifications that are not classified in other notification types (RASFF, 2016; RASFF, 2021).

The RASFF portal is a database that contains the detailed information about food and feed notifications. The database includes date of the case, notification type, notification basis, notifying country, the subject, the measure taken, risk decision and distribution status. A number of studies have analyzed the RASFF data in terms of mycotoxins (Piglowski, 2019); veterinary drugs in fish and fish products (Guardone et al., 2022); *Listeria monocytogenes* (Lüth et al., 2019); seafood products (Amico et al., 2018); food contact materials (De Leo et al., 2021); dairy products (Postolache et al., 2020); food fraud (Beia et al., 2020); serious notifications (Papapanagiotou, 2021); biogenic amines (Leuschner et al., 2013) and allergens (Pádua et al., 2019). The aim of the current work was to prepare a detailed report of food and food contact material notifications of the year 2021 in RASFF portal using Microsoft Office Excel 2010. For this purpose, the related data were extracted and analyzed for subject, notification basis, notification type, products, notifying country, risk level, distribution status and measures taken.

MATERIAL AND METHOD

The notifications that were recorded in the RASFF database under food and food contact materials were extracted for the period of 01/01/2021 to 31/12/2021. All notifications were taken from the portal, transferred to Microsoft Excel file and processed with Microsoft Excel (Microsoft Office Excel 2010) for further analysis. Each notification contains the following facts: reference of products, subject, notification type, notification basis, classification, risk decision, date of notification, notifying country, product, product category, distribution status, risk decision, hazards observed, number of persons affected, symptoms and measures taken.

RESULTS AND DISCUSSION

A total of 4438 notifications were recorded in the RASFF portal for food and food contact materials throughout the year of 2021. A percentage of 93.89% (n=4167) of the analyzed notices were related with foods whereas the remaining 6.11% (n=271) were about food contact materials.

Evaluation of the notifications according to subject

The evaluation of the number and ratio of the notifications according to their subjects were given in Table 1. The mostly notified hazard type was found to be the pesticides in food products. Similarly, Piglowski (2020) defined the pesticide residues as the main problem that caused notifications in fruits and vegetables. The second notified hazard type was found to be the microbial problems in foods. The presence of *Salmonella* spp. was the major cause among microorganisms covering 66.19% of all. *Escherichia coli*, *Listeria monocytogenes*, *Bacillus cereus*, *Clostridium* spp., *Cronobacter* spp. were the other hazardous bacteria found in various foodstuffs.

Table 1. Numbers and rates of notifications by subject

Subject	Number	Rate (%)
Pesticide residues (residual level exceeds the limit)	1178	26.54
Microbial problems in foods	973	21.92
Aflatoxin or ochratoxin detection	426	9.60
Food additive, color matter or supplement (unauthorized, prohibited, above the limit value)	346	7.80
Packaging problems	206	4.64
Other	194	4.37
Allergens presence of allergen or not mentioned on the label, undeclared allergens	181	4.08
Presence of foreign bodies	147	3.31
Heavy metals	140	3.15
Detection of unauthorized a new food or food ingredient	104	2.34
Absence of analytical report, official document, declaration, residue monitoring system, marking or health certificate	89	2.01
Health claims	83	1.87
Poor temperature control, breaking the cold chain	66	1.49
Migration	63	1.42
Unauthorized coating agent or material	61	1.37
Process contaminants	36	0.81
Altered organoleptic properties	24	0.54
Polycyclic aromatic hydrocarbons	23	0.52
Withdrawal and recall from the market	20	0.45
Presence of mineral oil	13	0.29
The high amount of trans fatty acids	11	0.25
The high level of radioactivity	11	0.25
The high amount of vitamin	10	0.23
Absence of hygienic conditions	10	0.23
Genetically modified product	9	0.20
Incorrect or no expiration date	8	0.18
The high content of volatile components	6	0.14
Total	4438	100

The presence of mycotoxins mostly observed in dried figs and dried products were the other important hazards reported in RASFF portal. There were 382 notifications about aflatoxin B1, B2, G1, G2; 73 notifications about only aflatoksin B1 and 44 notifications about ochratoxin A in the system. In the study conducted by Banach et al. (2016) the major problem in spices and herbs was determined to be the presence of pathogenic microorganisms and mycotoxins. Particularly, mycotoxins had been the most reported hazard category for many years (Pigłowski, 2019). In the study of Deniz Şirinyıldız and Yorulmaz (2019), the dried fig notifications between 2004-2019 were evaluated and the presence of aflatoxins in the products were determined as the main risk. Likewise, Çınar et al. (2017) designated the high aflatoxin level in dried products, nuts and seeds notified to RASFF portal between 2009 and 2016. The other abundant subject of the notifications was the "food additive, color matter or supplement (unauthorized, prohibited, above the limit value)" with 346 notices. Packaging problems (e.g. migration); presence of allergen or not mentioned on the label, undeclared allergens; presence of foreign bodies (e.g. piece of metal, plastic and glass); heavy metals (e.g. aluminum, cadmium, mercury, iron, zinc, arsenic); detection of unauthorized a new food or food ingredient; absence of analytical report, official document,

declaration, residue monitoring system, marking or health certificate; health claims (e.g. poisoning, epidemic, suffocation); poor temperature control, breaking the cold chain; unauthorized coating agent or material; process contaminants (3-MCPD and glycidyl esters); altered organoleptic properties; polycyclic aromatic hydrocarbons; withdrawal and recall from the market; presence of mineral oil; the high amount of *trans* fatty acids; the high level of radioactivity; the high amount of vitamin; absence of hygienic conditions; genetically modified product; incorrect or no expiration date and the high content of volatile components were the different hazards determined in different products.

Notification basis

The number of notifications by notification basis is given in Figure 1. Nearly one third of the notifications were recorded as a result of official control in the market. Similarly, in the study carried out by Çiftçi et al. (2022), it was reported that most of the notifications were created as the result of official control in the market. The other important parts were border control (consignment detained) and company's own check. These were followed by consumer complaint, border control (consignment released), monitoring of media, border control (forwarded to destination), food poisoning, surveillance programme/monitoring sample, official control in non-member country, whistleblower information, information notification for attention, request and no distribution from notifying country.

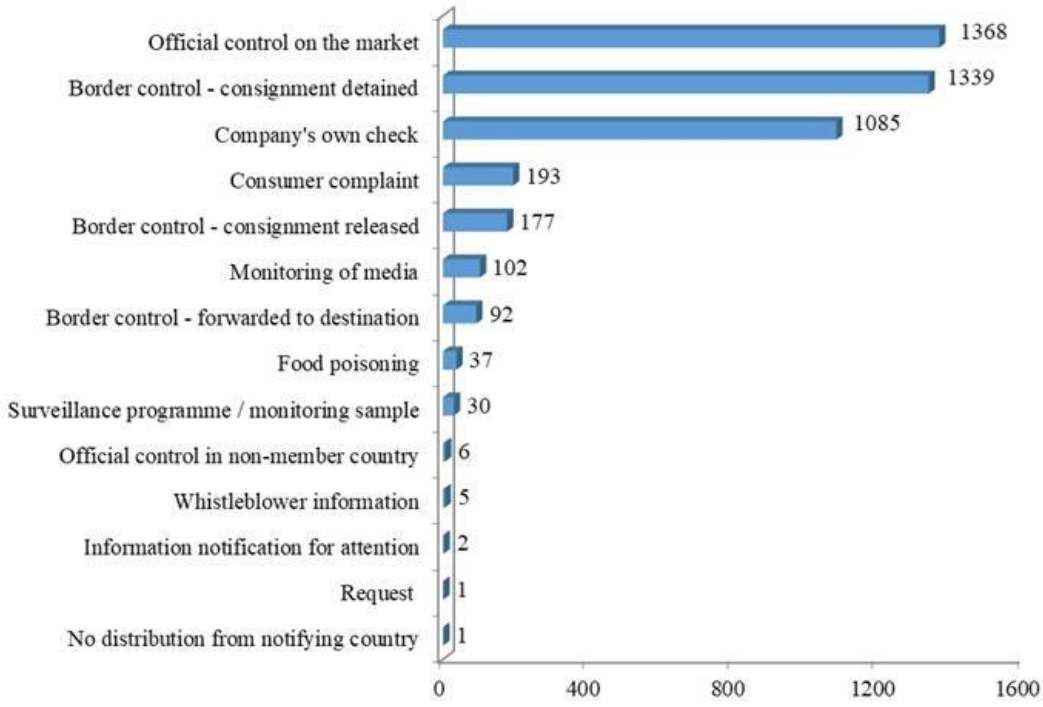

Figure 1. The number of notifications by notification basis

Notification type and products

The classification of the notifications was given in Figure 2. Concerning the different classes; 32.79% of the notices were alert, 32.29% were border rejections, 21.90% were information notification for attention, 12.71% were information notification for follow-up and 0.29% were news. No information was provided about the type of one notification.

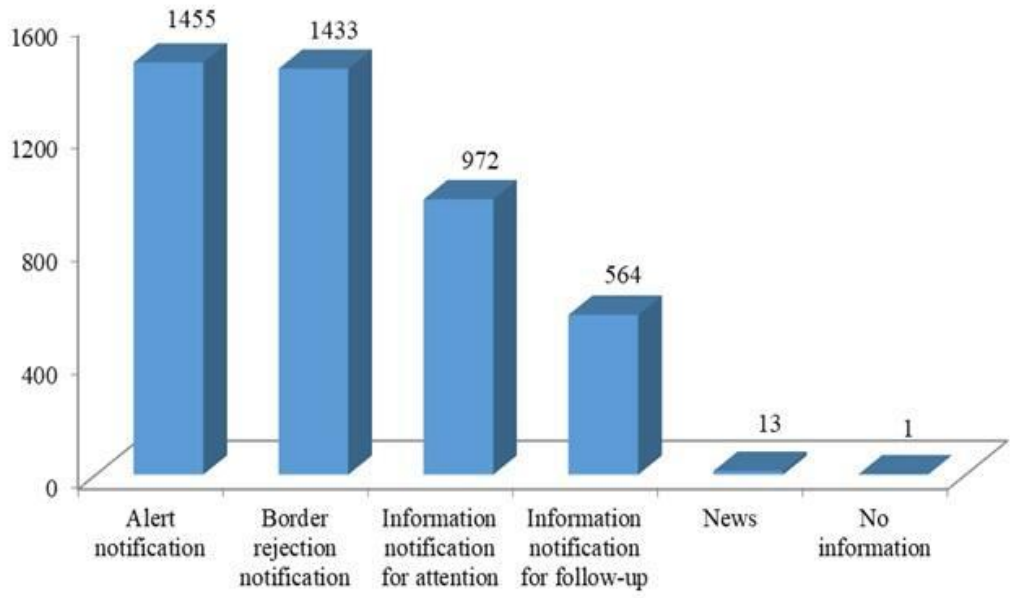

Figure 2. Classification of notifications

The distribution of notifications of different classes based on product category is given in Table 2. The most recorded product group in RASFF portal for 2021 was fruits and vegetables (21.45%).

The nuts, nut products and seeds (10.39%) and the poultry meat, poultry meat products (8.38%) were the other frequently recorded product groups. The other products were herbs and spices (8.07%); dietetic foods, food supplements and fortified foods (7.30%); fish and products thereof (6.26%); food contact materials (6.11%); cereals and bakery products (5.50%); meat and meat products (other than poultry) (4.46%); other food product/mixed (4.42%); milk and milk products (2.34%); prepared dishes and snacks (2.07%); food additives and flavourings (1.76%); bivalve molluscs and products thereof (1.64%); crustaceans and products thereof (1.55%), confectionery (1.33%) and cocoa and cocoa preparations, coffee and tea (1.33%). The product groups with 50 or less notifications were soups, broths, sauces and condiments; non-alcoholic beverages; fats and oils; ices and desserts; cephalopods and products thereof; eggs and egg products; natural mineral waters; honey and royal jelly; alcoholic beverages; gastropods; wine and water for human consumption (other).

Notifying country

A wide variety of contributions to the RASFF portal were observed when considering the notifying country. Germany was the most notifying country with 725 cases followed by Spain with 526 notifications. Netherlands (n=444), Italy (n=386), Belgium (n=322), Poland (n=318), Bulgaria (n=276), France (n=250), Denmark (n=161), Finland (n=118), Sweden (n=99), Slovenia (n=77), Romania (n=70), Switzerland (n=65), Czech Republic (n=63), Croatia (n=58), Lithuania (n=55), Austria (n=51), Greece (n=47), Portugal (n=45), Norway (n=43), Luxembourg (n=39), Latvia (n=37), Estonia (n=32), Slovakia (n=31), Ireland (n=27), Cyprus (n=23), Hungary (n=19), Malta (n=14), European Commission (n=12) and Iceland (n=4) were the other notifying countries. Country information about a notification was not provided.

Table 2. Notifications of different classes based on product category

Product Category	Alert	Border rejection	Information for attention	Information for follow-up	News
Fruits and vegetables	149	545	195	60	3
Nuts, nut products and seeds	114	293	43	11	-
Poultry meat and poultry meat products	141	13	169	49	-
Herbs and spices	129	173	45	11	-
Dietetic foods, food supplements and fortified foods	129	23	79	92	1
Fish and products thereof	58	85	103	29	3
Food contact materials	28	60	81	102	-
Cereals and bakery products	135	36	30	43	-
Meat and meat products (other than poultry)	86	20	48	43	1
Other food product / mixed	118	36	26	15	1
Milk and milk products	69	2	15	16	2
Prepared dishes and snacks	57	10	13	12	-
Food additives and flavourings	61	1	4	11	1
Bivalve molluscs and products thereof	27	4	40	2	-
Crustaceans and products thereof	8	27	28	6	-
Cocoa and cocoa preparations, coffee and tea	17	22	9	11	-
Confectionery	29	9	9	12	-
Soups, broths, sauces and condiments	22	15	4	6	-
Non-alcoholic beverages	9	18	4	14	-
Fats and oils (1 non-compliance notification)	16	13	9	5	-
Ices and desserts	31	2	2	1	-
Cephalopods and products thereof	7	17	10	-	-
Eggs and egg products	6	-	2	4	1
Natural mineral waters	1	5	1	5	-
Alcoholic beverages	3	-	2	1	-
Honey and royal jelly	3	2	-	1	-
Gastropods	2	1	1	-	-
Water for human consumption (other)	-	-	-	1	-
Wine	-	1	-	-	-
No information	-	-	-	1	-

Risk decision

Concerning risk decisions, 58.29% of the cases were recorded as serious (n=2587), 23.77% of were undecided (n=1055), 17.01% were not serious (n=755), 0.90% had no risk (n=40) and 0.02% had no information (n=1). Risks are notified as "serious" when important health risks are determined; as "not serious" when risks which are not serious for public health are determined; as "no risk" when there is no risk; as "undecided"

when a decision was not made about the risk degree.

Distribution status

The number of notifications by distribution status is given in Figure 3. In the biggest portion of the cases, the product not was not (yet) placed on the market (27.56%). 24.63% of the products were distributed to other member countries, 14.74% were not distributed from notifying country, 10.21% of the products were (presumably) no longer on the market, 9.64% of the cases the distribution of the products were restricted to notifying country, 4.69% of the products were traded online, 3.56% were forwarded to destination, about 2.43% of the goods information on distribution was not (yet) available, 1.31% were distribution to non-member countries only. The other important parts were no distribution to other member countries, product allowed to travel to destination under customs seals, no distribution and no information. The remaining 0.23% were registered as unknown.

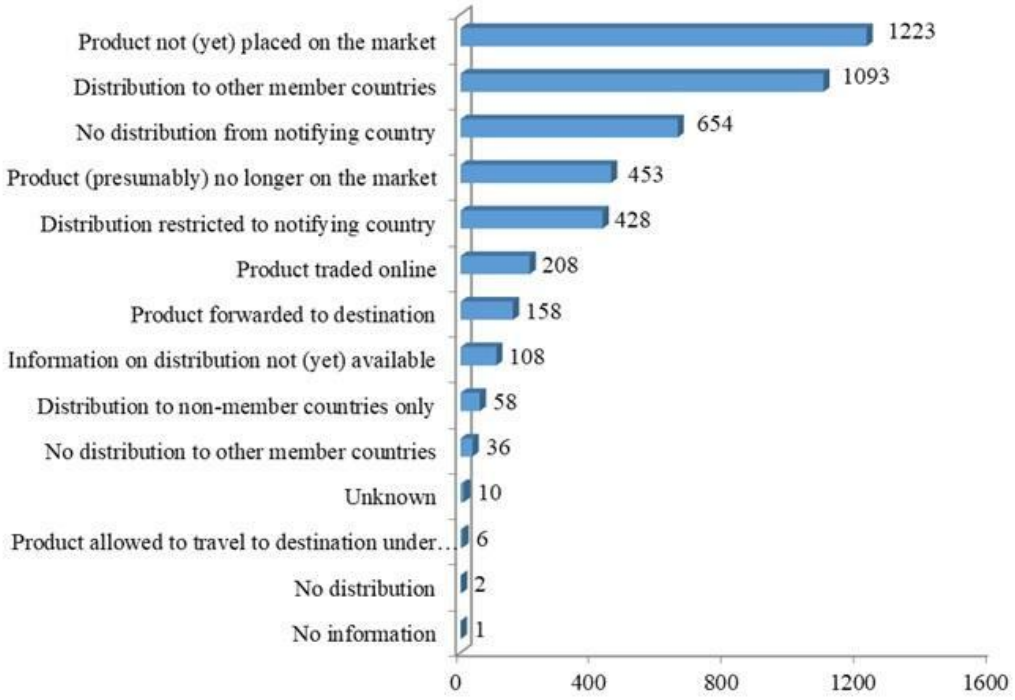

Figure 3. The number of notifications by distribution status

Measures taken

The distribution of the measures taken upon notifications was given in Figure 4. The most frequently taken measure was withdrawal from the market (13.59%) followed by destruction (12.21%), official detention (11.87%), informing recipient(s) (8.97%), recall from consumer (8.16%), no measures found for this notification (7.75%), informing authorities (6.76%), re-dispatch (5.30%), withdrawal from recipient(s) (3.67%), detained by operator (2.61%), other measures taken (2.59%), return to consignor (2.52%), informing consignor (2.28%), no stock left (2.07%), placed and product under customs seals (1.87%), public warning-press release (1.67%), no information (1.67%), no action taken (1.62%), reinforced checking (1.51%) and not applicable (1.31%). Those with 50 or less notifications were grouped as "other measures taken". This group consisted of (requested) removal of online offer (n=24), seizure (n=17), monitoring of the recall/withdrawal (n=17), chemical treatment and physical treatment (n=15), prohibition to trade-sales ban (n=14), relabeling (n=9), product under custom seals (n=5), use for other purpose than food/feed

(n=5), transformation (n=3), release to the market (n=3), product traded online (n=1), distribution restricted to notifying country (n=1) and (requested) removal of online offer (n=1).

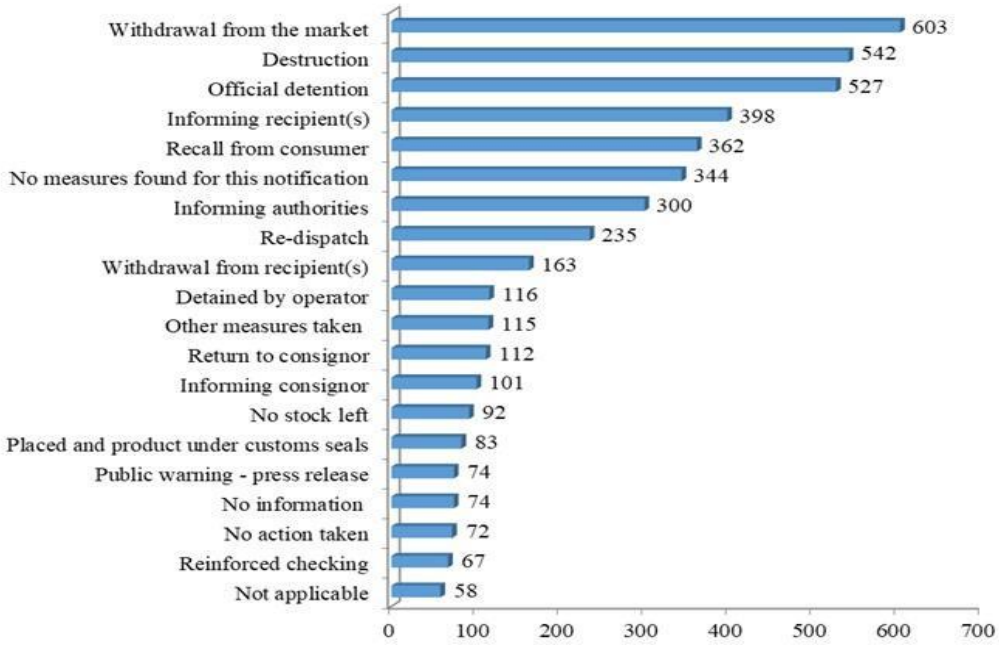

Figure 4. The number of notifications by measures taken

CONCLUSION

In the current work, notifications about food and food contact materials recorded in the RASFF portal during 2021 were assessed. The most frequent hazard was determined to be the presence of pesticide in the products. The mostly notified product group were fruits and vegetables. Germany and Spain were the most notifying countries. Majority of the cases were documented as alert and had serious risk degrees. The analysis of the RASFF data provides a basis to monitore the food safety hazards of the year 2021. The results reported herein may provide to take necessary precautions for preventing future hazards. The findings of the study can be used to determine the key food safety topics for future research. Moreover, the hazards encountered by monitoring the portal may also help to ensure safety in food industry and increase the consumer awareness.

CONFLICT OF INTEREST

The authors have declared no conflict of interest.

AUTHORS' CONTRIBUTIONS

All authors contributed significantly to different processes in the article.

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