

Food fraud of animal products detected at the market

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Abstract

This paper contains an overview of food frauds from the Food Center for Food Fraud and Quality portal since 2017 to August 2019. It provides an information about specific cases which differ in the categories of fraud, food commodities and case reporting countries. Data analysis showed that in 2017 and 2018 years, the majority of cases related to mislabelling and in 2019, most of the cases concerned food not fit for consumption. We found that fish and fish products were the most frequently adulterated commodities in 2017 and 2018, and by August 2019, mainly frauds on meat and meat products were reported. Most reports for the monitored period among all commodities originated from Italy.

Food, adulteration, JRC, milk, fish, meat, seafood

Introduction

Food fraud can be understood as one category within the food risk continuum which also includes food quality, food safety and food defence (Spink et al., 2019). Within the EU food fraud covers cases where there is a violation of EU food law, which is committed intentionally to pursue an economic or financial gain through consumer deception (Manning and Soon, 2018; Manning, 2016). Food Fraud has been a problem for as long as food trade exists in human history. Recent food fraud scandals have attracted particular attention of the public and authorities. The fight against food fraud is still hampered by a lack of a clear definition stating which facts constitute a legal case of food fraud (Wisniewski and Buschulte, 2019). Food fraud results from the interaction of motivated offenders with opportunities, and lack of control measures. There is no EU harmonised definition for “food fraud”. However, the lack of a harmonised definition does not prevent the Commission and the EU countries from taking coordinated action against “fraudulent practices” in the food supply chain (Vaqué and Videras, 2018).

The Medical Information System (MedISys) is a fully automatic 24/7 public health surveillance system monitoring human and animal infectious disease and chemical, biological, radiological and nuclear (CBRN) threats in open-source media (Linge et al. 2010). Food fraud filter was developed within MedISys (i.e. a portal in the European Media Monitor (EMM)) that collects media reports world-wide on food fraud. EMM system continuously monitors over 7 000 web pages, RSS feeds, social media and blogs to find new articles published on the Internet (250 000 articles daily). The system reads and analyses these articles and extracts information (e.g. organisations, location, news, quotes, groups or categories) and clusters similar articles (Bouzemrak and Marvin, 2017). Bouzemrak et al. (2018) developed a food fraud tool (MedISys-FF) that collects, processes and presents food fraud reports published world-wide in the media. MedISys-FF is updated every 10 min 24/7. Food fraud reports were collected with MedISys-FF for 16 months and benchmarked against food fraud reports published in RapidAlert for Food and feed (RASFF), Economically Motivated Adulteration Database (EMA) and HorizonScan.

Material and Methods

Food fraud data reports were analysed using notifications from JRC tool MedISys during the years 2017, 2018 to August 2019. All research information's was obtained from the Food Center for Food Fraud and Quality portal. Data were evaluated using the Microsoft Excel 2016 program.

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- The records we obtained using the portal contained information about: the reporting country;
- the food commodities;
 - categories of food fraud;
 - accurate case information.

Results and Discussion

When evaluating notifications of food adulteration from the Food Center for Food Fraud and Quality since 2017 to August 2019, we found 161 reports in Europe. We evaluated seven most common specific counterfeiting methods, of which the country has the most notifications and which food commodities are the most counterfeited.

In 2017, 62 cases of food fraud were reported (Plate I, Fig. 1), while 28 cases were reported as mislabelling (46%). Most often, these were problems with mislabelling, unlabelling or missing traceability records. Some restaurants offered frozen products without information about the offer on the menu. The labelling of other companies has also been used to by-pass the laws of other countries due to limited exports. The second most common food fraud related to substitutions (15%), with 9 cases reported. More expensive raw materials from cattle, pigs, turkeys and fish were replaced by cheaper ones, products contained other types of animals than declared by the producer and horse meat was sold as beef. Endangered animals were found to be in some products, turkey meat was sold instead of lamb and horse instead of beef. Seven reports were due to origin masking (11%). Farms were not accredited for the production of food with the protected origin or they used inappropriate animals to produce foods and falsified documents to reconstruct traceability. Artificial improvement represented 10% of reported cases. The most commonly reported cases of artificial enhancement were due to the dyeing of lower quality products to sell them as fresh or to replace the material used for smoking of PDO (protected designation origin) products. Eight % of the reports were products not fit for consumption. The products were rotten due to the expiration date, products from older animals and products marked “unfit for consumption” were distributed or expiration dates being relabelled by new ones. Six % of cases were reported as contamination due to high levels of fipronil. Reports of illegal equipment use accounted for 2%. PDO product labels from a well-known company have been found in another company’s warehouse and illegal equipment was used to catch juvenile fish.

(Plate I, Fig. 2) shows the percentage of adulterated commodities in 2017. Fish and fish products were the most counterfeited (43%), with 17 reports in Italy, 6 in Spain, 1 in the Netherlands, UK and France. Meat and meat products had a fraud rate of 20%. Three cases were reported in the UK and Italy, 2 in Spain and one in Belgium, Netherland, Portugal and Slovakia. Concerning milk and dairy products, 10 cases (16%) were reported, with 9 being reported in Italy and 1 in Portugal. Food fraud related to eggs reported 8 cases (13%), 5 cases were in Italy, 1 case was in Netherland, Belgium and Germany. The least reported were seafood (3%) and frauds on several food (2%) commodities at once. Two reports of fraud on seafood originated from Spain and 1 from Italy.

In 2018, 72 cases were reported (Plate II, Fig. 3) and, as in the previous year, 33% was the highest frequency of mislabelling (24 reports). Many reports showed problems in traceability, mislabelling, some products were not made from raw materials as indicated on the labels, documentation was missing, expiry dates of the products were falsified, restaurants were indicted for selling frozen foods, food commodities were fraudulently labelled as organic or products labelled “Best of British” came from another country. The second largest number of cases (17) concerned products not fit for consumption (24%). The main reasons were that some producers had done unfreezing of the products by adding warm water or selling frozen products as fresh, adding viscera and pork blood to the cow’s meat to increase its weight, products did not fulfill hygienic conditions, or expired for more

than three years and has been contaminated with Salmonella or has been rotten. There were 13 reports, representing 18% of all reports in Europe. The most serious mistakes are that some producers replace PDO products with products not entitled to this label and offered them to tourists, substitute or mix raw materials from the species on the label with other species and conventional meat was sold as organic meat. There were 8 cases (11%) with origin masking and, in addition to missing documentation confirming the origin or counterfeiting the origin, products from countries other than declared were also sold. Of the 10 cases, 5 were mainly manufactured in one country and marked with the PDO mark of another country. Four reports concerned artificial enhancements, in particular, the use of unauthorized additives and dyes, the use of large amounts of bleach and the use of water retention agents.

Adulterated commodities in Europe for 2018 period are shown in (Plate II, Fig. 4). The most reported were fish, meat and products. 29 cases of fish adulteration (40%) were reported: 19 from Italy, 7 from Spain and 3 from France. Regarding the adulteration of meat and meat products, 23 cases were reported (32%), of which 6 were from Italy, 5 from Spain, 4 from Belgium and the UK, 3 from Ireland and one from Portugal. 8 cases of adulteration of milk and dairy products (11%) were reported, all of which came from Italy. Also, all 6 reports (8%) of food fraud of multiple meals at once came from Italy. The least adulterated in 2018 were eggs and seafood, with four reports of egg fraud, 3 of which were from Italy, one from the UK and 2 cases of adulteration of seafood, one from Italy and one from Spain.

By August 2019, 29 cases of food fraud have been reported, the percentage of which is shown in (Plate III, Fig. 5). The most common problem was food not fit for consumption. The number of reported cases was 10 (36%), mainly due to the sale of food after the expiration date or rotten food, non-compliance with hygiene requirements, the sale of raw materials from sick slaughtered animals and the sale of food contaminated with microorganisms. The second most reported problem was mislabelling (29%). In 8 cases there were problems with non-compliance with administrative requirements, lack of documentation with no possibility of traceability, some species were declared on the label but in reality, were absent in the product. Five cases (18%) were reported as substitutions, some products contained endangered animal species, some were incorrectly labelled with the PDO mark, products from another country were sold in a country other than the one produced there, animal ingredients were replaced by herbal ingredients or animal species were replaced by other species. Two reports concerned substitution by cheaper raw material and its sale and labelling of raw materials with PGI (Protected Geographical Indication), which did not meet the requirements for this marking. In two cases origin masking (7%), the food was labelled as Italian and originated in another country and imported live animals were slaughtered and labelled in a country other than that of origin. Only one case has been reported as an artificial enhancement (3%), because of a sulphite addition as a substance that is forbidden to meat found in the sample.

(Plate III, Fig. 6) shows adulterated commodities in Europe by August 2019. Most reported were meat and meat products (53%), with 4 reports in Portugal, 3 in Italy, two in France and Spain, and one in Malta, Poland and Belgium. Four cases of food fraud related to the adulteration of several foods (14%) at the same time, all reports being from Italy. Three cases concerned milk and dairy products (11%) and eggs (11%). Two reports from the Netherlands and one from Italy concerned eggs. Two cases of milk and dairy fraud came from Italy and one from the UK. The least reports of fraud related to fish and fish products (7%), one from the UK and the other from Italy. Seafood fraud concerned one report (4%) from Italy.

Reports of food fraud in each country from 2017 till August 2019 in Europe include 92 from Italy, of which 37 concerned fish and fish products. Spain received 25 reports

also at fish and fish products, 12 reports originated from the UK and 8 of them related to meat and meat products, 7 reports from Belgium and Portugal in both countries 6 cases related to meat and meat products, together 6 cases came from France and 4 related to fish and fish products, 5 from the Netherlands with 3 related to eggs, 3 cases from Ireland related to meat and meat products, Malta, Poland and Slovakia reported one case of meat fraud.

We can agree with the statement of Vaqué and Vidreras (2018) that the most common types of food fraud include substitution of an ingredient with a similar, cheaper ingredient, inclusion of undeclared ingredients, adulteration of foods to improve some of their characteristics; non-declaration or false declaration of processes and false declaration of the origin or geographic region of production of a food item. Bouzembrak et al. (2018) found that the most reported fraudulent commodities in the media (MedISys-FF, RASFF, EMA, HorizonScan) for years 2000-2015 were i)meat, ii) seafood, iii) milk and iv) alcohol. By Tähkäpää et al. (2015) adulterations in years 2008-2012 were reported in all food categories, with meat including poultry and fish and fish products. Meat and meat products prevailed in 2009-2010 and by fish and fish products followed in 2010-2011.

Conclusion

Analysing the presence of food frauds in various European countries we can conclude, that in 2017 there were most cases of mislabelling and substitutions. Up to 43% of all reports concerned fish and fish products, and 20% concerned meat and meat products. The least reports related to seafood.

In 2018, most reports related to mislabelling and products not fit for consumption, at least (6%) cases related to artificial enhancement. As in 2017 and 2018, the most reports related to fish and meat products, and the least cases concerned seafood.

By August 2019, most cases of products unfit for consumption and mislabelling have been detected. The most common reports concern fraud on meat and meat products (53%) and the least reported cases concern seafood (4%). Among the countries the most reported in the period of years are Italy (92), Spain (25) and UK (12). One report originated from Slovakia, Malta, Poland and Germany. Analysing media data can help to understand food fraud issues and improve control measures in the countries.

Acknowledgements

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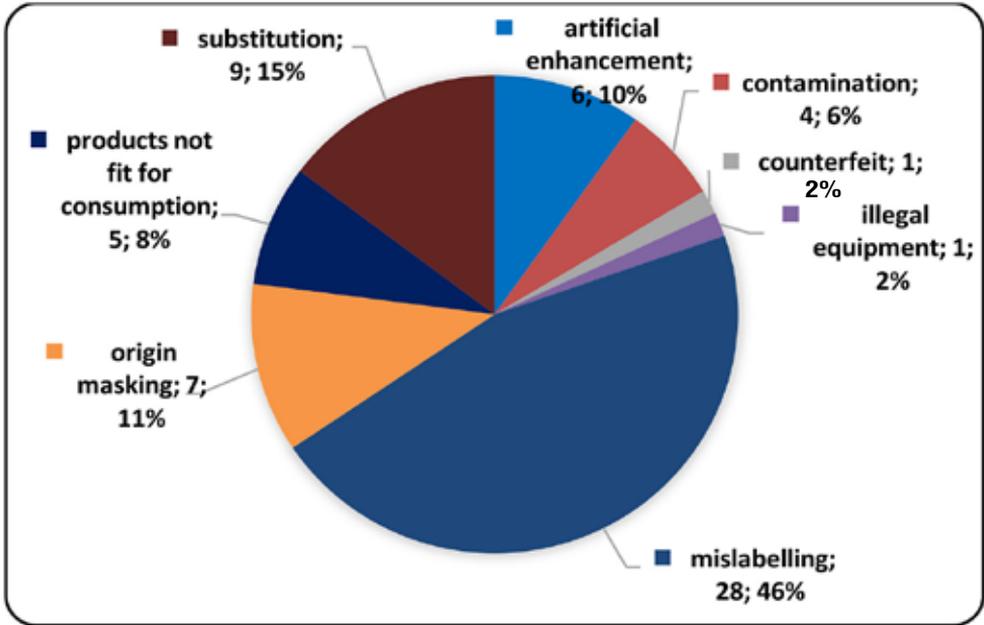


Fig. 1. Food fraud in Europe for 2017 period (Food Center for Food Fraud and Quality database)

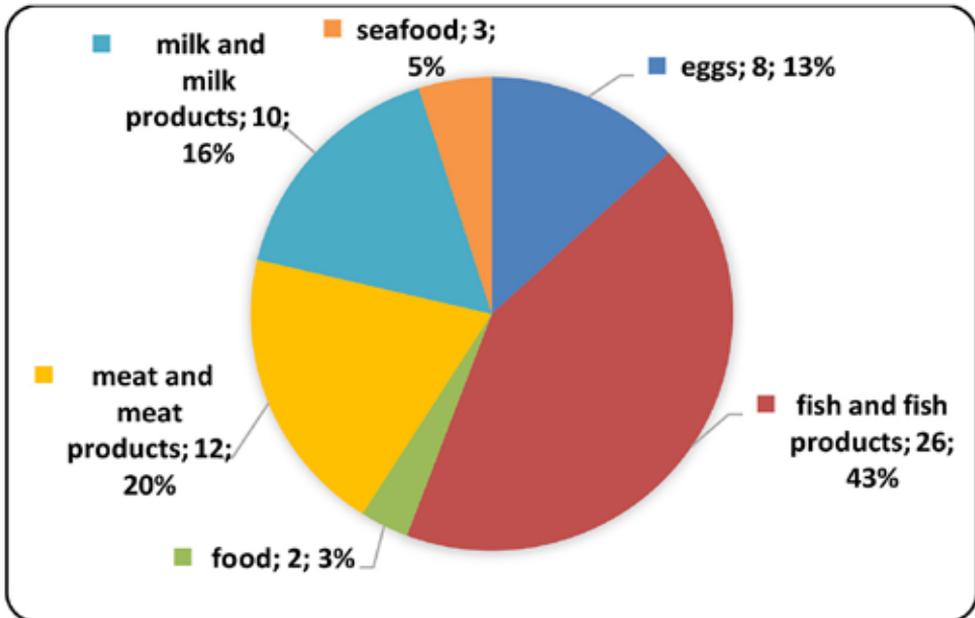


Fig. 2. Adulterated commodities in Europe in 2017

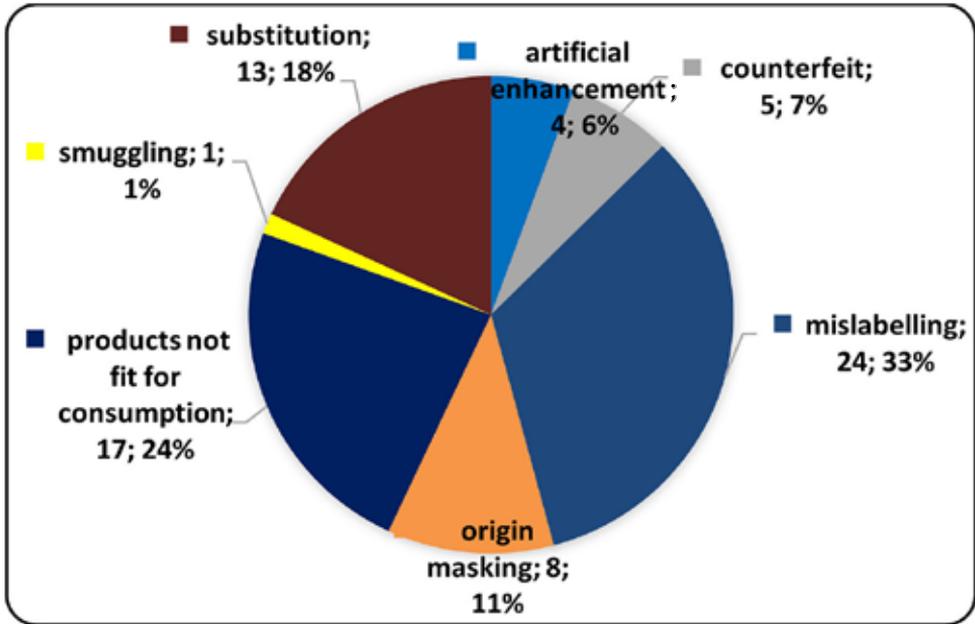


Fig. 3. Food fraud in Europe in 2018 period (Food Center for Food Fraud and Quality database)

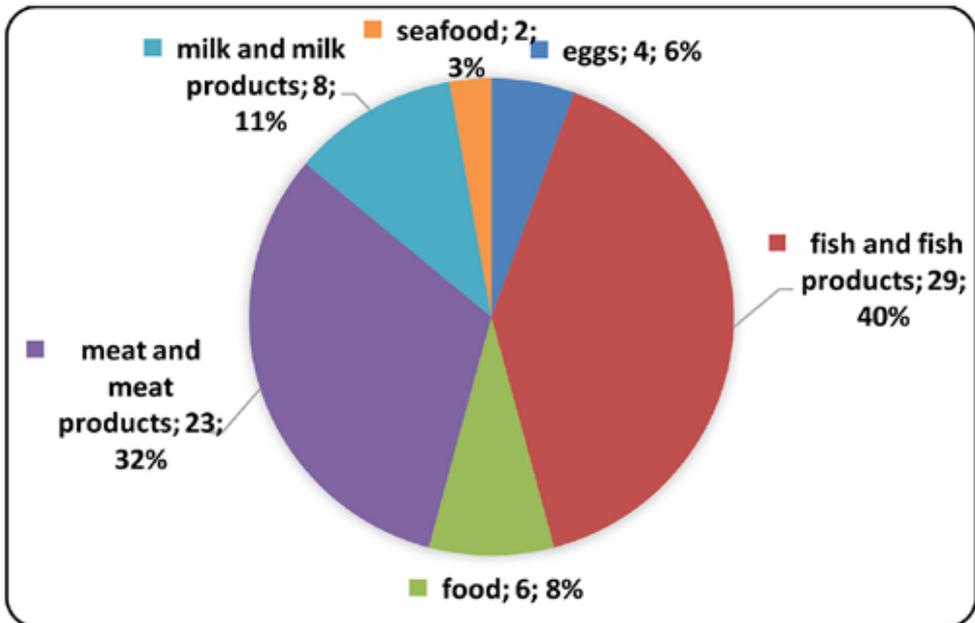


Fig. 4. Adulterated commodities in Europe for 2018 period

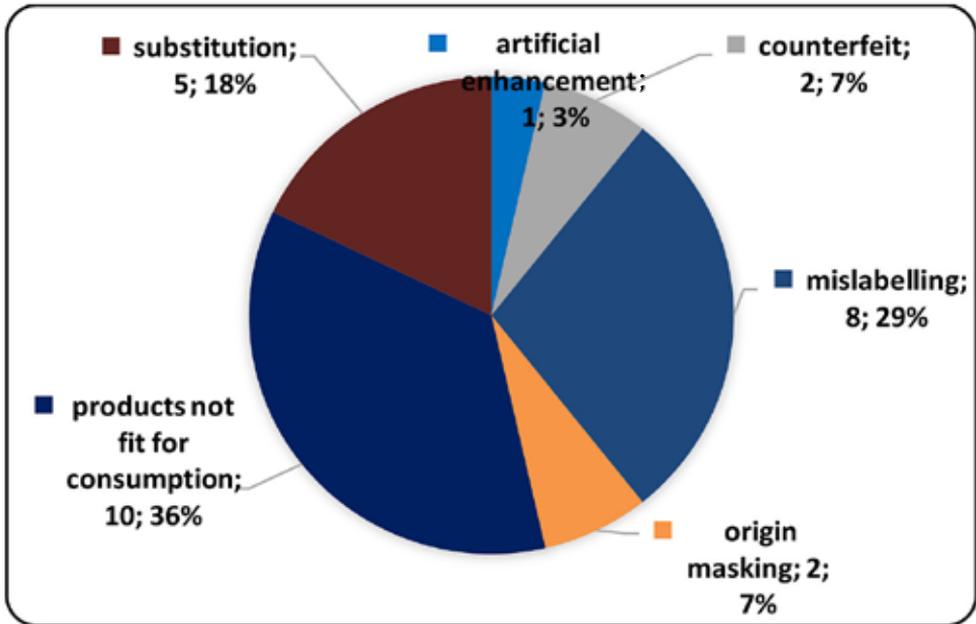


Fig. 5. Food fraud in Europe from Food Center for Food Fraud and Quality database by August 2019

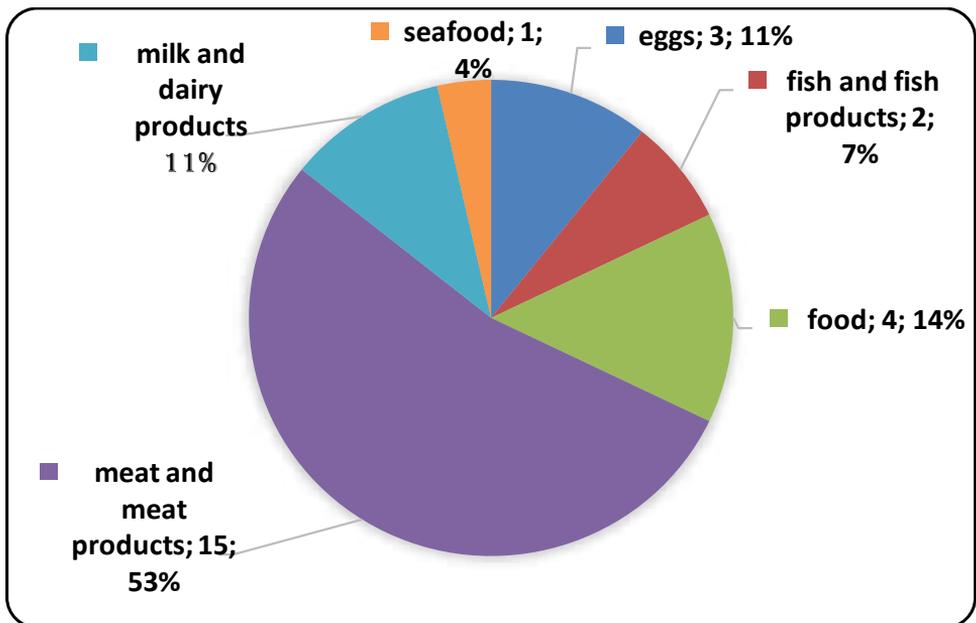


Fig. 6. Adulterated commodities in Europe by August 2019