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EDITORIAL

A daring task: the battle against food crime

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The European Commission currently estimates that the total costs of food fraud to the global food industry and to consumers amounts to about 30 billion Euros every year. In comparison: These costs exceed those attributable to the illegal trade in other black markets such as those of firearms (8.5 billion US Dollars) and heroin (30 billion US Dollars) (European Commission 2019; Sampson 2019). Of course, these are only estimates, but the sheer volume of money probably earned in this market demonstrates the scale of the problem. Food fraud is *not* a trivial offense in which case individual consumer trust is betrayed by a small (or even negligible) amount of money, e.g., 50 cents because 30% of the 20 g of dried Oregano sachets bought in the supermarket were "diluted" with cheaper leaves from olive or myrtle trees. On the contrary, food fraud is a globally operating organized crime business making use of the economies-of-scale effect: Fraudsters do not deal in grams but in tons—the EU market for herbs and spices alone amounts to over 500,000 tons with a value of 1.8 billion Euros. To appreciate how high the revenues from food fraud potentially are, we refer to a recent case that occurred in Germany: In May 2019, Europol reported that 150,000 L of sunflower oil colored with chlorophyll and labelled as extra virgin olive oil had been confiscated. The suspects are estimated to have earned around 8 million Euros every year by selling one million liters of the fake extra virgin olive oil for 5–10 Euros per liter, the original sunflower oil only having cost them one million Euros (Europol 2019a).

Meanwhile, the above-mentioned example also illustrates that the term *food crime* is much more appropriate (Van Ruth et al. 2017). *Food fraud* is currently defined as the intentional violation of EU (agri-food) law and customer deception for the purposes of economic gain. Fraudsters deliberately adulterate food, for example, by substitution, dilution, or mislabeling of the product or its components. In some cases, food fraud leads to damage of human health, e.g., the melamine milk scandal in 2008 in China, with six dead and around 50,000 sick babies. Although a public health risk is not intended (in contrast to a *food defense* incident), fraudsters accept potential harm as long as it remains undetected. In fact, the only problem with a potential *food safety* incident (e.g., involving undeclared allergens) for fraudsters is that it might significantly increase their risk of detection.

Ever since the horsemeat scandal in 2013, food fraud or food crime has received great political attention. Both horse and pork DNA was detected in a wide range of beef-containing food items (mostly frozen ready-to eat meals such as beef lasagna) in Western Europe, and these products were all labelled to contain beef only. The mass-scale adulteration of food showed that Europe's public food control and management systems were not adequately prepared to detect and prevent food fraud. As a consequence, a reform of the food control systems was necessary.

The EU Commission implemented a five-point action plan of short-, medium- and long-term countermeasures such as advanced training for food inspectors, police and custom authorities, the launching of an electronic exchange system of non-compliances with food and feed legislation, as well as the creation of an EU Food Fraud Network for a more efficient cross-border administrative assistance and cooperation. In the center of the reform was the Official Controls Regulation (EU) 2017/625 that replaced the Regulation (EU) 882/2004 and came into force in April 2017. For the first time, the focus was on fighting against food crime in addition to traditional food safety issues.

It should be mentioned that since 2015, members of the EU Food Fraud Network exchange information within the Administrative Assistance and Cooperation (AAC) system. The AAC system applies to non-compliances and potentially intentional violations of the EU agri-food chain legislation regarding food safety issues or human or animal health risks, which now also includes reports on non-compliances regarding food authenticity or food fraud issues (AAC-FF).

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The OPSON operations by Europol, with the aim of seizing counterfeit foods and identifying the criminals behind these networks, and with a main campaign over the course of four months every year, were significantly intensified in order to improve the cooperation between police, customs and national food regulatory bodies. The recent OPSON VIII operation carried out at shops, markets, airports, seaports and industrial estates from December 2018 to April 2019 witnessed the seizure of 16,000 tons and 33 million liters of fake food and drinks (Europol 2019b).

The European Commission also recommended that each Member State should set up national reference centers for the authenticity and integrity of the agri-food chain. They should provide EU countries with up-to-date, reliable technical data and research findings to assist with the effective performance of their control tasks. So far, Germany is the only Member State that has such a center: In May 2017, the Federal Ministry of Food and Agriculture decided to establish the National Reference Center for Authentic Food (NRZ-Authent) at the Max Rubner-Institute, the Federal Research Institute of Nutrition and Food, in order to provide food control authorities an easy access to information on scientific publications, new analytical methods and scientific meetings in the area of food authenticity testing. A further key aspect is the ongoing development of analytical methods for the testing of the authenticity of food (e.g. the verification of the geographic origin) and in particular the development of fast methods.

Germany has also developed an early warning system to anticipate food fraud risks. The tool was established by the Bavarian State Office for Health and Food Safety and the Ludwig Maximilian University of Munich in cooperation with the Federal Office of Consumer Protection and Food Safety. Based on a commodity flow and trade prices analysis, ISAR (Import Screening for the Anticipation of Food Risks) performs an automated analysis of data from the Federal Statistical Office (Destatis) on about 2400 different food items from 220 countries for a systematic detection of unexpected changes in import volumes and prices of foods imported by Germany (Verhaelen et al. 2018; LMU Munich 2019). The descriptive model also considers drivers such as weather data, political instabilities, animal or plant diseases as well as crop failure. It successfully demonstrated that the crop failure and all-time high in hazelnut prices in Turkey in 2014 led to numerous adulterations with almonds and cashews.

In summary, the fight against food fraud remains a considerable task—challenging and daring, but by no means 'Sisyphean'. Although fraudulent methods seem to have become more sophisticated in recent years, public institutions in the EU have developed a considerable array of instruments to cope with food fraud and thereby enhance consumer protection.

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