

# Food supply chain integrity

Researchers at **TEAGASC** and UCC are looking into the challenge of food fraud and food threat, and investigating approaches to dealing with these issues.

What do black swans and the Irish food industry have in common? This question is currently being investigated in a *safeFood*-funded project, involving Teagasc and University College Cork. 'Black swan events' are low-probability but high-impact events, and are of mounting interest in the context of food supply chain integrity. This is because all food businesses are exposed to threats and vulnerabilities. These have always existed, but are of growing concern due to increasing supply chain complexity. The fact that supply chain disruptions are more likely to be publicly announced ensures that this is an area of importance to industry, as well as to regulators and public health agencies. If these kinds of threats are not prevented or adequately responded to, they may result in illness and death, as well as in economic and reputational damage to individual companies, and indeed the wider food industry. Given that exports from the Irish agrifood sector are worth more than €12.5bn on a whole-island basis, these challenges cannot be ignored.

## Food fraud and food threat

It is important to distinguish between familiar food safety and food quality events, and less familiar food fraud and food threat events (**Figure 1**). In the former case, because they occur frequently and are accidental, risks and likelihoods are identifiable, enumerable, and quantifiable. In addition, such events, being internal to the processing unit and recurrent, are amenable to data collection on their context, causes, and overall likelihood. They can be controlled to an acceptable level by identifying the most important (or critical) risks, and initiating responses that reduce the likelihood and consequences of those risks. Hazard Analysis and Critical Control Points (HACCP) is the primary example of such a risk model and control process. By contrast, food fraud and food threat events are the result of intentional actions by perpetrators who identify and exploit vulnerability in the supply chain. Because such events are relatively infrequent, data about them are limited, often due to sensitivities and reputational concerns on the part of the victims.

Thus, the primary focus of countermeasures should be on the identification of vulnerabilities, with the emphasis placed on prevention rather than on mitigation.

## Perceived level of exposure

The aims of our current research are to assess the food industry's perceived level of exposure to food fraud and food threat, to examine approaches taken to deal with food fraud and food threat risks in other jurisdictions (the UK, the Netherlands, the US and Denmark), and to determine the feasibility and benefits of integrating such approaches into food supply chains in Ireland. The research will be undertaken in stages including a literature review, expert interviews and an online survey. The interviews and survey are underway with the questionnaire sent to almost 1,000 Irish firms, and interesting findings have already emerged from the literature review.

## Think like the perpetrator

First, the literature has identified a need to think like the perpetrator of such activities in identifying risks and designing responses. Offenders are focused on market signals such as price spikes or an increasing demand for a commodity. Analysis of data relating to price and demand can therefore help to identify vulnerabilities. The literature also emphasises that the potential opportunity to undertake such activity is dependent on supply chain factors, including: its complexity and the level of collaboration and information flow along the chain; the availability of test and detection technology; and, knowledge of how to adulterate. Accordingly, wrongdoers may analyse such factors to identify areas where potential profits (in the case of fraud) or potential damage (in the case of threats) are high, the chances of detection are low, or the consequences of such action, if detected, are low. Strategies to combat such activities thus seek to enhance horizon scanning to detect candidate products and ingredients, to ensure negative consequences for wrongdoers, and to improve visibility and information sharing along the supply chain.

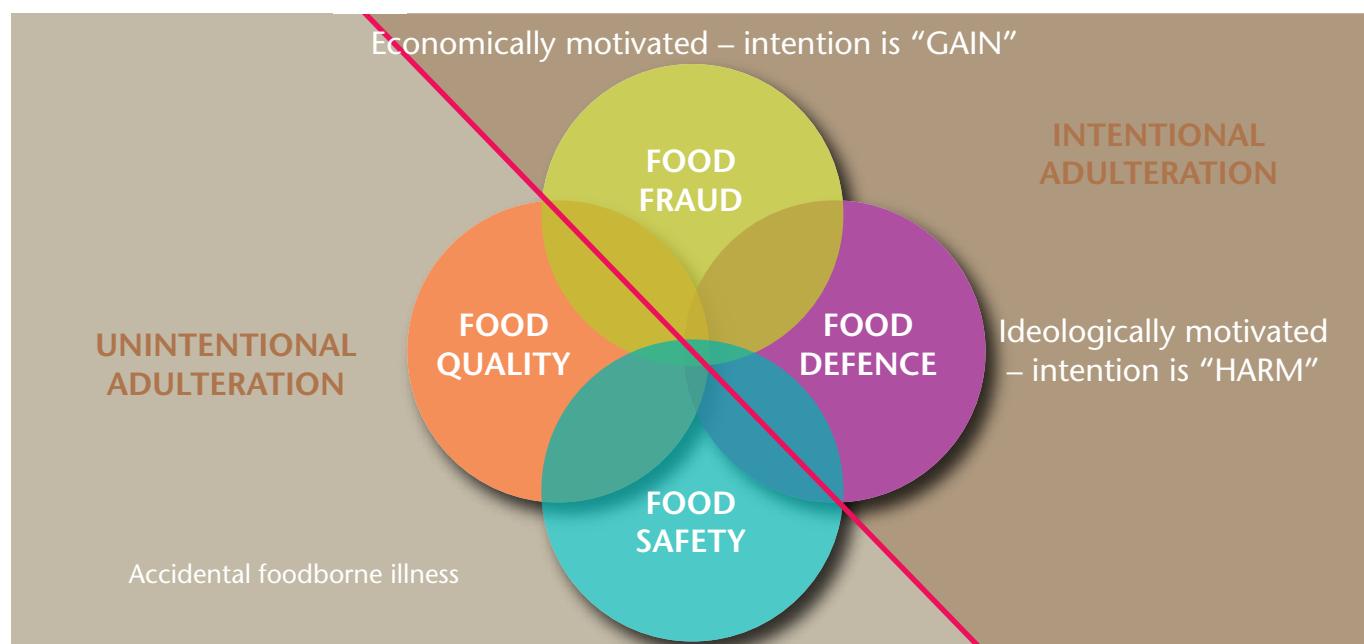


FIGURE 1: Food fraud in the context of the Global Food Safety Initiative.

### Increase risk of detection

Second, in relation to prevention, the aims are to increase the risk of detection, reduce the opportunity for profit, and increase negative consequences for the perpetrator. One preventive action is to ensure that adequate penalties are in place. The familiar quality control and assurance processes, which, for example, can result in contractual penalties or reputational loss, fall short when dealing with food fraud and food threat. In the EU the central law is Regulation (EU) 2017/625. It updated an earlier Regulation (EC) 178/2002 in the wake of the horse meat fraud by adding provisions against “fraudulent or deceptive practices along the agri-food chain” and requires national authorities to take account of “potential risks and the likelihood” of such events occurring. Public prosecutions to enforce such regulations are important to create a less attractive environment for perpetrators. The role of ‘private’ law (i.e., industry-developed standards) is an important response by supply chain actors. Such standards and accreditations – of which the Global Food Safety Initiative (GFSI) is the most influential – require processes and tests that producers and auditors can use to identify and resolve vulnerabilities. When such certification becomes a requirement for doing business, non-conformant businesses are excluded from many contracts. In essence, therefore, ‘private’ law makes the business environment less attractive for potential offenders.

### Information flow is key

Finally, for response strategies to be effective, information flow between supply chain stakeholders is crucial. Ongoing efforts to develop rapid testing methods have enhanced surveillance and detection of food fraud and food threats. Furthermore, databases developed by public agencies (e.g., the European Food Fraud Network (EFFN)) and commercial concerns (e.g., the United States Pharmacopeial Convention (USP) and Fera Science Ltd) allow better information sharing. Despite these developments, our review suggests a need for food chain actors to utilise these databases to a greater degree so as to embed the resulting knowledge into their processes.

### Further information

A seminar to share all project results will take place on December 6, 2018. Further information will be available at: [www.teagasc.ie/news—events/](http://www.teagasc.ie/news—events/). Please contact the authors for access to the questionnaire if you wish to contribute to the study or visit: [https://cubs.eu.qualtrics.com/jfe/form/SV\\_b19lwyUuH8DvCg5](https://cubs.eu.qualtrics.com/jfe/form/SV_b19lwyUuH8DvCg5).

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### Authors

#### Alan Sloane

Lecturer, Department of Food Business and Development, University College Cork

#### Maeve Henchion

Principal Research Officer, Department of Agrifood Business and Spatial Analysis, Teagasc Food Research Centre, Ashtown, Dublin 15  
Correspondence: [maeve.henchion@teagasc.ie](mailto:maeve.henchion@teagasc.ie)

#### Seamus O’Reilly

Senior Lecturer, Department of Food Business and Development, University College Cork

#### Hanna Sheerin

Research Officer, Department of Agrifood Business and Spatial Analysis, Teagasc Food Research Centre, Ashtown, Dublin 15

