

# Food safety after Brexit



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Applied Microbiology International is a global membership organization that seeks to bring the international microbiology community together to advance scientific impact. We are the oldest microbiology society in the UK and with more than half of our membership outside the UK, we are truly global, serving microbiologists based in universities, private industry and research institutes around the world.

New trade deals may leave the UK exposed to new food safety threats from imports, including drug-resistant microbes. Food exports from the UK may need to meet different safety requirements, incurring costs on British food producers. The UK Government must seek continued involvement in European food safety surveillance systems and knowledge-sharing networks after Brexit. The EU is a key source of funding for food safety research. Steps should be taken to mitigate potential funding losses once the UK leaves the EU.

Future government support for the safety of our food should also focus on UK National Reference Laboratories (NRL) and gaps in the domestic skills base.

## 1: INTRODUCTION

Food safety and security has emerged as an increasing concern throughout the Brexit negotiation period, catalyzed by reports of chlorine disinfectant-washed chicken and animal welfare concerns.<sup>1</sup> Fears have also been raised that the UK may be forced to accept food produced outside the European Union (EU) with lower standards in order to establish future trade agreements.<sup>2</sup>

Keeping food safe after Brexit is a high public priority. A survey in early 2018 found that 82% of the public wish to maintain current food safety standards.<sup>3</sup> Microbiological science\* plays a vital role in identifying, understanding and preventing food safety threats as they emerge. In July 2018, Applied Microbiology International held a roundtable discussion on the potential impacts of departing the EU on food safety in the UK, focusing on issues related to science.\*\* This briefing covers key points raised during the meeting.

## 2: RISKS RELATED TO NEW TRADE DEALS

30% of the UK's food is imported from the EU, with an additional 20% coming from non-EU countries.<sup>4</sup> Upon leaving the EU, the UK may seek to source more food from non-EU countries, through trade deals such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). Because of this, the UK may be open to new food safety risks. Understanding the exact source of foods contaminated with pathogenic (harmful) microorganisms is not straightforward, in part due to the complexity of global food supply chains (**BOX 1**). Surveillance data and intelligence-sharing networks are vital tools to identify and deal with threats as soon as they emerge in the UK or neighbouring countries (**BOX 2**).

### 2.1 Potential risks from imports

The UK contributes to the EU RASFF system, which notifies Member States of urgent food safety threats as soon as they are detected. Previous RASFF data can shed some light on possible threats and countries to focus on post-Brexit.

### BOX 1: 2011 *E. coli* O104:H4 outbreak

The UK worked alongside European neighbours in a coordinated response to the 2011 outbreak of *E. coli* throughout Germany and other parts of Europe.<sup>5</sup> The outbreak, the deadliest in recent history, was caused by the rare Shiga toxin-producing O104:H4 strain of *E. coli*. Tracing the source of the outbreak proved complex, leading to initial reports that Spanish cucumbers were to blame. State-of-the-art genomic techniques were employed, leading to the conclusion that imported fenugreek seeds from Egypt were the cause.<sup>6</sup>



\* The study of microscopic organisms (microorganisms) including bacteria, fungi and viruses.

\*\* Roundtable participants included university researchers, food policy experts, industry representatives and public sector scientists.

## BOX 2: EU surveillance and notification systems

The EU controls a number of online data-sharing systems that allow Member States (and non-EU countries who register) to access immediate alerts on disease outbreaks that emerge in neighbouring countries. A number of these are relevant to food safety:

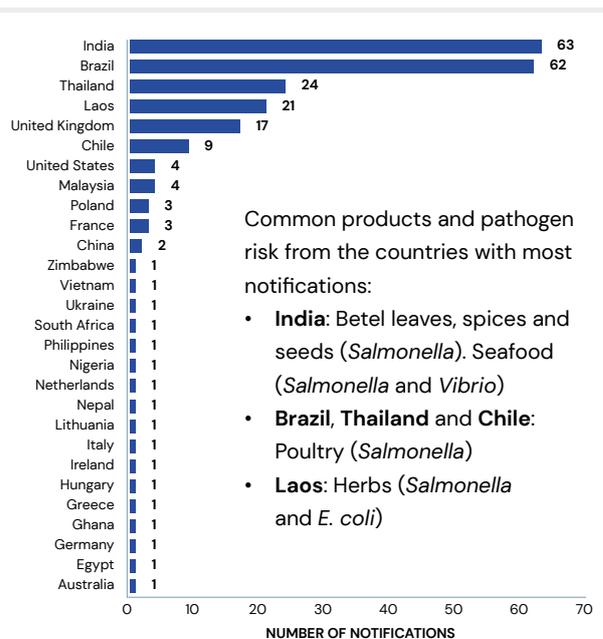
- **Rapid Alert System for Food and Feed (RASFF):** Notification system for feed and food safety threats (e.g. microbial and chemical contaminants, allergens).<sup>7</sup>
- **EU TRAdE Control and Expert System (TRACES):** Management tool for certification and controls for imports and exports of animals (and by-products), plants, food and feed.<sup>8</sup>
- **European Union Notification System for Plant Health Interceptions (EUROPHYT):** Notification system for plant pests and diseases.<sup>9</sup>
- Other public health surveillance data systems:
  - > **Epidemic Intelligence Information System (EPIS) platform**<sup>10</sup>
  - > **The European Surveillance System (TESSy)**<sup>11</sup>

The European Commission is working to integrate these systems (e.g. TRACES, RASFF and EUROPHYT) to promote faster information sharing, particularly for threats that carry multiple risks (e.g. animal health and food safety). Authorities in third countries also receive training from the EU to engage with these information systems.

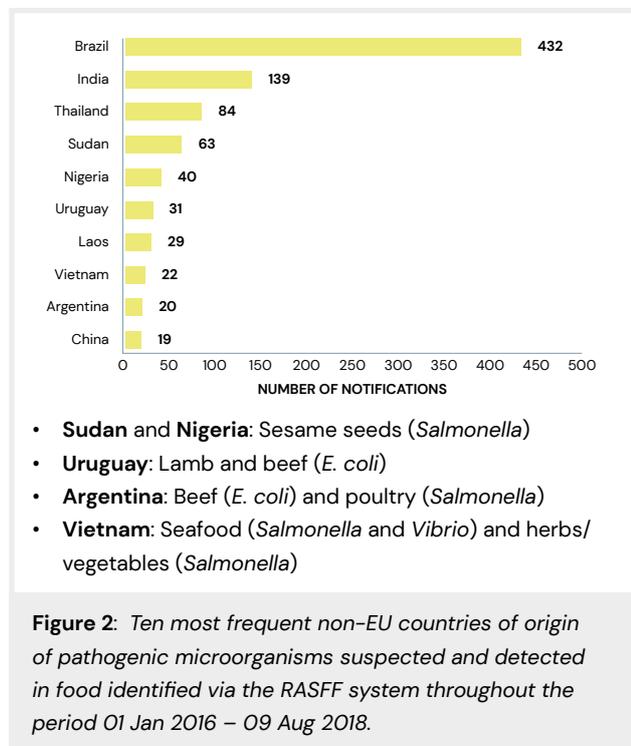
The UK's future involvement in these systems is not certain, although the UK Government has indicated an intention to seek access to RASFF and other EU communications systems.<sup>12</sup>

For example, between January 2016 and August 2018, the majority of alerts for *pathogenic microorganisms in food in the UK* originated from third countries (i.e. those outside of the EU): India, Brazil, Thailand, Laos and Chile (Figure 1). The major threat came from *Salmonella* in imported poultry (95 of 225 notifications, 42%).

Looking more broadly at notifications from European Economic Area (EEA) countries and Switzerland reveals other food safety risks from third countries (Figure 2). The UK has a well-developed infrastructure to deal with familiar threats (e.g. *Salmonella* from poultry, *E. coli* from beef). However, the risks may be different for food imported from new trade partners, whether this means different pathogens (e.g. parasites and viruses) or familiar threats (e.g. *Salmonella*) from new sources. The UK will need to be ready to identify and deal with potential new food safety risks post-Brexit. For example, the EU conducts food safety inspections in third countries, which may need to be replicated by the UK after leaving the EU.<sup>1</sup> This will require additional resources, especially for new trade deals or if the UK adopts different food safety requirements.



**Figure 1:** Countries of origin of pathogenic microorganisms suspected and detected in food, as notified by the United Kingdom via the RASFF system throughout the period 01 Jan 2016 – 09 Aug 2018. Total = 229.



## 2.2 Antimicrobial drug resistance

The global trade of food and animals is a potentially significant factor in the spread of microorganisms that are resistant to antimicrobial drugs, which are a serious public health threat (**BOX 3**).<sup>13</sup> Whilst antimicrobials are an important tool for food production (e.g. antibiotic drugs in animal health and antifungal crop sprays) they must be used responsibly. The UK is a world leader in championing approaches to reduce antimicrobial use in agriculture, but many countries continue poor practices such as the use of antibiotics to promote livestock

growth, a practice that has been banned across the EU since 2008. New trade deals ought to consider the potential risks of antimicrobial resistance (AMR) in imported food (particularly meat and fish/seafood), taking into account the agricultural and aquaculture practices of trade partner countries.

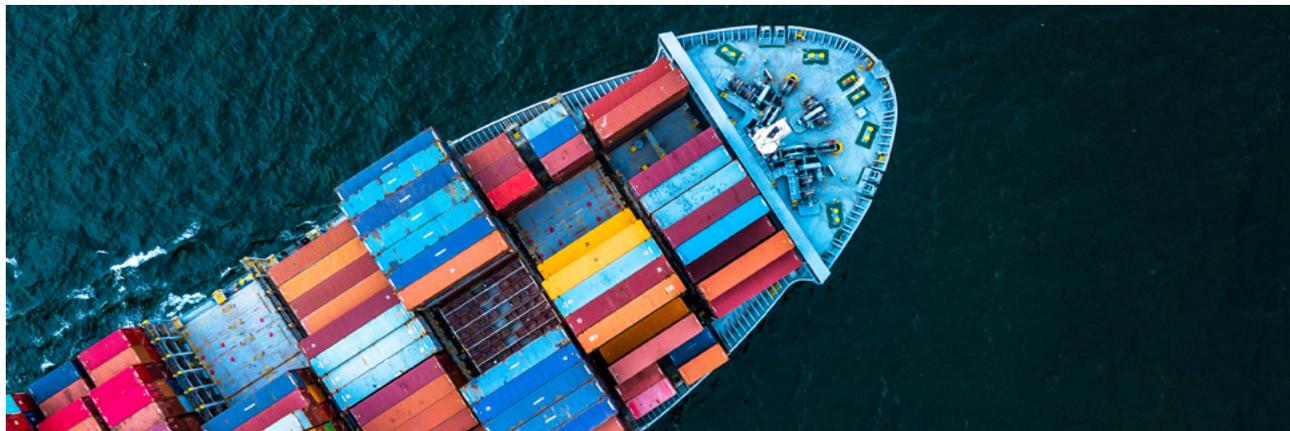
Surveillance of AMR within Europe is coordinated by the EU, through the sharing of public health and veterinary data among Member States. The UK would benefit from continued access to data collection networks coordinated by the European Centre for Disease Prevention and Control (ECDC) such as the European Antimicrobial Resistance Surveillance Network (EARS-Net) and European Surveillance of Antimicrobial Consumption Network (ESAC-Net).<sup>14</sup>



### BOX 3: Colistin resistance<sup>15</sup>

Colistin is an antibiotic drug of last resort for infections caused by multi-resistant bacteria (i.e. those that are resistant to several types of antibiotic). In January 2016, an *E. coli* strain that was resistant to colistin, and to another group of last-resort antibiotics (carbapenems), was found in chicken meat on sale in China. Resistance to colistin was also found in *Salmonella* and *E. coli* in pigs on a British farm in late 2015. This was a particular concern as scientists found that this type of resistance could be easily spread among different species of bacteria.

The immediate public health risk was deemed to be low; however, UK surveillance programmes are monitoring the threat. Furthermore, the detection of colistin resistance prompted the European Medicines Agency to recommend the reduction of colistin use in animal husbandry.



## 2.3 Exports

The House of Commons Environment, Food and Rural Affairs Committee report *Brexit: Trade in Food* notes that the UK may need to prioritize future trade agreements with third countries in existing bilateral agreements with the EU, such as South Korea, South Africa, Peru, Chile and Iceland.<sup>2</sup> Furthermore, trade with China, India and the US are identified as opportunities for potential growth.

Non-EU countries may hold significantly different food safety standards to those employed by the UK. New trade deals will potentially require British producers to satisfy terms by modifying or establishing entirely new production systems and criteria. Aside from the time and cost associated with negotiating trade agreements, adhering to different food safety requirements will incur additional costs and may require time for data gathering and scientific input (BOX 4).

## 2.4 Food decontamination

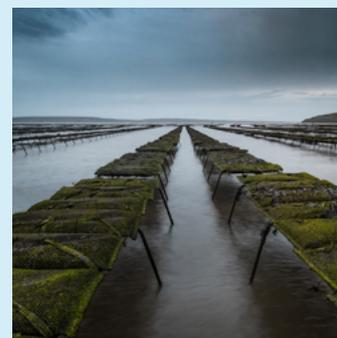
Over the past year, concerns have been raised that the use of disinfectants in food production can mask poor animal welfare and inadequate hygiene practices. Debate around this issue has focused on the potential scenario that a future UK–US trade deal will involve imports of US chicken washed with chlorinated water.<sup>18</sup> By contrast, the sale of ‘chlorine-washed chicken’ is banned across the EU. The only decontamination substance allowed by EU legislation for use on meat is lactic acid.<sup>19</sup>

Minimizing the risk of food contamination relies on multiple strategies, which can include the use of physical, chemical and biological treatments. It is important to note that decontamination substances are always assessed by scientists to determine the potential public health risk. When used appropriately, disinfectants should pose a minimal threat to consumer

### BOX 4: Shellfish production

For shellfish exports to the US, producers must demonstrate that *exclusion zones* have been established around sewage discharges, in line with the US Shellfish Sanitation Program.<sup>16</sup> This aims to control virus contamination (e.g. norovirus) in shellfish production areas. European legislation currently does not contain specific requirements for exclusion zones.

A 2015 technical report produced for the Food Standards Agency considered options for exclusion zones in the UK, based on examples from other European countries and the US. The report concluded that no option provided a good fit for easy adoption within the UK and indicated several gaps in scientific knowledge that must be filled prior to the development of UK-focused exclusion zones.<sup>17</sup>



## BOX 5: Risk assessment and risk management<sup>21</sup>

The European Food Safety Authority (EFSA) **assesses the health risk and effectiveness** of decontamination substances based on independent scientific opinion. Authorities in the European Commission and Member States use this advice to make **risk management** decisions to regulate the use of a substance. **Risk managers** in the food industry then decide which specific actions (including decontamination strategies) to take to prevent and control food safety risks.

UK authorities currently rely on risk assessment advice provided by EFSA. The Food Standards Agency has proposed that in preparation for exiting the EU, the UK should replicate the EU's risk assessment and management frameworks.<sup>22</sup>

health. The decision whether and when to use a particular substance (such as chlorinated disinfectants) is often a risk management issue, rather than a risk assessment issue (BOX 5).

Fears have been expressed that the UK will adopt previously banned practices after departing the EU, signalling a relaxation of food legislation. We strongly recommend that the transparent use of independent scientific advice continues to be an integral part of food safety regulation post-Brexit. Authorities in the UK should look to strengthen decision-making systems to respond rapidly and flexibly to new threats and up-to-date research. Taking the chlorine example, UK scientists have recently reported that chlorinated water does not effectively disinfect salad leaves and can even render harmful bacteria undetectable to routine testing methods.<sup>20</sup> This evidence places the use of chlorinated disinfectants for any foodstuffs (not just poultry) into question.



### 3: FOOD SAFETY RESEARCH AND SKILLS

Food safety research in the UK benefits greatly from a strong domestic science base and effective international collaboration and information sharing. Brexit may impact food safety science and researchers in a number of ways, although opportunities exist to support future innovation and collaboration.

#### 3.1 International representation and independent science expertise

The UK makes a significant contribution to the work of expert panels in EFSA, with UK-based experts making up 12.5% of the population of EFSA's scientific panels in

the period of 2009–2018.<sup>23</sup> However, recently the UK's overall representation on these panels has dropped from the highest contribution to fifth highest.<sup>24</sup>

UK food safety scientists and experts also engage with other international networks such as COST (European Cooperation in Science and Technology)<sup>25</sup> and standards-setting organizations including the International Organization for Standardization (ISO)<sup>26</sup> and European Committee for Standardization (CEN).<sup>27</sup> The UK will likely continue to house some of the best food safety experts in the world but there is a possibility that this expertise will carry less international influence after Brexit, depending on the agreed future collaboration between UK and EU authorities.

## 3.2 Reference laboratories in the UK

The UK National Reference Laboratories are responsible for developing reliable, standardized testing methods for feed and food and animal health. NRLs are coordinated across Europe by established EU Reference Laboratory (EURL) networks. The UK led seven EURL networks,<sup>\*\*\*</sup> although these will be relocated when the UK withdraws from the EU. For example, the *EU Reference Laboratory for monitoring bacteriological and viral contamination of bivalve molluscs*, previously based at Cefas, was dissolved in 2018 with tasks distributed among other existing EURLs.<sup>28</sup>

Losing EURL status risks reducing the role of the UK as an international leader on key areas of animal health and food safety. Furthermore, former EURLs in the UK will cease to receive financial support from the EU. Third countries may still participate in EURL activities, although the extent of the UK's future involvement is not confirmed.

Upon exit, UK reference laboratories may seek to build on their international presence as worldwide reference centres for the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE).<sup>29</sup> However, activities related to the FAO are not supported by additional funding. Furthermore, OIE funding generally focuses on international development and so will not necessarily support activities related to food safety in the UK.



## 3.3 Research funding

Food safety research in the UK benefits considerably from EU funding, both directly from agencies (e.g. EFSA) and through programmes such as Horizon 2020. For example, between 2009 and 2016, UK beneficiaries received 23% of the total grant funding supplied by EFSA.<sup>23</sup> The EU has indicated that food safety activities and research will continue to be a priority, with the announcement that €1.68 billion of the proposed new Single Market Programme (2021–2027) will be earmarked for a 'specific food strand'.<sup>30</sup>



<sup>\*\*\*</sup> EURLs previously based in the UK: avian influenza; bluetongue; crustacean diseases; foot and mouth disease; transmissible spongiform encephalopathies (e.g. BSE); viral and bacteriological contamination of bivalve molluscs.



The UK should likewise prioritize food safety research in order to remain competitive on the international stage. However, the UK's future involvement with the successor Framework Programme to Horizon 2020 (Horizon Europe) has yet to be agreed. Scientists and researchers in universities, institutes and industry will continue to have access to funding through UK Research and Innovation (UKRI), although it is currently unclear what proportion of this funding will be directed towards food safety research. It is also uncertain how food safety research might benefit from the UK Government's plan to increase R&D investment to 2.4% of GDP by 2027.<sup>31</sup>

We have received additional concerns from scientists working in Government agencies, who have participated in Horizon 2020-funded research projects. They are concerned that an inability to participate in future Horizon programmes will leave a funding gap that cannot be filled, exacerbated by the fact that Government laboratories are ineligible to apply for UKRI funding to lead research projects.<sup>\*\*\*\*</sup>

The UK Government should consider actions to ensure that high-quality food safety research continues to be funded post-Brexit, including:

- Reaching an agreement for UK researchers to participate in EU funding schemes.
- Ringfencing a portion of the committed R&D investment for food safety research.
- Removing the restriction on government laboratories accessing UKRI funding, potentially for selected topics such as food safety.

### 3.4 Skills gaps and training

#### GENERAL SKILLS

Experts at the roundtable discussion indicated that food microbiology skills in the UK are at risk, voicing concerns that the recruitment of students into food science degrees and PhD studies is in decline. One participant highlighted the issue of a reduction in practical skills being delivered at university level, which places a higher burden on industry to train graduates. However, food production sites in the UK lack the capacity to provide extensive practical training to food science students or graduates. A drop in skilled food scientists migrating to the UK upon EU exit may further exacerbate skills gaps. Departing the EU provides an opportunity, however, for the UK to position itself as a centre of expertise for food science skills and training. For this to become a reality the Government should seek to support universities and the food industry to cooperate in the training of food scientists.

#### VETERINARIANS

The UK draws heavily upon an international pool of qualified veterinarians. The potential for Brexit to result in a shortage of vets has been well reported.<sup>32</sup> For example, as many as 95% of Official Veterinarians overseeing abattoirs in the UK graduated overseas; many of these vets are non-UK EU graduates.<sup>33</sup> Animal health is an important factor that affects food safety, and veterinarians contribute to this through investigating animal health and welfare standards. Veterinary microbiology skills are particularly important to investigating notifiable zoonotic diseases (diseases that can spread from animals to humans) and advising on biosecurity measures.

<sup>\*\*\*\*</sup> Government-funded laboratories can receive funding from government departments and agencies (e.g. Defra and the FSA). However this occurs through a tendering process on pre-defined questions. In other words, scientists in government-funded laboratories can not necessarily drive forward their own research in this way.

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