Department for Environment Food, and Rural Affairs
Call for Evidence: National Food Strategy

Submission by the Society for Applied Microbiology

Introduction

1. The Society for Applied Microbiology (SfAM) welcomes the opportunity to respond to the Department for Environment Food, and Rural Affairs' (DEFRA) National Food Strategy call for evidence.

2. With issues such as climate change and an expanding global population increasingly threatening the UK's food system, the application of microbiological science in food research, innovation, and production can play a significant role in combatting these issues and ensuring the UK's food system is healthy, resilient, and sustainable.

3. Food safety is a vital consideration for the food strategy as advances in food production will need to be safeguarded from microorganisms and their toxins. For microbiologists to continue to identify risks to and explore innovations for accelerating food production in a sustainable and healthy way, there will need to be better collaboration between microbiologists and industry stakeholders, including government, regulators, and food technologists. Without greater support for collaboration, industry stakeholders risk developing alternative solutions without thorough consultation, which can result in contamination and production of food borne illnesses.

4. Microbiome research is another significant area for the food strategy as its application can provide several opportunities for improving food production. Altering or modifying microbiomes, which are the community of microorganisms (such as viruses and bacteria) that have adopted to live in a particular environment such as soil, has the potential to enhance agricultural practices and improve the health of plants and livestock. However, to harness this innovation, the food strategy needs to support cross-sector collaboration for further exploration and endorse clearer regulation of microbiome research.

5. To promote innovation in food production, it is vital that public awareness and education of food production is improved. Without adequate and trustworthy information, consumer misinformation may pressure researchers and food retailers to cease developing and promoting advances in food security.

6. Since microbiological science can contribute towards a wide array of areas to transform the food system, this response is limited to highlighting only some of the areas that DEFRA should consider for further exploration. For further evidence of ways microbiological science can address food safety and contribute to the national food strategy, please see the attached briefings from SfAM's 2018-19 *Food Safety*

and Security policy series.[1] This response also draws upon SfAM's submission to the House of Commons Science and Technology Committee's 'My Science Inquiry', which advised the Committee of the importance of exploring microbiome research in the UK.[2]

We would like to understand the rationale behind your idea and study any accompanying evidence. For example, it might be an innovation that is already working well in your home, neighbourhood or business and could be scaled-up; or perhaps it is already happening in other countries. It could be a policy which could take a smaller idea to scale, or make a big idea a reality. We are also open to new ideas that might not have been tested but which you think have the potential to improve the system. Please enter your response in the box below.

Support for collaboration between microbiologists and industry stakeholders

7. As the demand for 24-hour automated food production increases and advanced machinery is employed, it is crucial that industry stakeholders and regulators consult microbiologists to understand the realistic opportunities, benefits, and limitations of advances in technologies.

8. For example, a significant challenge for increasing food production is the ability to detect and remove biofilms (which may contain harmful bacteria including species of *Salmonella* and *E. coli*) which can form on machinery, and which may require fully disassembling machines prior to cleaning. If engineers and food technologists do not sufficiently consider appropriate sanitation programmes when developing food production through technologies such as robotics, 3D printing or automated systems, the consequences can be devastating, such as the 2008 listeriosis outbreak, in which there were 23 deaths, highlighted in the attached food safety briefing.[3]

9. An example where collaboration is globally recognised as vital, especially for food safety, is the *One Health Agenda*.[4] This initiative brings together multiple sectors internationally to combat the spread of antimicrobial resistance (AMR), whereby microorganisms become resistant to antimicrobial drugs. Since AMR poses a substantial threat to food safety, as the overuse or misuse of antibiotics to treat livestock can affect food quality and security, initiatives like these are crucial for food security.[5]

Microbiome Research

10. Microbiome research is far-reaching with many potential applications across various sectors, from healthcare to agriculture. Microbiome development in soil and the agritech sector, for instance, has already resulted in products that increase crop

[1] SfAm's policy series may be found at https://sfam.org.uk/about-us/our-work/priority-areas/food-safety-security.html
[2] SfAM's proposal to the House of Commons Science and Technology Committee's 'My Science Inquiry'
[3] SfAM's policy brief – *Science Policy Report: Food Manufacturing and Processing*
[4] World Health Organization One Health https://www.who.int/features/qa/one-health/en/
[5] SfAM Antimicrobial resistance https://sfam.org.uk/about-us/our-work/priority-areas/antimicrobial-resistance.html

productivity and improve plant resilience while reducing the need for pesticides and fertilisers.[6]

11. In order to harness microbiome research to develop products in animal health and agriculture, it is integral that regulation in these fields improves since current regulation is based on chemical and pharmaceutical industries.[7] Unsuitable regulation prohibits innovative growth and further exploration of the potential uses of microbiome manipulation.

Improving public awareness and education in food production

12. Misinformed consumers and ensuing media coverage can pressure researchers and producers to cease further development and research. As scientists look to develop sustainable decontamination and food packaging alternatives, such as biodegradable food packaging and edible cling film, the complex science underpinning these advances will require securing positive public perception.

13. For example, the usage of bacteriophages ('phages'), which are viruses that selectively infect bacteria but do not infect humans or animals, in controlling animal disease and decontaminating chilled ready-to-eat products requires public acceptance of bacteriophages in the food chain. A FSA survey in 2012 revealed that 51% of respondents were uneasy about the technology, although only 34% had previously heard of it.[8]

14. With minimally processed, fresh food trends increasing in popularity, it is vital that consumers receive accurate and trustworthy information if food innovation is to continue to develop.

About the Society for Applied Microbiology

The Society for Applied Microbiology (SfAM) is the oldest microbiology society in the UK, representing a global scientific community that is passionate about the application of microbiology for the benefit of the public. Our members work to address issues involving the environment, human and animal health, agriculture and industry.

www.sfam.org.uk

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[6] POSTnote on Sustaining the Soil Microbiome http://researchbriefings.files.parliament.uk/documents/POST-PN-0601/POST-PN-0601.pdf

[7] Postnote on The Microbiome and Human Health http://researchbriefings.files.parliament.uk/documents/POST-PN-0574/POST-PN-0574.pdf

[8] UK Research and Innovation Bacteriophage control of listeria in chilled RTE salmon products https://gtr.ukri.org/projects?ref=102320