FoodBioSystems DTP - PhD Project Advertisement Text

Project Title: FOODBIOSYSTEMS - Biostimulants improve soil and plant conditions to enhance the health-related properties of fresh produce

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Research Group: FOODBIOSYSTEMS BBSRC DTP
Project ID: FBS2020-12

Application Deadline: 6 March 2020

Project Description: Growing enough food to feed 10 billion people by 2050 is a global challenge. However, less attention is paid to the changing nutritional quality of food and how this affects human health. The antioxidants, vitamins and nutrients in fresh produce are essential for healthy lifestyles. Functional foods (e.g. nutraceuticals and ready-to-use therapeutic foods) have higher nutrient concentrations that can improve human health, reducing the burden on health services. The functional foods market size was estimated globally at $161.49 billion in 2018. The quality of fresh produce may also extend its shelf life, reducing food waste.

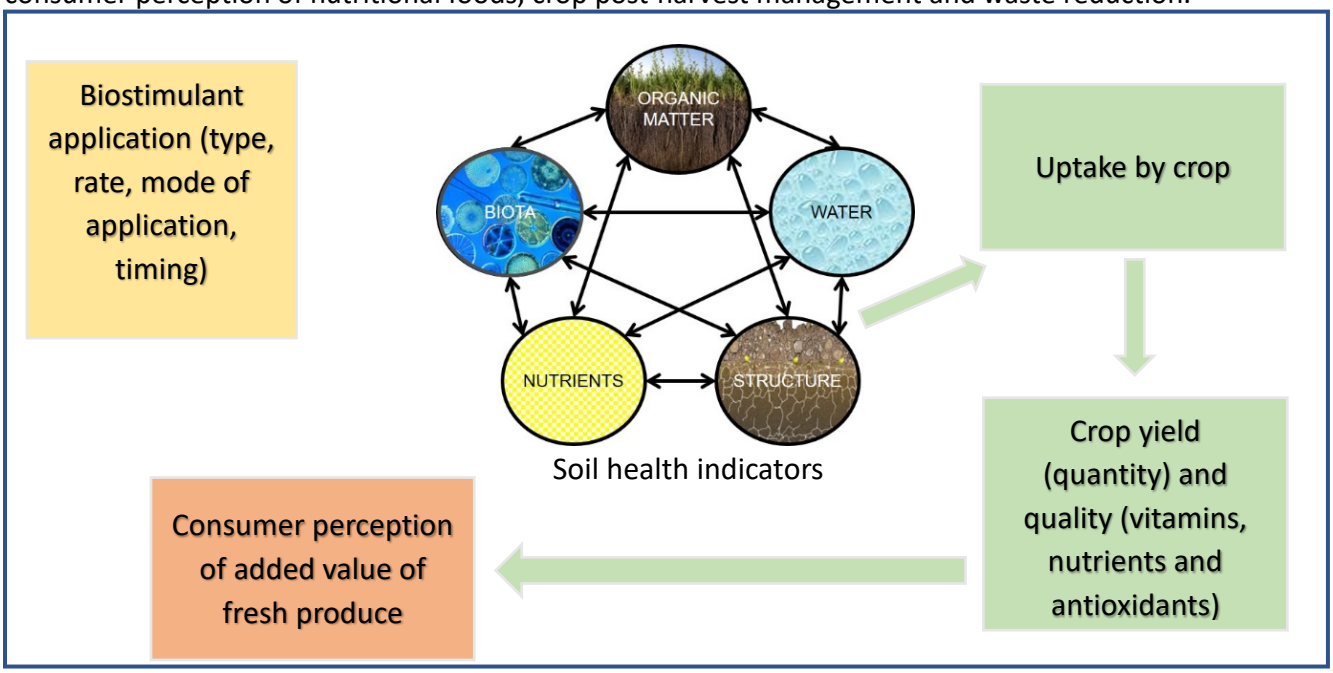
To improve crop quantity and quality, biostimulants (made from plants and plant extracts; animal by-products; marine algae and seaweed extract) can be added to agricultural soils. They contain active substances purported to improve soil and crop health, so producing higher yields and better quality food. However, biostimulants' influence on crop quality is poorly understood (Drobek et al., 2019), and is rarely explained in terms of changing soil properties, and how this affects food quality.

Based on laboratory and field trials, this project will generate new insights into how soil management affects the performance of biostimulants in improving soil and crop health, leading to better food quality.

The successful applicant will investigate different biostimulant treatments and modes of application to soil on different target crops and will evaluate the effect on soil health (physical, chemical and biological properties) and crop quality ((e.g. selected vitamins, nutrients, antioxidants, shelf life). Field trials and the unique Soil Health Facilities at Cranfield University will be used to understand how biostimulant effectiveness changes with soil management practice. Also, the student will be given a placement at Sainsburys to investigate the consumer facing impacts, and the value from fresh produce grown on better managed soils. For example, are the nutritional benefits of value to consumers? How does nutritional content impact on product shelf life (potentially reducing food waste)?

The student will use highly interdisciplinary techniques to study the effect of biostimulants on crop quality and soil health (e.g. Techniques such as liquid chromatography mass spectrometry will be used for the analysis of

antioxidants, vitamins and essential nutrients). The student will also learn important concepts related to consumer perception of nutritional foods, crop post-harvest management and waste reduction.



Funding Notes: This project is part of the FoodBioSystems BBSRC Doctoral Training Partnership (DTP), it will be funded subject to a competition to identify the strongest applicants. Due to restrictions on the funding, this studentship is only open to UK students and EU students who have lived in the UK for the past three years.

This project is part sponsored by Sainsburys who are particularly interested in how biostimulants enhance food nutrition and improve the shelf life of fresh produce, so adding value to consumers.

The FoodBioSystems DTP is a collaboration between the University of Reading, Cranfield University, Queen's University Belfast, Aberystwyth University, Surrey University and Brunel University London. Our vision is to develop the next generation of highly skilled UK Agri-Food bioscientists with expertise spanning the entire food value chain. We have over 60 Associate and Affiliate partners. To find out more about us and the training programme we offer all our postgraduate researchers please visit https://research.reading.ac.uk/foodbiosystems/.

Training opportunities: The student will receive training in world-class facilities at Cranfield University, Reading University and Sainsburys. The student will be trained in the following disciplines:

- Cranfield University Doctoral Researchers' Core Development (DRCD) programme
- Learn how to undertake a multifactorial analysis of current evidence (to identify gaps in current knowledge and to provide the 'a priori' grounds for hypotheses formulation)
- Learn how to design and implement field and laboratory experimental programmes.
- Statistical testing and analysis.
- Post-harvest analysis of crops.
- Training in techniques to capture the role of the producer, retailer and consumer. The student's placement at Sainsburys will cover areas including, investigating the role of the retailer and consumer, retail communication routes, the consumer facing impact, and value from fresh produce

grown on better managed soils.

Appropriate training in research ethics, health and safety, and environmental risks will be given.

Student profile: Do you have interdisciplinary skills and want to apply your expertise in academic, commercial and policy settings? Are you interested in how new scientific knowledge can translate into improved agricultural practice? Then this PhD opportunity could be for you. We welcome applicants from diverse backgrounds including (but not limited to):

- Agriculturalists
- Soil scientists
- Agronomists
- Biologists
- Botanists
- Ecologists
- Food scientists
- Plant scientists
- Agricultural engineers
- Geographers
- Natural scientists
- Environmental scientists

References:

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Halpern, M., Bar-Tal, A., Ofek, M., Minz, D., Muller, T. and Yermiyahu, U. (2015) Advances in Agronomy, 130: 141-174.

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