

## **Biostimulants improve soil and plant conditions to enhance the health-related properties of fresh produce**

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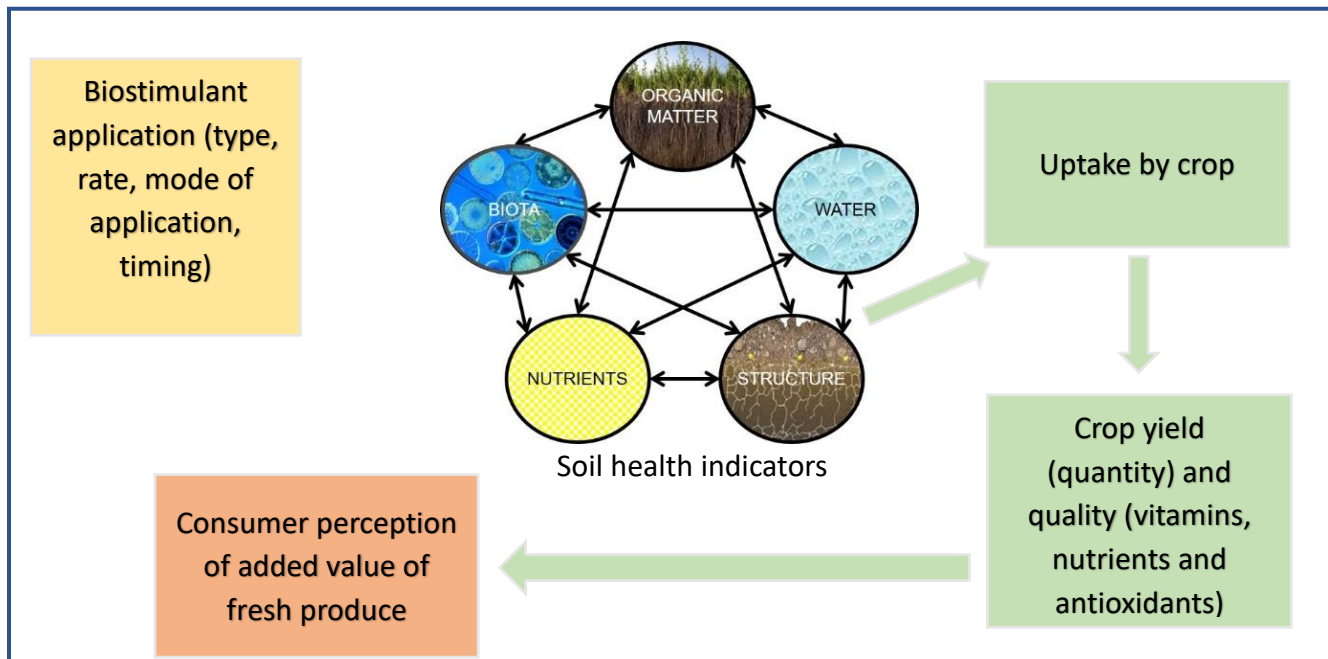
**Project Description:** Growing enough food to feed 10 billion people by 2050 is a global challenge. However, less attention is paid to the changing nutritional quality of food and how this affects human health. The antioxidants, vitamins and nutrients in fresh produce are essential for healthy lifestyles. 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.



**References:**

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 Di Vittori, L., Mazzoni, L., Battino, M. and Mezzetti, B. (2018) Scientia horticultrae, 233: 310–322.