

FoodBioSystems DTP - PhD Project Advertisement

Project title:

FBS2021-53-Magan: Post-harvest control and mechanisms of action of fatty acid-based natural compounds for fungal pathogens of pome fruits

Lead supervisor:

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Co-supervisors:

Dr Gareth Griffith, Reader in Mycology, Aberystwyth University

Dr Marie Carmen Alamar, Lecturer, Postharvest Biology, Plant Science Laboratory,

Dr. Hazel Davey, Reader in Biology, Aberystwyth University

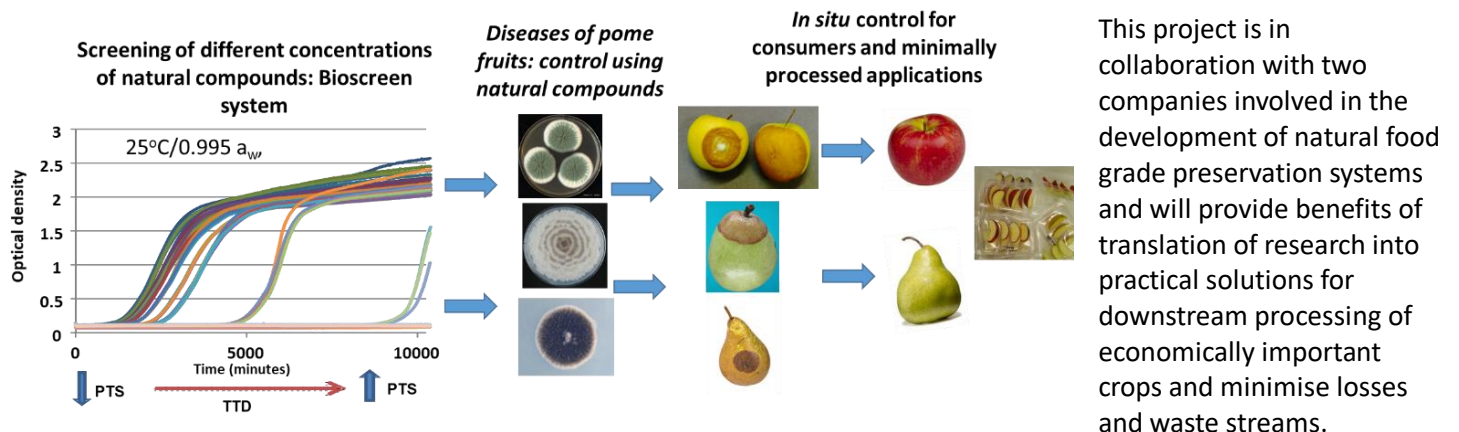
Case Co-supervisor: Dr G Moores, ApresLabs, Rothamsted Innovation Centre, Harpenden, Herts, U.K.

Project description:

Pome fruits (apples and pears) are economically important perishable crops in the UK and EU. It has been critical to control important pests and diseases of these crops to reduce losses and waste. There has been a significant increase in resistance to the prevailing crop protection chemicals, especially fungicides. Fungal pathogens have evolved to develop resistance to some of the fungicides used today. In addition, the EU has reduce by almost 50% the chemical groups that can be used in crop protection because of environmental and health concerns. This has driven the examination of alternative control measures, including integrated management strategies to control important fungal pathogens such as *Penicillium*, *Botrytis*, *Alternaria* and *Monilinia* species which cause visible symptoms and prevent their sale or use in minimally processed ready-to-eat applications.

There is thus interest in the use of GRAS (generally recognised as safe) natural compounds which will control these economically important pathogens in these perishable fruits. This project aims to investigate the effect of different formulations of natural fatty acid-based food grade compounds for control of these fungal diseases of pome fruits for direct consumption or for the minimally processed chain.

We will initially utilise a rapid screening assay system (Bioscreen C) which has been modified to examine control of the life cycle of filamentous fungal pathogens (inhibition of spore germination and colonization) as well as quantifying effects on sporulation and saprophytic survival. The mechanisms of action of the different formulations using flow cytometry, molecular methods and enzyme assays will be used to identify the best formulations for post-harvest use in pome fruits to control these economically important fungal pathogens. This would reduce the waste streams as well as provide the right quality of fruit for direct consumer use or for their use in minimally processed ready-to-eat value chains.



Training opportunities:

The student will receive a range of specific opportunities. At Cranfield, the Applied Mycology Group is a vibrant research activity, that has expertise in fungal ecology, ecophysiology and molecular ecology and is developing natural alternative approaches to control fungal pathogens, spoilage fungi and mycotoxigenic fungi in perishable and durable food chains. The student will be able to significantly enhance their fundamental and applied research expertise. The student will also be able to attend MSc course modules in our Food Chain and Management and Future Food Sustainability courses that will assist in providing excellent background knowledge on raw material quality assurance, certification, food mycology, molecular plant pathology and ecology, diagnostics and the food security agenda. In addition, Cranfield provides generic PhD student training in project and time management, scientific writing skills, statistics and data management, and presentation skills.

In addition, periods of time will be spent with the co-supervisors at Aberystwyth University with a research group which specializes in examining mechanism of action of crop protection compounds using flow cytometry, vital staining approaches, permeability assays and enzyme inhibition assays.

The student will also benefit from collaboration with our industrial collaborators in AlphaBioPesticides (Cambridge) and their partners at Rothamsted Innovation Hub (Apreslabs). This will provide additional experience which will be beneficial for employment opportunities in relevant crop protection industries.

Student profile:

The candidates must have a biological sciences related degree and possibly an MSc in a relevant area, e.g. Agricultural Sciences, Plant Pathology, Crop Protection or Molecular Diagnostics. The student needs to have some interest and background in microbiology/mycology and molecular biology, or have some experience in biochemistry so that flow cytometry and mechanism of action studies can be effectively done. Some interest in interacting with the commercial side of the AgriFood value chains, especially in relation to the crop protection industry, would be beneficial.

Funding Note

This project is a CASE award linked to AlphaBioPesticides (Cambridge) and Apreslabs (Rothamsted Innovation Hub) who will provide an additional stipend (£2000) and a contribution to consumables. Funding will be provided for time-periods spent with partners.

The project is part of the FoodBioSystems BBSRC Doctoral Training Partnership (DTP), it will be funded subject to a competition to identify the strongest applicants.

The studentship is open to UK and international students (including EU countries) however due to funding rules, no more than 30% of the projects can be allocated to international students.

The funding will include a tax free stipend (minimum £15, 285 per year), support for tuition fees at the standard UK rate (currently £4,407 per year) and a contribution towards research costs. **Please note** that the host universities have not yet confirmed the level of fees charged to international students funded by the DTP. Fee levels may vary across the institutions. This information will be shared on the FoodBioSystems DTP website as soon as it becomes available.

To apply

Please go to [FoodBioSystems DTP website](#) for information on how to apply for this studentship. The closing date for applications will be 8 February 2021.

References:

Agyare, S., Magan, N. and Xu, X. (2020). *Eur. J. Plant Pathol.* DOI: 10.1007/s10658-020-01981-3.

Carbó, A. et al. (2018). *Letts. Applied Microbiol.* 2-8. doi:10.1111/lam.12889.

Davey, H.M., & Guyot, S. (2020). *Curr. Proto. Cytom.* 93, e72.doi: 10.1002/cpcy.72.

Medina, A. et al. (2012). *Fungal Biol.* 116, 61-169.