PhD Project Advertisement

Project No/title: FBS2025 75 Taylor rl / *Bright Solutions for Safer Food: Light-Based Control of Campylobacter on Poultry*

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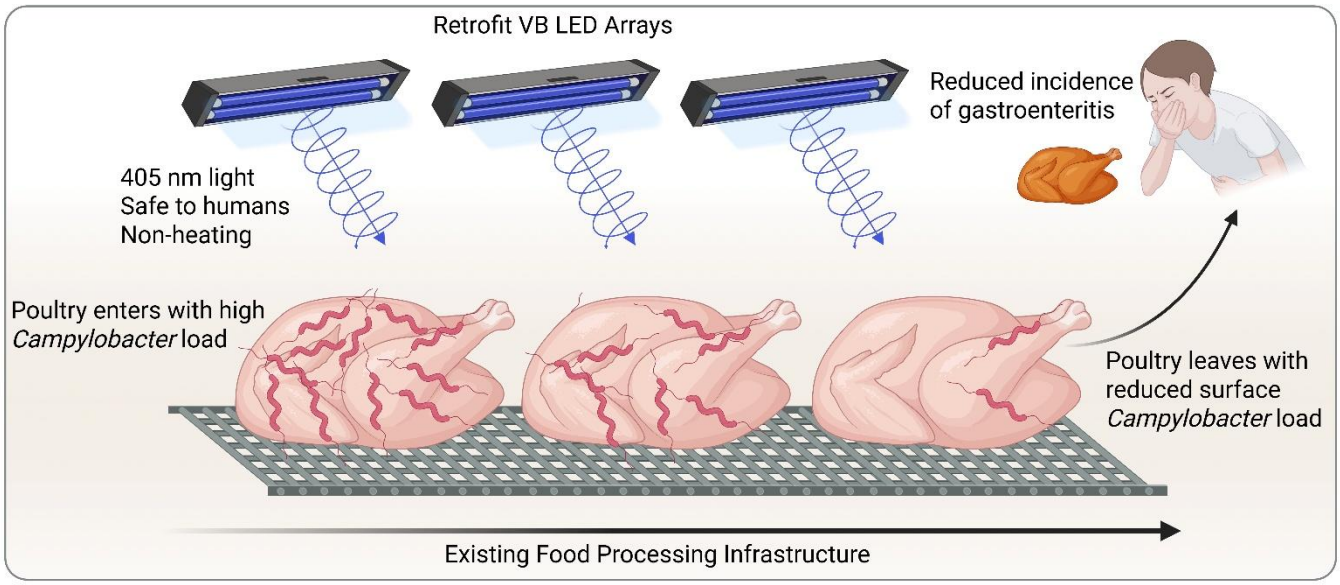
Project Details

Foodborne illness caused by the bacterium *Campylobacter* is the most common cause of gastroenteritis in the UK, responsible for hundreds of thousands of infections every year. Many infections are linked to raw poultry like chicken meat, where bacteria from the gut of the bird contaminate the surface of the meat during processing. *Campylobacter* infections are sometimes severe and require antibiotics, however, treatment is becoming increasingly ineffective due to widespread antibiotic resistance. There is therefore an urgent need for new, non-antibiotic methods to make poultry safer before it reaches consumers. This PhD project will explore the use of safe, low-energy violet-blue LED light to kill *Campylobacter* on poultry meat: a process termed photodynamic inactivation. You will help shape the design and implementation of this sustainable food-safety technology, ultimately preventing human infections.



Research aims: This project will test whether low-energy violet-blue LED light can reliably kill *Campylobacter* on poultry meat, investigate how quickly and in what ways the bacteria adapt to repeated light exposure, and assess whether such adaptations affect their susceptibility to other antimicrobials, like disinfectants and antibiotics.

What you will do: During this PhD, the student will learn to culture *Campylobacter* bacteria in the lab and expose them to controlled doses of violet-blue LED light, both in simple lab systems and on poultry under industry-relevant conditions. They will measure how well the treatment kills the bacteria, and whether surviving populations evolve resistance, effectively becoming harder to eliminate over time. To understand what adaptations the bacteria are making, the student will use modern genetic techniques to analyse the genome sequence and transcriptome of lab evolved isolates.

They will also test the interplay of resistance against multiple antimicrobials, including violet-blue photodynamic inactivation, disinfectants, and antibiotics. Throughout the project, the student will work closely with academic microbiologists, food safety specialists, and industry and policy partners, gaining experience in experimental design, data analysis, and communicating findings to scientific and non-specialist audiences.

References:

1. https://journals.asm.org/doi/10.1128/msystems.00454-22
2. https://www.gov.uk/government/publications/campylobacter-infection-annual-data/campylobacter-data-2015-to-2024
3. https://www.gov.uk/government/publications/gastrointestinal-infections-in-england/gastrointestinal-infections-in-england-2022-to-2024
4. https://www.gov.uk/government/publications/veterinary-antimicrobial-resistance-and-sales-surveillance-2024

Student profile

Essential for project: Background in one or more of: microbiology, food science, biochemistry, or related subject. An interest in foodborne pathogens, antimicrobial resistance, and food safety interventions, including both laboratory and application aspects.
Desirable for project: Experience with microbiology lab methods, microbial genomics or bioinformatics, and/or food processing environments. Full training will be provided in all aspects of the project.
Minimum requirements for all FoodBioSystems applicants: An upper 2nd class degree (or equivalent) in a subject relevant to the project. Candidates with a lower class of Bachelors degree, but merit or above at Masters level will also be considered. Demonstrable skills in problem-solving, team-working, communication, and time management.

Training

Project specific training opportunities: The student will receive integrated, multi-disciplinary training spanning microbiology, food safety, and engineering. Core laboratory training will cover microbial culture, quantifying pathogen survival, antimicrobial resistance testing, and photodynamic inactivation methods, alongside molecular skills such as genome- and transcriptome-based analysis, bioinformatics, and statistics. Applied food safety training will include working with realistic food system models, validating processes under simulated industry conditions, and assessing risks relevant to industry and regulators. Engineering-focused training will introduce LED array design, basic electronics, CAD modelling and system integration for use in food-processing environments. The student will also complete a three-month professional placement (PIPS), with opportunities to work with government partners such as the Animal and Plant Health Agency (APHA), gaining insight into policy, regulation, and knowledge exchange. Together, this training will equip the student for careers in academia, industry, or public sector roles.

FoodBioSystems training opportunities: Throughout their studentship, all FoodBioSystems doctoral researchers participate in cohort training that covers four key themes: food systems, big data (data analytics and modelling), business, and research fundamentals. All doctoral researchers complete a placement: either project-related with a non-academic (CASE) partner, or unrelated to the project and outside the academic environment (PIPS). Details of training are available on the DTP website: https://research.reading.ac.uk/foodbiosystems/training/.

Project supervision style

The student will be supported by a structured supervisory framework designed to provide regular guidance and interdisciplinary input. The lead supervisor will meet with the student weekly for 1:1 discussions on experimental design, data analysis, and project progression. Monthly meetings will be held with the wider supervisory team to provide integrated input on all project aspects, and to ensure coordinated support across disciplines. The student will also participate in regular Reading laboratory group meetings to present results, discuss challenges, and receive peer feedback. Written feedback on draft reports, thesis chapters, and manuscripts will be provided within 15 working days of submission, with shorter turnaround for concise materials such as abstracts or presentations. Feedback will be provided by the lead supervisor in the first instance, with the co-supervisors integrated as required. This structured supervision plan ensures continuous monitoring, timely feedback, and comprehensive support for the student's academic, technical, and professional development.

Stipend (Salary)

FoodBioSystems DTP students receive an annual tax-free stipend (salary) that is paid in instalments throughout the year. For 2025/26 this is £20,780 and it will increase slightly each year at rate set by UKRI.

Equity Diversity and Inclusion

The FoodBioSystems DTP is committed to equity, diversity, and inclusion (EDI), to building a doctoral researcher (DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the FoodBioSystems DTP website and include:

- Offering reasonable adjustments at interview for shortlisted candidates who have disclosed a disability or specific learning difference.
- Guaranteed interview and applicant mentoring schemes for applicants, with UK home fees status, from eligible under-represented ethnic groups who also meet academic eligibility criteria and the student profile essential for the project.

These are opt-in processes**.**
Our studentships can be offered to home students on a part-time basis, and studentship end date and stipend payments will be amended to reflect the part-time registration. The minimum registration for DTP funded part-time students is 0.5 FTE (studying an average of 20 hours per week over 8 years). We regret that part time registration is not available to international students due to complexities of visa restrictions.

Funding note

We welcome applications from candidates with Home/ROI fees and international fees status. This studentship is funded by UKRI and covers stipend, fees at Home/ROI rate, and research costs.
Costs that must be found from other sources or met by the individual student include:
The difference between international and Home/ROI fees at University of Reading, visa fees, healthcare surcharge, relocation costs, and guarantor services.
Information about fees is available at https://www.reading.ac.uk/doctoral-researcher-college/funding/fees/fees-new-students
For up to date information on funding eligibility, studentship rates, and part-time registration, please visit the FoodBioSystems website.