

## Pulsed ultraviolet-light technology and ecoinnovations for safeguarding consumer health and fragile seafood industry from norovirus outbreaks

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### Introduction

Contamination of water and food are responsible by many outbreaks and deaths worldwide, caused by failures in production, ineffective disinfection techniques, proximity to sources of contamination, and human intervention on environment. Norovirus (NoV) is a virus associated with water contamination and commonly related with foodborne illness, causing acute self-limiting gastroenteritis. In Ireland, the detection of NoV at plant level result in a shutdown of operations for several days and a process of depuration, analysis and final inspection. Literature has confirmed that there is no effective mitigation technology currently deployed that eliminates this virus in contaminated seafood, where the globally annual cost estimated for treating infected patients reaches \$60 billion<sup>1</sup>. Pulsed ultraviolet-light (PLUV) is a clean and non-residue technique, recognized by FDA as safe for use on processing and handling of foods, and is environmental friendly. This technique delivers light pulsed in broad spectrum delivering up to 10 pulses per second of highly efficient energy accumulated in capacitors<sup>2,3</sup>. The aims of this PhD project are the development of new pulsed light-ultraviolet technology and ecoinnovations to improve the productive chain of seafood in Ireland and worldwide, reducing NoV outbreaks, ensuring the microbiological quality of products and food safety.

### Methodology

Systematic review

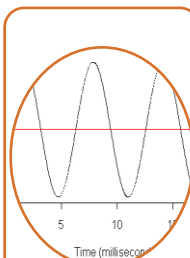
Analysis of key parameters governing PL-UV usage

Establish efficacy of sensor for determining microbial bioburden in seafood depuration

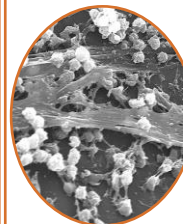
Risk assessment model for informing policy and decision making

Submit PhD thesis, publish papers and register patents

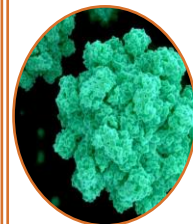
### Expected results



System modelling of PL-UV configuration (energy, light sources, reflective surfaces, wavelengths)



Efficiency analysis against model microorganisms of food and water contamination at bench level



Disinfection and elimination of contaminations with NoV and pathogens at seafood industry



Sensor for NoV decontamination risk assessment and technology registration

### References

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