



# Tania PALMEIRO SANCHEZ

**Technology centre:** Dairy Processing Technology Centre (DPTC), NUI Galway

**Academic Mentor:** Dr. Vincent O'Flaherty

**Commercial Partner:** Kerry Foods Ltd.

**Commercial Mentor:** Dr. Sean Pender

Tania received her PhD in Chemical and Environmental Engineering from the University of Santiago de Compostela (Spain). Her thesis, entitled "Saline wastewater valorisation: a challenge for the obtainment of bioproducts", tackled both issues of the treatment of saline wastewaters and their feasibility to produce value-added products. Her PhD was awarded with a mention *Cum laude* and also an international mention. She has participated in national and international conferences, published in international peer-reviewed journals, and also collaborated in book chapters.

Currently, her work is focused on the valorisation of wastewater from the dairy industry to produce bioplastics (i.e., Polyhydroxyalkanoates). This research involves the design of a feasible valorisation system as well as the understanding of the microbial communities and their role in the process.

## Dr. Vincent O'Flaherty

Dr. Vincent O'Flaherty has expertise in microbial biofilm and microbial ecology research, focused on: anaerobic biofilm reactor technology for biorefining, energy production and wastewater treatment; control of biofilms in infectious disease settings and the microbial ecology of anaerobic biofilms and soil ecosystems. He is an international research leader in the field of anaerobic digestion with 108 papers in leading international peer-reviewed journals - 39 in the past 5 years. His work has been recognised internationally through numerous invitations to present keynote talks. He is an expert panel evaluator for the European Research Council and review for all the leading journals in the field.

## Dr. Sean Pender

Dr. Sean Pender completed his PhD in anaerobic digestion microbiology at National University of Ireland, Galway (NUI Galway) on the specific topic of anaerobic digestion of sulphate-containing wastewater. He has authored several scientific papers on the topic of anaerobic wastewater treatment in leading journals such as *Water Research*. Following completion of his PhD, Sean worked as a post-doctoral researcher in Galway and, in that role, he was directly involved in the day-to-day mentoring of undergraduate and post-graduate students. Sean has more than 15 years of industry management and team leadership, a key feature of which is the development of talent, the assimilation of newly recruited graduates into existing teams and the design and delivery of activities to maximise individual performance and team integration.

## Dairy Processing Technology Centre (DPTC)

The Dairy Processing Technology Centre is an industry-academic collaborative research centre, hosted by University of Limerick (UL), with a research agenda driven by the long-term growth opportunities for the dairy sector. The Centre will help to fuel growth in the Irish dairy sector by performing research focused on cost-efficient processing, facilitating a step-change in environmental sustainability and creating, validating and commercializing a pipeline of science and technology-based manufacturing platforms for dairy ingredients.

## Kerry Group

Kerry Group is a global leader in the industry of food and beverages and is the largest and most technologically advanced developer and provider of taste and nutrition solutions worldwide. Kerry is a leading supplier of added value brands and customer branded foods to Ireland, the UK and international markets and provides nutrition and functional ingredients solutions to all sectors of the food, beverage and pharmaceutical markets. Its brands are household names including Dairygold, Richmond, Fridge Raiders, Cheestrings and Denny among many others.

## Tania's project

---

### “REsidues as FEEDstock for value-added products – application to the case of the Irish Dairy Industry (REFEED)”

Waste and wastewater treatment have evolved through history. First civilizations discarded the residues while in the early 20th century, the treatment of wastes began to reduce sanitary problems. In the early 21st century, an innovative perspective appeared: these residues began to be considered as feedstock to produce value-added products.

The concept of a “waste” product being recycled into value-added products feeds directly into the EU Strategy on the Circular Economy. Closing energy and material “loops” by smarter process design and “waste” recycling is key in minimising the waste of resources, emissions and energy leakage.

The aim of the REFEED project is to valorise dairy processing wastewaters to obtain value-added products. These valuable outcomes can be energy, chemicals and/or materials. The project is centred in the recovery of chemicals and materials since they have higher economical value for the partner company while being more environmentally friendly products. The value-added products that will be recovered are a range of organic acids called volatile fatty acids (VFAs) and a group of bacterial biopolymers known as polyhydroxyalkanoates (PHAs).

VFAs are commercially desired since they can be used as building blocks for the synthesis of a wide variety of chemicals that can replace a group of petroleum-based products. These VFAs are produced by microorganisms using wastes as feedstock, which guarantees a renewable and green process.

PHAs are a huge group of microbial biopolyesters that can be produced using these VFAs as feedstock although other non-fermented feedstocks can be used. The reason for choosing VFAs as substrate is because the yields of the process are much higher. PHAs are attracting the attention of the research community due to their potential as bioplastics, which makes them good substitutes for conventional plastics.

---