



Prateek SHARMA

Technology centre: Dairy Processing Technology Centre (DPTC), Teagasc

Academic Mentor: Diarmuid Sheehan

Commercial Partner: Dairygold Food Ingredients Limited

Commercial Mentor: Anna Moynihan

Prateek is an experienced cheese scientist. He previously worked in the Irish Dairy industry and in academia at the National Dairy Research Institute, India before undertaking a PhD at the Riddet Institute in New Zealand (in association with the global company, Fonterra). Prateek received his bachelor's degree from the Maharana Pratap University of Agriculture and Technology, India where he was awarded a gold medal. He undertook his master's degree at the National Dairy Research Institute, India, where he was involved in the development of a ready-to-reconstitute Basundi mix. The outputs from the project included an international research paper, 2 conference presentations and an Indian patent. Subsequently Prateek undertook a second master's degree in Food Science at the former Dublin Institute of Technology, now Technological University Dublin, Ireland under Erasmus Mundus funding. During this time while placed with Glanbia, he successfully developed a long-life directly acidified milk drink formula. Subsequently, while working with Dairygold, he led innovations in process optimization of demineralisation of whey and its novel applications in the infant formula industry. More recently Prateek received his Doctoral Degree from Massey University, New Zealand. From this he has published six peer reviewed research papers in high impact international journals, presented at five international conferences of repute and co-supervised three international students.

Diarmuid Sheehan

Dr. Sheehan is a Senior Research Officer based at the Teagasc Food Research Centre Moorepark and is a Principal Investigator (PI) for both the Dairy Processing Technology Centre and the Food Health Ireland programme. As well as licensing IP protected technologies to industrial partners, he was programme manager from 2010 to 2014 for a public private partnership focused on converting research expertise into the development of products for market launch. He is also an Associate Editor for the International Journal of Dairy Technology and co-lead of the European based Cheese Symposium series.

Anna Moynihan

Anna Moynihan is an experienced R&D professional specialising in cheese technology. She graduated from UCC in 2008 with a BSc (Hons) in Food Science and Technology and completed her PhD in 2015 on "Studies on the texture, functionality, rheology and sensory properties of Cheddar and Mozzarella cheeses". She was awarded the prestigious US Fulbright Scholarship in 2010 to conduct a part of her PhD research at University of Wisconsin-Madison, USA and published two research papers in peer reviewed journals. Since 2012, Dr. Moynihan has been leading commercially driven cross-functional cheese innovation projects in Dairygold.

Dairy Processing Technology Centre (DPTC)

The Dairy Processing Technology Centre is an industry-academic collaborative research centre, hosted by the University of Limerick, 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.

Dairygold Food Ingredients

Dairygold Food Ingredients has a strong research collaboration with the Teagasc Food Research Centre, both directly and through other innovation platforms. Dairygold has one of the largest Cheddar production plants nationally and is committed to improved dairy market returns for its stakeholders by producing and exporting milk products in a cost effective and sustainable manner.

Prateek's project

“MoST Cheese: Molecular drivers for optimizing sustainability of industrial scale cheese production”

The aim of Prateek's project is to develop smart manufacturing methods to improve the sustainability within commercial scale cheese manufacturing plants through the reduction of energy intensive and climate sensitive processes by optimisation of molecular interactions between cheese matrix constituents (e.g. Salt, moisture, protein).

Irish milk production has grown since removal of EU quotas in 2015. This increased milk production will help to address the growing global demand for food, however, it may place increased pressure on the dairy industry to be more sustainable and to decrease its environmental impact. Ireland produces ~225,000 tonnes of cheese annually (~93 % exported, worth ~ € 815m).

During cheese manufacture, whey is drained from curd and processed to make other ingredients such as powder. The curd that remains contains moisture, fat, protein, lactose and minerals; this curd is then salted which excludes more whey from the cheese; this is called salty whey and must be treated and disposed of through effluent streams.

The project involves evaluating the effect of recycling salty whey and reusing the salt present in this to add to the cheese again so that the use of salt is reduced. It is important to understand the effect that these changes on the cheese matrix and on molecular interactions within the cheese so that we can understand how this will impact on the product quality and functionality for applications including consumers products.

The project will provide a platform science to enhance salt diffusion kinetics and dynamics of solute transport in a reduced solvent environment. The project will integrate model protein gel systems and sophisticated analytical techniques such as Nuclear Magnetic Resonance and Confocal Raman Microscopy, and will also validate its results at industrial scale.

Overall, the project will use science to deliver climate-friendly, economically viable and sustainable cheese manufacturing solutions for a key export industry.
