



LE DENG

Technology Centre: Dairy Processing Technology Centre (DPTC), Teagasc Food Research Centre
Academic Mentor: Dr Diarmuid Sheehan
Company Partner: Carbery Group
Company Mentor: Linda Tanner

Dr Le Deng has gained considerable experience in dairy science and technology around the globe. She received her bachelor's degree from China Agricultural University (Beijing, China) and completed her master's degree from Wageningen University (Netherlands). In 2020, she graduated with a PhD degree in Food Technology from Massey University (New Zealand) with a thesis entitled "Studying the relationship between emulsion structure and lipid digestibility for infant milk", which was an industry-orientated project sponsored by Fonterra. During her PhD, she excelled in statistics where she tutored students in mathematical & statistical techniques at Massey University to support their undergraduate studies and to enhance their knowledge of statistics. She has also worked for Fonterra and at the Riddet Institute (New Zealand) on various projects. Le's current project aims to provide a scientific platform to underpin development of pasta-filata and process cheeses with bespoke rheological and functional characteristics, and to enhance other properties including clean label to target the growing MENA and Asian markets for cheese, in particular in China.

Dr Diarmuid Sheehan

Dr Sheehan is a Senior Research Officer based at the Teagasc Food Research Centre Moorepark. Amongst other activities, he is RFA 1 lead and a Principal Investigator (PI) for the Dairy Processing Technology Centre and a PI for the Food Health Ireland programme. He has licensed IP protected technologies to industrial partners and was previously a programme manager for a public private partnership focused on converting research expertise into the development of products for market launch. Diarmuid has published over 75 peer reviewed publications and book chapters, is an Associate Editor for the international Journal of Dairy Technology and chairs the Standing Committee for Dairy Science and Technology of the International Dairy Federation.

Linda Tanner

Linda Tanner is the Cheese Research and Development manager in Carbery and has 27 years' experience working in this field since she graduated from UCC with a Food Science and Technology degree. Linda's current role involves managing cheese research and NPD projects within Carbery and with external teams. Throughout her career, she has mentored undergraduate, postgraduate and postdoctoral level associates and employees. Linda has also worked very closely with leading scientists in local research Institutions primarily. Linda has been managed many government-funded Innovative Partnership projects over the years involving these local institutions.

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 products.

Carbery Group

Carbery group is a leading international manufacturer of food ingredients, flavouring systems and cheese products. The company has brought innovative and high-quality foods and ingredients to market for over 50 years. It has manufacturing facilities worldwide, including Ireland, UK, Italy, USA, Brazil and Thailand. It is a founding stakeholder of both the Dairy Processing and Food for Health Ireland Technology Centres which seek to harness world-class science and industry expertise to improve dairy processing and health benefits of food.

Le's project

“Designing curd biochemical, physico-chemical and microstructural properties for optimal functional and rheological properties of processed and pasta-filata cheeses for emerging Asian markets”

Ireland produces > 285,000 tonnes of cheese per annum, approximately 93 % of which is exported to a value of ~ € 850 m. Traditionally, 65 % of cheese was exported to the UK. However given market challenges posed by Brexit, this project will equip Carbery to further target the rapidly expanding Asian market and in particular to grow its Asian business from 5 to 18 % of its projected 63,000 tonnes/annum cheese production. Pasta-filata (Mozzarella) and process cheese are gaining wide interest particularly in Asian markets for their properties of convenience, nutrition, and functionality (stretch, melt, flow, sliceability, etc.) and they are used in many different applications, e.g. pizzas, burgers, toasties, food ingredients, formulated foods, etc.

However, an in depth understanding of how varying the cheese microstructure and composition (e.g. patterns of protein breakdown, levels of calcium in the curd, pH, moisture, protein and fat levels, etc.) will impact on functional properties (slicing, shredding, flows, melts etc.) and on heating are important to create cheeses with bespoke attributes for specific end uses. This project will focus on the study of rheology to develop a scientific and technological platform to understand how the specific melt and flow properties may be controlled. Similarly, it will seek to facilitate the desire by consumers for clean label ingredients in achieving optimum process cheese properties. The latest analytical innovations in rheometry and scanning electron and confocal Raman microscopy will be utilised to achieve this.