Nanik PURWANTI

Technology centre: Dairy Processing Technology Centre (DPTC), Teagasc
Academic Mentor: Dr. Eoin Murphy
Commercial Partner: Arrabawn Co-Op
Commercial Mentor: Shane Mulcahy

Nanik received her bachelor's degree in Bogor Agricultural University, Indonesia. In 2005 Nanik started her master's degree in Wageningen University and Research (WUR), The Netherlands, focusing on Polylactide-ultrasound contrast agents. In 2007 Nanik started her Doctoral degree in Wageningen University and Research doing research on Structuring high-protein foods. She won multiple grants after holding the doctorate degree including a postdoctoral fellowship program from United Nations University and Kirin Holding Company, Japan (2013-2014), research grants from L'Oréal-UNESCO for Women in Science National Fellowship Programme in 2014, and from Indonesia Toray Science Foundation in 2016. She also received competitive research funding from Ministry of Research, Technology and Higher Education of the Republic of Indonesia in 2017 and 2018.

Dr. Eoin Murphy

Dr. Eoin Murphy research areas align with the research goals of the fellowship. Dr Murphy's main area of interest is in drying processes and, in particular, optimising their efficiency. Prior to joining academia Eoin worked as a novel process/product developer in the infant milk formula industry. He has a strong track record of working within Enterprise Ireland frameworks specifically in projects which have strong collaboration between industry and academia.

Shane Mulcahy

Shane is a research and development technologist at Arrabawn co-op, where he works on the optimisation and efficiency of processing lines. Shane has a degree in chemistry and has 14 years' experience in the dairy industry and has worked in all areas of processing from quality control to production support. One of the main areas of focus for Shane is in the optimisation of the separation of whey and subsequent drying of streams and he has led a number of projects on site in the recent years. Shane is actively involved in the DPTC, including collaborating with researchers to publish a paper on Whey Protein Concentrate recently.

Dairy Processing Technology Centre (DPTC)

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

Arrabawn Co-Op

Arrabawn Co-operative is a leading milk co-operative in Ireland with 980 farmers, and a milk pool of 330 million. The milk ingredients factory in Nenagh Co. Tipperary is a long-established milk processing facility with a history going back over a 100 year on the site. The production of mineral acid casein has taken place on site since the late 1980s and acid whey has been dried on site since the 1990s. Arrabawn currently is one of the largest producers of acid whey in Ireland. Small quantities of WPC 35 and Whey permeate are also produced on site. The company have a good deal of expertise in whey processing and production and has a good track record with engaging with academic institutions, most recently through the DPTC.

Nanik's project

"Increasing Processability and Overall Valorisation of Irish Acid Whey"

Ireland has about 18,000 dairy farmers and a national dairy herd of 1.4 million cows with national milk production in 2016 of 6.65 billion litres. However, only 10% of milk in Ireland is produced for direct consumption. The rest is processed further into various products such as cheese, milk powders, infant formula, etc., which bring substantial capacity and by product management challenges.

Acid whey from casein production is a major by-product that for the most part is further processed into high commercial value products, i.e., whey protein and lactose. However, the negative aspect of this valorisation scheme is the difficulty associated with manufacturing, particularly stickiness during drying, which can be exacerbated by seasonal variation of milk.

The proposed research aims to characterize the effect of seasonal and processing variation on acid whey stream from casein manufacture. This research will explore the effects of pretreatments of acid whey on the manufacture of whey protein concentrate and permeate powders. The research is in close collaboration with Arrabawn, a major manufacturer of acid whey powder with interest in increasing volumes of acid whey products.

Results from the project will help Arrabawn and the wider dairy industry to overcome processing limitations to extract as much value as possible from all components of acid whey, while also allowing the fellow to gain expertise in overall whey processing, not only at laboratory scale but also at pilot and industrial scale. The proposed research supports DPTC in creating cost-efficient processing in Irish dairy industry without waste of valuable components, which makes processing of dairy co-products become sustainable. This achievement will strengthen long-term collaborative partnership between dairy industry and academia.