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Hosted by Dr Lin Qingsong

Next-Gen Protein Ingredients: Sustainability Meets Digital Innovation in Food Processing

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Traditional protein production from dairy, poultry and livestock generates high greenhouse gas emissions, strains natural resources, and cannot fully meet the nutritional demands of a growing population. Sustainable alternatives, such as plant-based and other novel protein sources, offer a scalable solution, and Canada is well positioned to lead this transformation, as it is a top global producer and exporter of protein-rich crops. However, challenges with flavour, taste, texture, nutritional balance, and food safety continue to limit consumer acceptance of alternative proteins. By utilizing green bioprocessing techniques, such as microbial fermentation and enzymatic treatments, or innovative thermal processing technologies, such as infrared, microwave and radio frequency heating, we are improving the yield, sensory, functional and nutritional attributes of alternative plant-based protein ingredients. Our research leverages Foodomics, the integration of various omics approaches, to unlock a deeper understanding of the molecular composition of food matrices and their changes during processing. Through development of Foodomics methodologies, such as food proteomics and volatolomics, we have accelerated both scientific discovery and industrial application of various post-harvest processing and protein fractionation technologies. In this talk, I will share real-world case studies illustrating how these approaches address critical technology barriers, driving the development of new protein ingredients from plants and other alternate sources. Finally, the presentation will also delve into the potential applications of digital tools to catalyze the design and development of novel process workflows and shorten new product development lifecycle.

Dr. Rajagopalan currently leads the Future Agri-food Science and Technologies team at the National Research Council of Canada, Saskatoon. He obtained a PhD from the Department of Biological Sciences at the National University of Singapore in 2008 and carried out his post-Doctoral studies at the University of Heidelberg, Germany, where he received the prestigious Alexander von Humboldt Post-Doctoral Fellowship. Dr. Rajagopalan joined the National Research Council (NRC) of Canada at Saskatoon in 2011. He was appointed as an Adjunct Professor at the Department of Chemical and Biological Engineering at the University of Saskatchewan in 2021. He has authored over 30 publications in reputed peer-reviewed scientific journals and holds a patent for developing a peptide with biopharmaceutical applications. He has received multiple international awards and recognition, such as the Young Scientist Award from the Human Proteome Organization (HUPO) and the Boehringer Ingelheim Fonds Award. Recently, he has helped build the Protein Ingredient Innovation strategy of the NRC and established capabilities in food processing technology development, food chemistry and Foodomics.