Dr Vincenzo di Bari

Current Role: Assistant Prof. in Food Structure and Processing (since October 2021).

Research interests lay at the interface between biology and engineering with to identify sustainable ways to feed a globally growing population. Current research projects focus on (1) phase transition of crystallising materials to manufacture bio-based coatings and films, (2) extraction and physiochemical characterisation of bio-materials including microorganisms; (3) processing of legumes and cereal seeds to manufacture products with targeted textural and nutritional properties to meet consumer preferences and physiological needs (i.e. swallowing).

Secured UKRI grants:

- Project 33831496: Fermentation Using Metabolic Additions And AI For Authentic Meat Imitation (FUMAMI)
- Project 10066166: Potential for BioBased Waxes for Paper Bottle Barrier Coatings
- Project 10072090: Cheese from Peas.
- Project 10075636: Enhancing the nutritional quality of novel whole-cut meat alternatives, using fungal fermentation, biofortification and process innovation.

Previous roles:

Industrial Senior Research Fellow (July 2020 to September 2021). Fellowship sponsored by McCain GB (Ltd) having title: "Palm Oil Replacement Technology". Fellowship aimed at gaining a fundamental understanding of molecular interplay in wax-based oleogels to enable the translation of oleogel technology at the industrial scale.

Senior Research Fellow (January 2019 to July 2020). Role hold at the "Centre for Additive Manufacturing (CfAM)" under the EPSRC project "Formulation for 3D printing: Creating a plug and play platform for a disruptive UK industry". Faculty of Engineering, The University of Nottingham. The project validated the functionality of waxes for hot-melt ink-jet 3D printing.

Parallel Industrial research project (January 2019 to July 2020): Design and characterisation of novel, sustainable plant-based lipid blends for frying applications. This project fully funded by McCain GB Limited developed new functional lipid blends able to deliver environmental and nutritional benefits. This preliminary project led to a fellowship.

Previous roles and research topics covered:

Research Fellow (January 2016 to December 2018), Division of Food Sciences, Biosciences, University of Nottingham. Work in collaboration with Prof T. Foster, Dr D. Gray and Dr B. Wolf.

Main Research topics:

- Identify the role of process and formulation on the development and stability of oleogels emulsions for the replacement of saturated and *trans*-fats (industrial collaborations)
- Optimisation of sustainable aqueous-based extraction processes to recover natural organelles ('oil bodies'/oleosomes) from oil-rich seeds and nuts.
- Development of a novel enzymatic assay to assess thermal treatment effectiveness in oleosomes emulsions.

Industrial secondments (confidential project):

- ✓ **Unilever (5 months):** project on reformulation of fat phase in ice-cream. Project based both at home institution and at the company (Colworth House, Bedfordshire, UK)
- ✓ **Greencore (1 month):** project aiming at reformulation of cakes to reduce the content of partially hydrogenated *trans*-fats. August 2017.

International research exchange (5 weeks): project aiming at characterising the surface morphology of spray dried oil-body emulsion droplets. Project in collaboration with Dr C. Nikiforidis at the Physical Chemistry and Soft Matter Laboratory of the University of Wageningen (Netherlands).

Email: Vincenzo.Dibari@nottingham.ac.uk Born: Bologna, Italy, 05/06/1986

Research Associate (Oct. 2014 – Dec. 2015), Division of Food Sciences, Biosciences, UoN. Work in collaboration with Prof T. Foster, Dr D. Gray. Main Research topics:

- Waxes chemical profiling and microstructural characterisation of oleogels to understand the role of process and formulation on the thermo-mechanical properties of systems.
- Development and optimisation of aqueous based grinding-extraction processes for the recovery of nutraceutical lipids from waste seeds (i.e., blackcurrant and tomato seeds).
- Impact of grinding methods and supercritical CO_2 extraction process as novel combined route for the extraction of nutraceutical and functional lipids from blackcurrant seeds.
- Upgrading food waste materials: characterisation and use of brew spent grains to develop model foods with novel textural properties.

Research Associate (June – August 2014), School of Chemical Engineering, University of Birmingham (UoB). Project funded by Kinnerton (division of "Zertus UK") to develop novel chocolate fillers (confidential).

Research Internship (April 2010 – October 2010): Rothamsted Research Centre (UK). Research Project aiming at the extraction and characterisation of gluten proteins from new lines of wheat. Effect of buffer type, seed grinding procedure (bulk milling vs layer-by-layer) and sonication assisted-extraction were tested. The protein profile from different layers of the seeds was also investigated. Project supervised by Prof P. Shewry and Dr P. Tosi.

Education:

PhD in Formulation Engineering (February 2011–May 2014), Chemical Engineering, UoB.

Thesis title (open access): Large deformation and crystallisation properties of process optimised cocoa butter emulsions.

Università Degli Studi di Foggia, Facoltà di Agraria (Faculty of Agriculture), Italy

- **Master of Science in Food Science & Technology (October 2008 – December 2010):** Maximum distinction mark (110 /110 *summa cum laude*).
- **Bachelor of Science (BSc) in Food Science & Technology (October 2005 – 2008):** Maximum distinction mark (110 /110 *summa cum laude*).

Selected Publications:

- Sutcharit *et al.* (2023). Chloroplast/Thylakoid-rich Material: A Possible Alternative to the Chemically Synthesised Flow Enhancer Polyglycerol Polyricinoleate in Oil-Based Systems. Food Research International, 165, 112472.
- Meacci *et al.* (2021). A mathematical model of a single seed oleosome. Results in Applied Mathematics, 9, 100128.
- De Chirico *et al.* (2020). Assessment of rapeseed oil body (oleosome) lipolytic activity as an effective predictor of emulsion purity and stability. Food Chemistry, 316, 126355.
- V. di Bari *et al*. (2019). Material properties of cocoa butter emulsions: role of fat phase processing and water fraction on mechanical response. Colloids and Surfaces A: Physicochemical and Engineering Aspects, 575, 292-298.
- di Bari, V., *et al*. (2017). Crystallisation in water-in-cocoa butter emulsions: Role of the dispersed phase on fat crystallisation and polymorphic transition. Food Struc. 12: 82-93.
- di Bari, V., *et al.* (2014). Effect of processing on the microstructural properties of water-in-cocoa butter emulsions. Journal of Food Engineering 122: 8-14.
- De Chirico, S., *et al.* (2018). "Enhancing the recovery of oilseed rape seed oil bodies (oleosomes) using bicarbonate-based soaking and grinding media." Food Chemistry 241: 419-426.
- **Patent 1**: Publication number. WO2014160920 A1. Process for the production of stable emulsions. di Bari, V. *et al.* (2014)
- **Patent 2:** Publication number. WO2021064453 - Oil-Wax compositions and uses of oil-wax compositions for cooking food articles. Sarney et al. (2019).

Email: Vincenzo.Dibari@nottingham.ac.uk Born: Bologna, Italy, 05/06/1986