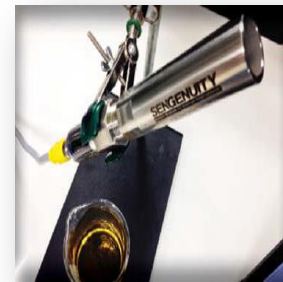
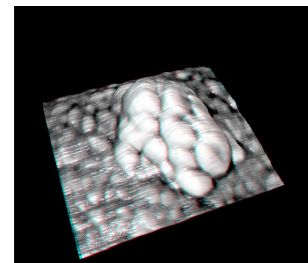


Food Chemistry and Technology Department



Thematic 1: Science of milk to finished product



Impact of Different Grass/Clover/Ration Diets on the Volatile profile, Sensory Characteristics and Functionality of Milk and Milk Products



Understanding the impact of primary production on the nutritional and functional quality of dairy products

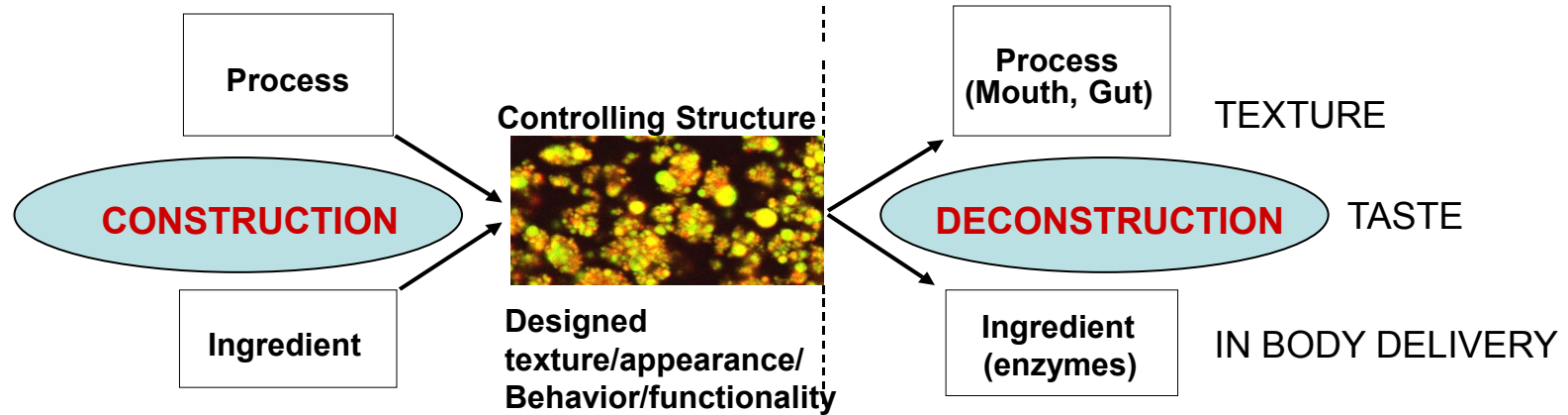
- Examining the effects of cow feeding practises on the macro and micro constituents, nutritional and chemical properties of milk and products
- Understanding the impact of cow diets on the process-ability of milk, in the dairy factory
- Understanding the impacts of cow diets on the sensory attributes of Irish dairy produce across the product life cycle
- Understanding the impact of cow diets on the physical and functional properties of structured dairy products
- Identification of biomolecules uniquely influenced by Irish pasture systems



Thematic 2: Colloidal science, food structure and soft matter

The Focus

“Using microstructural and materials science approaches, designing food products by understanding materials/product behaviours, the underlying physics of structuring processes and the behaviour of food in **physiological and processing environments**”.



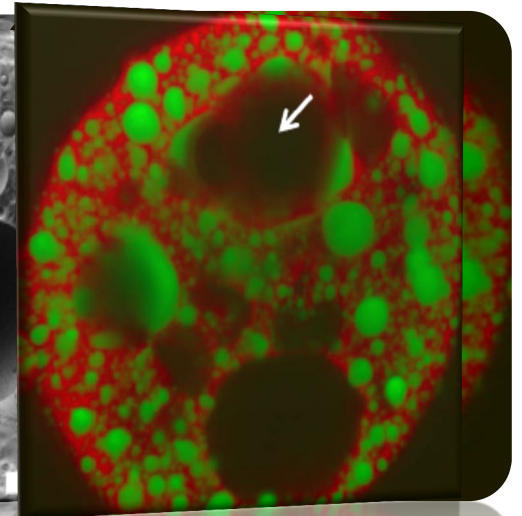
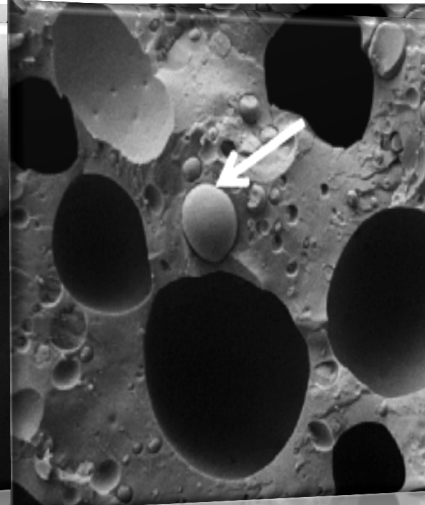
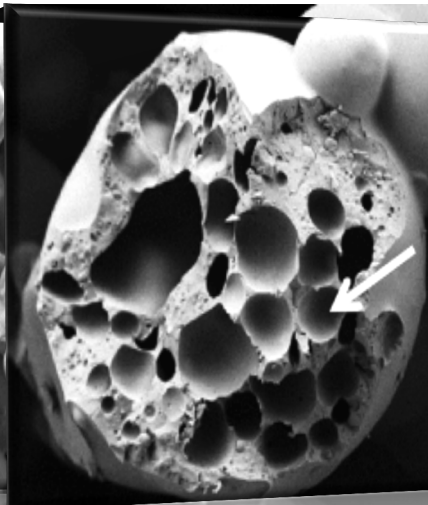
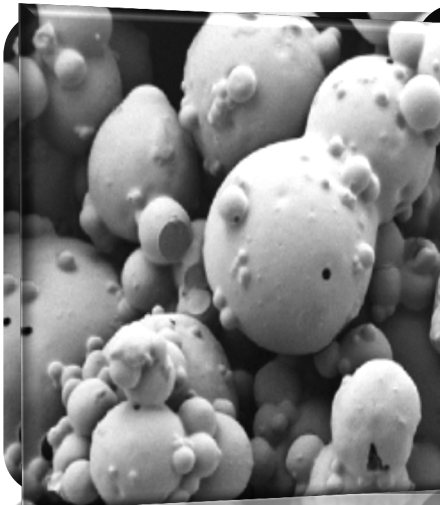
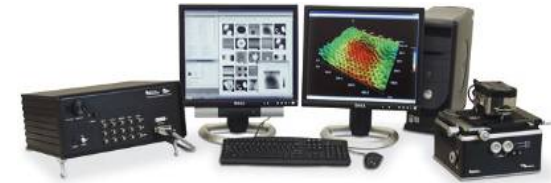
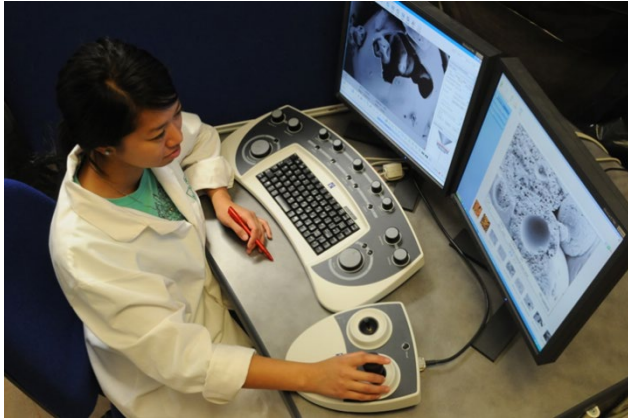
How do we realize our goals

Formulation and materials design: from Food Material Science aspect, understanding materials/product behaviours, link the physicochemical properties, structure formulation to functionality and industrial application

Novel structured emulsions for functional delivery: Targeting engineered flavour/bioactive/nutrients

Re-structuring dairy powders to improve functionality: powder and post-dehydration technologies/ultrasound-assisted extraction/rehydration processing technologies

Food structure governs behavior – state of the art microstructural tools for studying food structure function



Advanced analytical platforms support in-depth analysis of food chemistry and structure



Microscopy



Rheology



Morphology



Size Distribution



Bulk Composition



Flowability

Advanced analytical platforms support research activities



Thermal Transitions



Stability Analysis



Mineral Analysis



Texture profiling



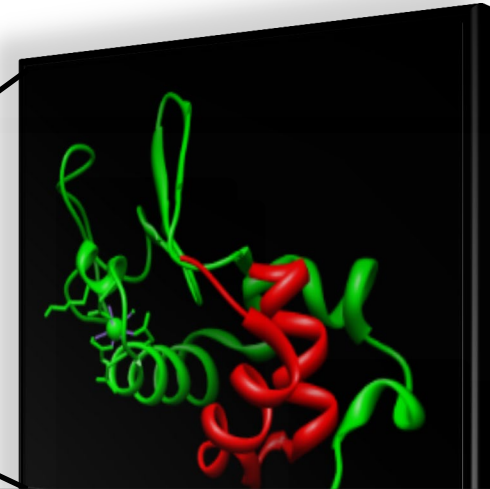
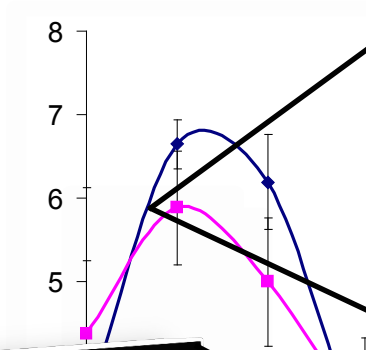
Macro Nutrients



Hydration Behaviour

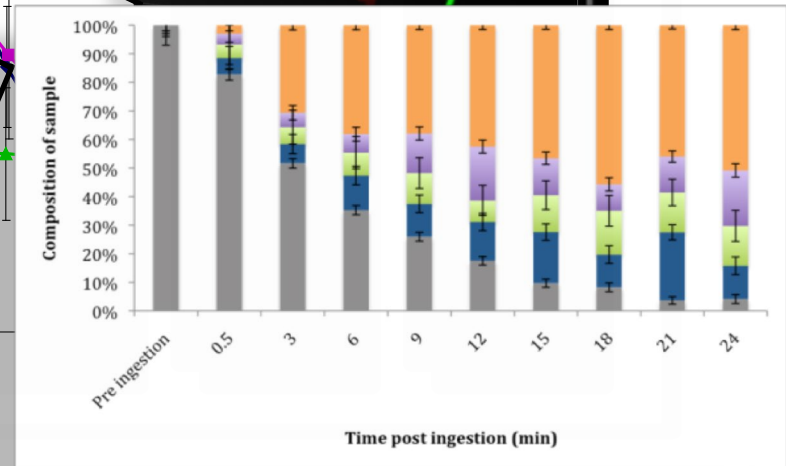
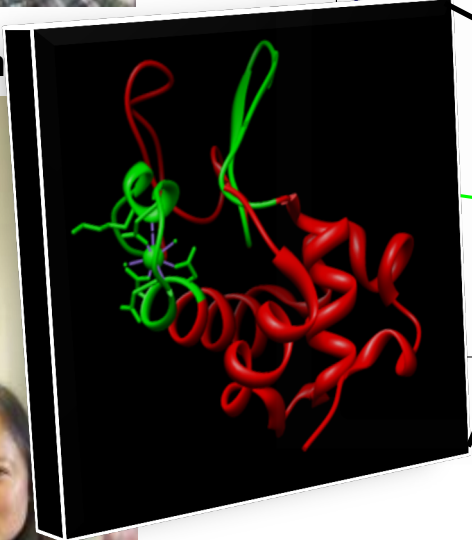
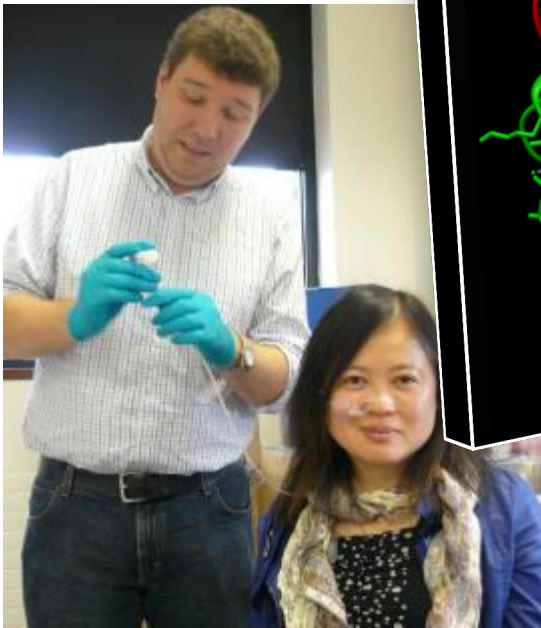
Thematic 3: Protein chemistry and behavior during processing and digestion

Dr. Andre Brodkorb



id

Dr. Joseph Kehoe & Zhan



in collaboration with INRA, Rennes and COST InfoGest

Real time imaging of protein structure formation in the human GI tract



Gastric imaging was performed using Mirocamâ capsule endoscopy technology - showed that mixing within the gastric environment was not sufficient to produce a homogenous mixture.

Digestion of ala in vitro (published) and in vivo (unpublished) Sullivan, L., Mok, K. H., & Brodkorb, A. (2013). The Formation of an Anti-cancer Complex Under Simulated Gastric Conditions. Food Digestion, 4 (1), 7-18.

Behaviour of dairy ingredients during processing is governed by their chemistry

Types of Spray dryer:



Pre-crystallisation:



Physical, mechanical, and industrially relevant properties of spray-dried dairy systems

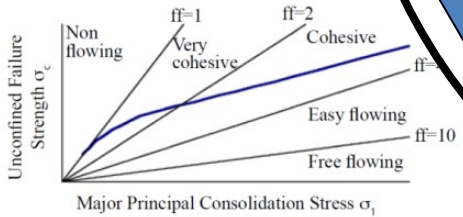
2

Processing conditions

3

4

Lactose/protein ratios:
 • Relationship between composition and flow properties of dairy systems



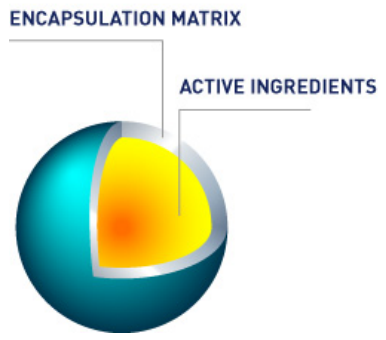
Flow properties

5

Crystalline lactose Contents:
 • Flow properties and mechanical properties

6

Lactose/protein ratios:
 • Encapsulation properties
 • Mechanical properties
 • Flavor release

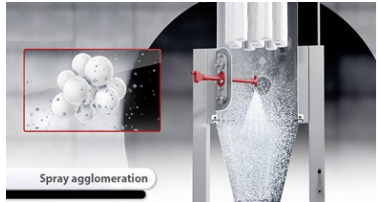


Encapsulation properties

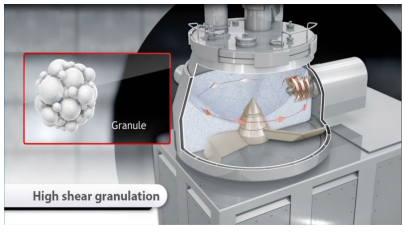
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Maltodextrin ratios and types:
 • Glass encapsulation and mechanical properties

Understanding food chemistry allow us to modulate structure altering subsequent functionality



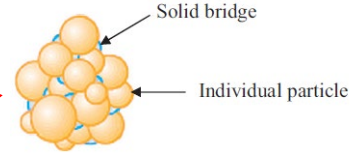
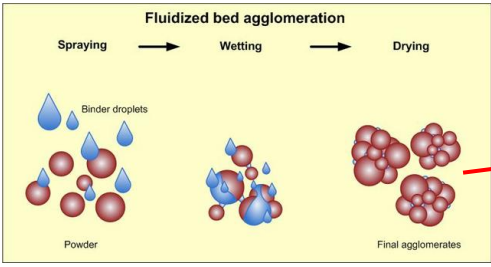
Post-dehydration process of dairy powders



Agglomeration & Coating by different approaches

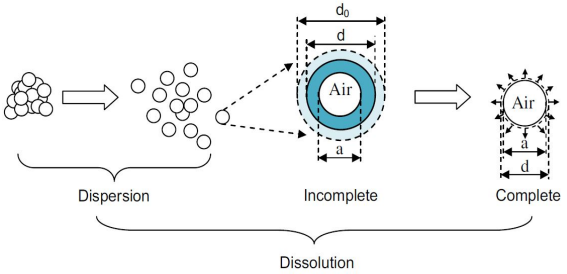
Modify the powder structural and physical properties

Size, density, porosity and occluded air



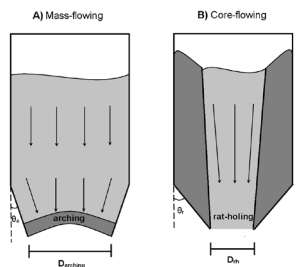
Rehydration behaviours

Wetting, dispersing and solubilisation processes



Flowability

Flow index, wall friction angles, hopper design.

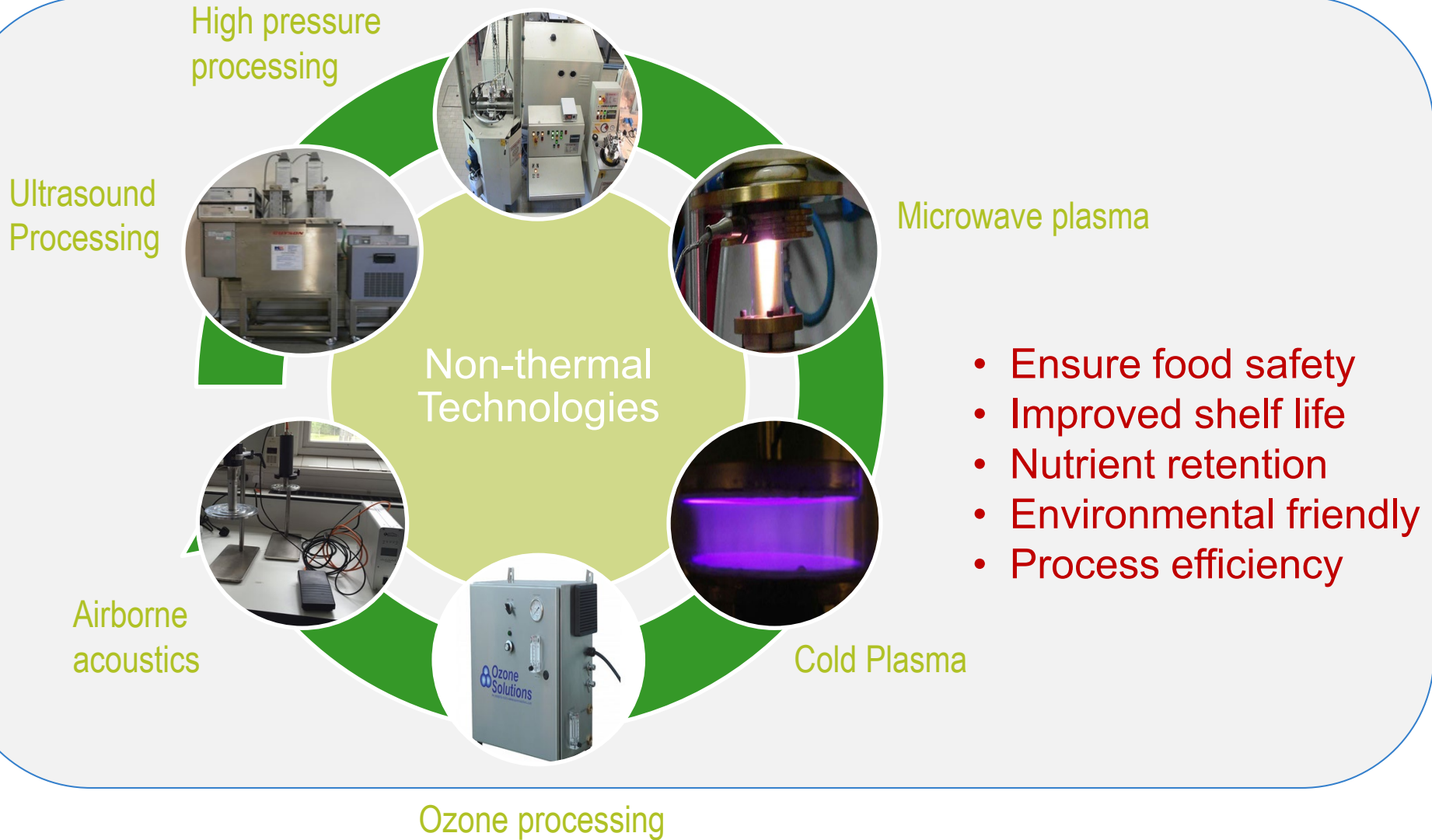


Water adsorption

Kinetics of water adsorption & adsorption isotherms



Thematic 4: Novel process technologies for food



Novel extraction process technologies for food

Supercritical
Fluid extraction



High pressure
extractor



Non-thermal
Technologies

Microwave assisted



- Enhanced extraction yield
- Process efficiency
- Clean and green
- Reduced solvent usage
- Bioactivity retention

Accelerated
solvent
extraction



Ultrasound
assisted



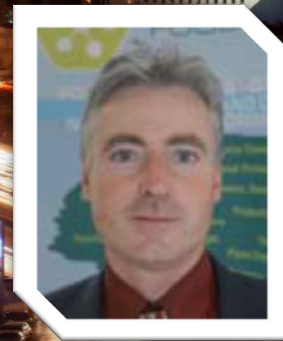
Thematic 5: Collaborative research with industry partners

Joint venture between Ornuu and Teagasc Moorepark




Launch: October 2013
Partnership with Al Wazeen Trading LLC

New cheese plant in Riyadh based on milk protein ingredients recombined into fresh cheese

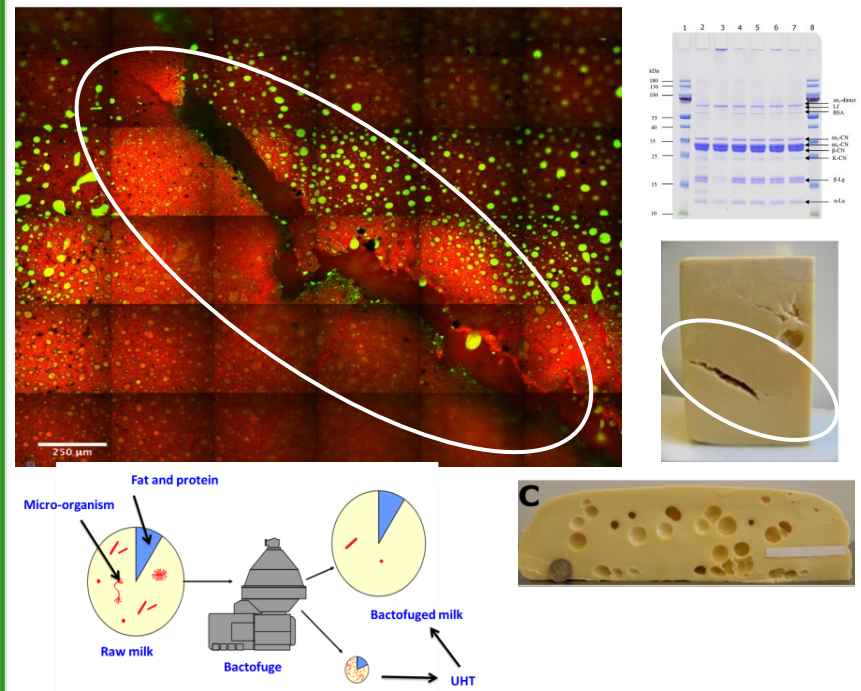
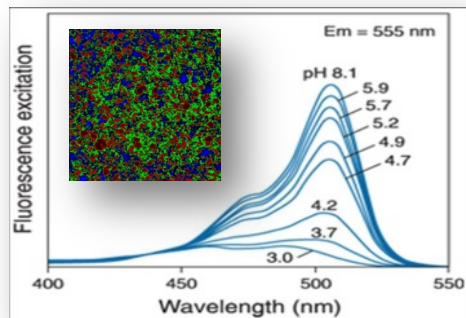


Thematic 5: Collaborative research with industry partners

Teagasc Cheese Diversification Programme

 Objective to develop a portfolio of products to meet customer and consumer needs in key markets

Kildery commercialised June 2014



Elucidation of interactions between curd microstructure, structure-function characteristics and factors influencing gas solubility to understand and control split defects in cheese

Teagasc Collaborating Universities in China



International Journal of Biological Macromolecules 74 (2015) 232–242



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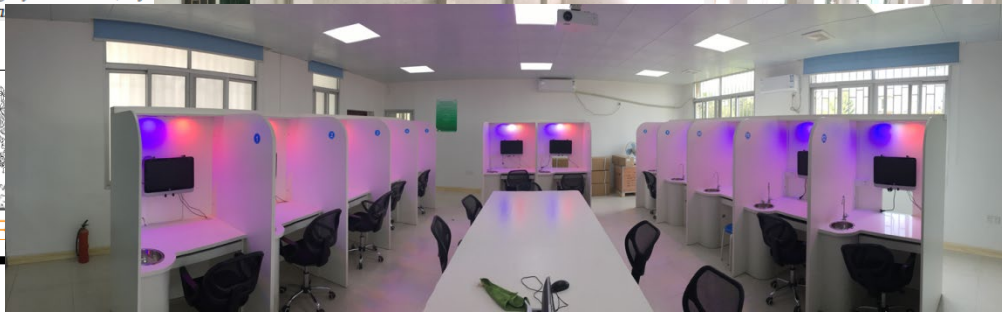
Extraction of polysaccharides from
Fortunella margarita

Hongliang Zeng^a,

^a College of Food Science, Fujian Agriculture and Forestry University, Fuzhou, Fujian 350002, PR China
^b Teagasc Food Research Centre, Moorepark, Fermoy, Co. Cork, Ireland



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Ultrasonic–microwave synergistic extraction (UMSE) and molecular weight distribution of polysaccharides from *Fortunella margarita* (Lour.) Swingle



Hongliang Zeng^a, Yi Zhang^a, Shan Lin^a, Yeye Jian^a, Song Miao^b, Baodong Zheng^{a,*}

^a College of Food Science, Fujian Agriculture and Forestry University, Fuzhou, Fujian 350002, PR China

^b Teagasc Food Research Centre, Moorepark, Fermoy, Co. Cork, Ireland



Ornuu opens new Saudi Arabia

As well as supplying Saudi, facility w region

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Eoin Burke Kennedy



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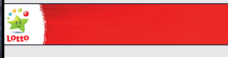


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Ornuu opens €20m Cheese facility in Saudi Arabia

