

Prepared Consumer Food Centre



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine



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The Prepared Consumer Food Centre (PCFC) has been established by the Department of Agriculture, Food and the Marine in consultation with Teagasc, Food Drink Ireland’s Prepared Consumer Food company members, Enterprise Ireland and Bord Bia, to support research, development and innovation in the Prepared Consumer Food sector.

Innovation is a key driver of economic growth and Teagasc continues to be committed to supporting science-based innovation and the delivery of related services to the Irish Prepared Consumer Food (PCF) sector. Teagasc recognises the diversity and complexity of the sector and offers specialist know-how, facilities and services from its Ashtown Food Research Centre in the broad areas of:

- Meat products
- Cereal, breads, biscuits and bakery technology
- Fruit and vegetable-based products
- Savoury snacks
- Other food preparations including ready meals, sauces, confectionary
- Non-alcoholic beverages

The vision for the PCFC is to support companies in piloting industry-led collaborative research and innovation capability, to maximise value creation opportunities and address the challenges across the industry. It will enable the adaption of technology to enhance consumer demands, increase competitiveness and ensure sustainability.

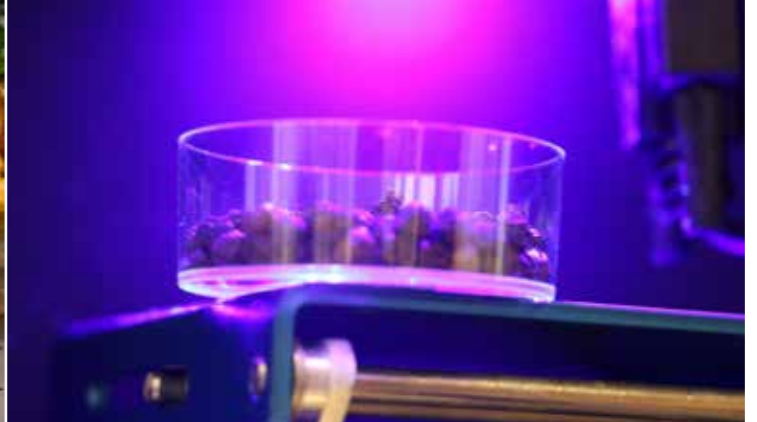
The Centre contains state-of-art pilot scale processing equipment which PCF companies can use for research and development in collaboration with Teagasc and other innovation support organisations. It also encompasses access to modern analytical and sensory laboratories to characterise foods in terms of nutritional, compositional, microbial and sensory profiles allowing complete product and process development.

Teagasc is delighted to outline here, some of the main components and contact points within the Centre. PCF companies are encouraged to avail of the use of the Centre within their own research and development strategies and/or by using the innovation support programmes provided by Enterprise Ireland.



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Food Product Innovation

The competitive position of food companies is very dependent on their capacity to develop innovative food products. The PCFC supports the development of new and value-added prepared consumer foods from the initial recipe development and formulation of products, to pilot production trials which test product feasibility. The Centre houses a modern test kitchen, with a range of equipment for the production of kitchen-scale products that are repeatable and scaleable. The pilot processing capabilities within the PCFC facilitate the scaling of products from across the PCF sector. Technologies include extrusion, pasteurisation/sterilisation, bio-fermentation, filling and packaging, amongst others detailed in this document.

Key Pieces of Equipment

- Roboqbo universal processing units (25 Litre and 120 Litre)
- Airgenex food dehumidification system
- Riggs autopack series 2 table top depositor
- Lakidis LM250 mixer
- Robot coupe veg prep workstation CL60
- Firex CBTE 070C V1 cucimix

Cereal-based, Bakery and Snack Products Suite

Consumer demands are changing at a significant rate, and becoming more diverse. This is particularly evident in the bakery and snacks sector. Therefore, the role of research and innovation in this area has never been more important. Strong competition in this sector, coupled with the threat of Brexit, is compelling companies not only to innovate and diversify, but also to look further afield for new and emerging markets, to ensure that they remain relevant and competitive. To assist with this, the PCFC at Ashtown offers a suite of equipment for research, development and innovation for a broad range of cereal-based products, bakery goods and snacks.

Key Pieces of Equipment

- 20-tray roll-in rack oven
- 8-pan modular deck oven
- 30 Litre planetary mixer
- Mechanical dough sheeter with a roller gap of 0.3 – 30mm
- 2 cylinder dough moulder
- Grain fractionation and milling equipment
- Full range of equipment for product analysis and characterisation

Meat Product Processing Suite

Processed meats are a key component of many prepared consumer foods. In order to remain competitive, manufacturers must innovate to create products which are healthy, safe, convenient, natural and sustainably produced. The PCFC Meat Processing Unit has a high level of adaptability, providing a wide range of equipment of varying capacities for different applications. A suite of humidity chambers combined with in-house smoking facilities allows for the development of fermented meats with unique flavour profiles and extended shelf-life. The cured and processed meat equipment is flexible and facilitates various protein types and end products, ranging from traditional slow-cured pork to sous-vide pulled beef. Adaptable packaging capabilities allow for testing of MAP and skin packaging solutions. In addition, the presence of multiple small-batch systems facilitates concurrent trials during formulation and process optimisation. This enables processed meat manufacturers to develop new products more rapidly and cost-effectively in response to evolving challenges and trends.

Key Pieces of Equipment

- Fermented Meat Suite – A range of humidity cabinets allows for the development of unique flavour profiles and the development of new product types.
- Cured and Processed Meat Suite – This range of equipment is highly adaptable to many product types and capacities. A modern multi-needle injector can be adjusted to suit any protein type. A multi-tumbler unit allows for concurrent production of multiple 30kg batches at a time so that formulations and processes can be optimised before being scaled up. Various product textures can be created through cooking options such as combi and sous-vide.
- Meat Packaging Suite – The MAP and skin packaging machines have adjustable mould and gas settings to facilitate the creation of many product presentations.

Advanced and Emerging Technologies

Over the past several decades, the focus of the food industry has shifted from classical technologies towards advanced food processing, preservation and extraction technologies. This shift is attributed to: a) increased consumer demand for safe and nutritious food; b) the need for improved process and energy efficiency; and c) legislative and regulatory requirements aiming to minimise the use of chemical preservatives. Advanced food processing technologies including pulsed electric field, plasma technologies, cavitation technologies and UV light based technologies offer numerous advantages, including improved safety profiles, nutritional, shelf-life and sensory properties of foods. Such novel technological approaches are sustainable and can be applied to a range of prepared consumer foods.

Key Pieces of Equipment

- Pulsed Electric Field System (PEF) – A versatile technology which can be used for cold extraction, improved shelf-life, diffusion processes and pre-treatment of fresh produce.
- Ultraviolet light based technologies – Disinfection of produce, product surfaces, packaging and other food contact surfaces.
- Cavitation technologies – Enhanced cell disruption, improved extraction yields and mass transfer while reducing the energy and time required compared to traditional approaches.
- Supercritical CO₂ Extraction System – Environmental friendly technique which combines pressure and temperature for extraction and purification of biological materials.

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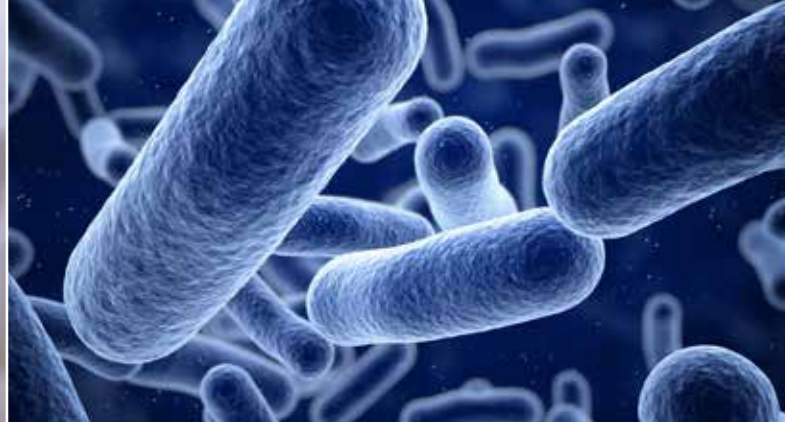
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Advanced Packaging Suite

Food businesses are constantly innovating in terms of products and packaging. Food packaging performs multiple functions such as containment, protection, preservation, product information, convenience, presentation and brand communication. The Advanced Packaging Suite, along with experts in product development and food packaging, brings an innovative, economic and qualitative boost to PCF food businesses in Ireland. The PCFC houses a range of versatile packaging equipment that can be applied to products across the sector from raw, semi-cooked and ready to eat liquids to semi-solid, solid, dry and granular food products.

Key Pieces of Equipment

- Automatic Tray Sealer offering different packaging options such as sealing, partial vacuum, modified atmosphere and skin packaging.
- Thermoformer suitable for flexible or rigid package formation, with or without modified atmosphere or vacuum packs.
- Vertical film forming machine capable of sealing solid granular and non-granular products, liquid products, products in brine, etc. and modified atmosphere packaging.
- Horizontal flowrapper with a packing speed of up to 80 packages per minute.
- Semi-automatic fill-seal machine suitable for new liquid, semi-thick, thick and viscous products.

Microbial Safety and Shelf-life Suite

Food safety is a pre-requisite to Ireland's agri-food economic success and reputation and to sustaining and growing food exports. Extended shelf-life is needed to support new market access and consumer demand for minimally processed, healthy fresh foods. In order to tackle these industry challenges the Microbial Safety and Shelf-life Suite has been equipped with state-of-the-art equipment and facilities. This dedicated biocontainment suite facilitates the development and validation of new innovative approaches to control microorganisms in PCF products and to assure microbial food safety using detection and characterisation technologies. The ability to validate safety and shelf-life using real food chain conditions facilitates a key step in the commercialisation process for new PCF products and processes.

Key Pieces of Equipment

- A range of process equipment (mincers/grinders/ mixers/smokers), packaging equipment (vacuum pack/vacuum skin pack/modified atmosphere), storage (temperature and humidity controlled chambers), cookers (microwave, sous-vide) and display (retail cabinets) in a biocontainment suite allowing research and validation on new controls and practices to manage key pathogens and spoilage microorganisms.
- Equipment to detect and characterise microorganisms in PCF foods include a flow cytometer (cell viability assessment) and MinION (a portable device for DNA and RNA sequencing and assessment of total microbial community in PCF products).

Nutritional Quality Suite

The application of advanced analytical techniques is critical for the development of innovative food products, in particular, those with enhanced nutritional claims. The Nutritional Quality Suite establishes a comprehensive facility to produce the relevant analytical results and satisfy a wide range of product label claims. At present, there is a major gap in capabilities to allow for the analysis of essential food nutrients. The suite of analytical methods available within the PCFC allows for the determination of macronutrients, sugars, minerals, water soluble and fat soluble vitamins. This will support and enhance the product development activities within the Centre.

Key Pieces of Equipment

- Liquid chromatograph with triple quadruple mass spectrometer detector allows for the analysis of multiple water soluble and fat soluble vitamins in food.
- Gradient ion chromatography with amperometric detection allows for the analysis of sugars in conventional foods, as well as sugar free or lactose free products.
- Inductively coupled plasma together with single stage mass spectrometry for cost effective analysis of minerals/elements from one sample injection.

Sensory Science Suite

Sensory science can be applied across the product development process to understand how the key sensory properties of food drive consumer acceptability. In today's highly competitive global food market, a deeper understanding of consumer sensory perceptions is needed so foods can be designed with optimal consumer benefits. The PCFC provides food companies with a suite of traditional (e.g. descriptive, affective and discrimination tests) and novel biometric sensory techniques to characterise and unravel the complex flavour and texture profiles of their products. New biometric tools can capture physiological responses from consumers, providing a more realistic insight into their sensory perceptions towards food products.

Key pieces of Equipment

- 18 computerised sensory testing booths with adjustable lighting (white, red and green) and controlled ventilation.
- Modern fully equipped kitchen and food preparation area adjoining the sensory booths.
- Biometric tools including eye-tracking glasses, facial expression analysis, a Galvanic Skin Response (GSR) unit and an Electroencephalography (EEG) headset.

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How Companies Can Engage

The primary objective of the PCFC is to support science-based innovation within the Prepared Consumer Food sector. This will ensure PCF companies remain at the forefront in terms of competitiveness and meeting consumer demands, on both national and global markets.

The establishment of this Centre will ensure proactive engagement and effective exploitation of emerging opportunities. It will provide the infrastructural capabilities, equipment and collaborative expertise to accelerate the development of new products and processes within the PCF sector.

We encourage the industry to engage directly with our staff, using the contact details provided, and to access the facilities and know-how available within the PCFC. We look forward to exploring collaborative opportunities and industry-led projects through a range of Enterprise Ireland funding mechanisms.

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Notes

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