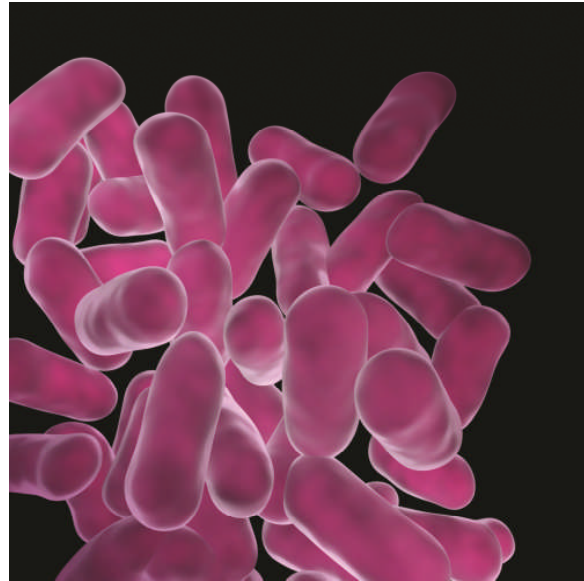


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Culture Collections in Teagasc Food Research Centre Moorepark



Key external stakeholders:

- Dairy Industry, food manufacturers, pharma industry, research community

Practical implications for stakeholders:

The culture collections in the Teagasc Food Research Centre Moorepark provide banks of bacterial cultures with potential for exploitation as dairy starters, adjunct cultures and probiotics for the Food and Pharma industries and the research community.

Main points

The main functions of the DPC and APC culture collections are:

- To provide a central repository for safe housing and cataloguing of DPC and APC Biobanks.
- To provide researchers within Teagasc and APC and interested stakeholders with accurate data regarding the potential applications, safety and quality of strains within the collections.

To provide unambiguous traceability for IP protection and accountability.

Main results:

DPC and APC culture collections contain 7000 and 62,000 strains respectively. The DPC culture collection predominately consists of strains of lactic acid bacteria of the genera *Lactococcus*, *Lactobacillus* and *Streptococcus*. These bacteria have been isolated over many years from a variety of dairy-associated sources. In addition, this collection also houses bacteria and yeasts isolated from surface ripened cheese, many food, animal and human Class 2 pathogens and also bacteriophages isolated from both dairy and environmental sources. More recently the biobank associated with the APC contains strains isolated from human intestinal samples which have potential for exploitation as probiotics for the treatment of anti-inflammatory diseases such as IBD and IBS, anti-*Clostridium difficile* probiotics and antimicrobials in addition to strains producing bioactive metabolites such as conjugated linoleic acid and exopolysaccharides.

Opportunity / Benefit:

The DPC and APC culture collections are available to researchers in Teagasc Food Research Centre, researchers in the APC and companies for exploitation in the Food or Pharma or Veterinary arena.

Collaborating Institutions:

University College Cork

Teagasc project team: Dr. Mary Rea (PI)
Dr. Olivia McAuliffe
Dr. Fiona Crispie
Prof Paul Ross
Prof Catherine Stanton,

External collaborators: Researchers in the Alimentary Pharmabiotic, University College Cork

1. Project background:

The culture collection held at Teagasc Food Research Centre Moorepark, called the DPC Culture Collection, currently holds in excess of 7,000 strains of bacteria and yeast. This collection was begun over 40 years ago and is constantly growing based on the evolution of the Food Research Programme. These bacteria were isolated from a wide variety of foods and from environmental, human, veterinary and clinical samples. In addition the collection houses a large number of strains that have been purchased from culture collections worldwide and are used as reference strains.

Historically the strains deposited in the collection were isolated predominantly from fermented dairy foods such as cheese, yoghurts and fermented beverages. However, more recently, due to the increasing interest in the health promoting role of the bacteria that make up the gut microbiome, this collection has expanded to include a wide range of potential probiotic microorganisms isolated from the animal and human gastrointestinal tract. In addition and situated on the Moorepark Campus are three additional culture banks associated with (i) the Alimentary Pharmabiotic Centre (~63,000 strains) which studies the role of gut microbiota in health and disease (ii) the Eldermet project (<http://eldermet.ucc.ie>) (6,000 strains) and (iii) the Infantmet project (4,000 strains) which study the gut microbiota of people at the extremes of life i.e. the elderly and the infants respectively.

2. Questions addressed by the project:

How best can the cultures in the biobanks be stored and characterised to make the strains more accessible for commercialisation?

3. The experimental studies:

All the strains are stored in duplicate stocks at -80°C and catalogued. In so far as is possible all information pertaining to the strains is captured in order to build up background information for future commercial exploitation of the strains.

Molecular methods such as 16S rDNA gene sequencing (for species identification) and genome fingerprinting methods such as pulsed field gel electrophoresis, to determine the genetic relationship of strains of the same species, were used for classification of the strains.

Many strains have been assessed as potential starter cultures in food fermentation, screened for their probiotic potential and for their ability to produce antimicrobial compounds and bioactive molecules.

4. Main results:

The DPC and APC culture collections house strains with potential for the following applications:

- Lactic acid bacteria and certain non-dairy bacteria suitable for use as starter/adjunct cultures in fermented foods.
- Lactic acid bacteria and yeasts suitable for flavour modification in foods.
- Smear cheese bacteria with applications for surface ripened cheese or with capabilities for flavour modification of fermented dairy products.
- Lactic acid bacteria and *Bifidobacterium* species with potential as probiotics producing both antimicrobial compounds and bioactive metabolites.
- A range of bacterial species in addition to lactic acid bacteria with antimicrobial producing ability or the capacity to produce bioactive metabolites or flavor compounds.
- A range of foodborne pathogens for research purposes.

5. Opportunity/Benefit:

All strains in the collections housed in TFRC Moorepark, unless restricted (i.e. prior license to another party) are available for exploitation to the Dairy, Food and Pharma sectors subject to discussions with the

Technology Transfer Offices in Teagasc and University College Cork.

6. Dissemination:

Main publications:

- Rea, M.C. D. Alemayehu, R. P. Ross C. Hill, (2013) Gut Solutions to a gut problem: bacteriocins, probiotics and bacteriophage for the control of *Clostridium difficile* infection. J. Med Microbiol. 62: 1369-1378.
- Alemayehu, D., J. A. Hannon, O. McAuliffe, R.P. Ross. (2014). Characterization of plant-derived lactococci on the basis of their volatile compounds profile when grown in milk. Int. J. Food Microbiol. 172: 57-61.

Popular publications:

- Pharmabiotics – health benefits beyond the gut T Research Vol 8 No 3 Autumn 2013.

7. Compiled by: Dr. Mary Rea, Dr. Olivia McAuliffe
