



Industrial Fermentation Platform

Scion's fermentation platform enables scale up of industrial biotechnology capability to generate microbially-produced products including proteins (enzymes), biopolymers (bioplastics), biofuels and biochemicals.

Scion is developing biological processes to use wood and other biomass feedstocks to create new products to support growing circular and bio-based economies. Companies can use our fermentation platform and work with us to test approaches to modifying and adding value to biomaterials and biofuels

Sartorius is recognised as the standard for fermentation globally, Scion is the only laboratory in New Zealand that utilises Sartorius fermentation units at multiple scales (250ml, 10L, 100L). This means methods, processes and optimisations can be transferred reliably within the laboratory, and between most leading laboratories internationally. It also has a benefit of technology transfer as processes can be scaled up with far greater predictably.

Fermentation resource and optimisation

The industrial fermentation platform consists of closed sterilisable vessels in which microbial or biochemical reactions are carried out under a controlled environment (temperature, pH, redox, oxygen content, stirring). Multiple parameters can be explored in 250mL mini reactors, moving up in size once conditions are optimised to 10L and 100L scale, which produces sufficient quantities for downstream processing. The process optimises high cell density yields and hence biomass productivity. The platform has a continuous dairy centrifuge and tangential flow filtration system allowing rapid harvesting of biomass or supernatant containing biofuel or biochemicals secreted into the growth medium.

This platform is housed inside our modern PC2 fermentation laboratory. This facility allows research and testing with genetically-modified organisms or imported non-GE production strains with applications for biopolymer and biofuel production.

Fermentation research

We are investigating ways to modify fibres, biopolymers, biochemicals and biofuels. Examples include:

- Converting product streams from biorefinery sugar solutions and waste derived feedstocks into biofuels and biochemicals
- Production of bioplastics such as polyhydroxyalkanoates (PHAs) by microbial fermentation.
- Greenhouse gas mitigation by utilising gas fermentation (carbon dioxide, methane as feedstock)
- Production of proteins (including enzymes) at sufficient quantity to modify and add value to biomaterials (lignocellulosics, biopolymers, lignin).
- Modifying biomaterials using enzyme-based cell-free systems.

We have experience with a diversity of microbes including *E. coli*, *C. necator* and *P. putida*, all biohazard risk group 1. Post-fermentation we have downstream processing and protein purification capabilities and the ability to characterise DNA, RNA, metabolites, proteins, media, gases and more.

Work with us

Scion works directly with industrial manufacturers and can assist organisations to transition from laboratory to pilot-scale production (1,000L to 10,000L reactors). We can tailor relationships to meet individual customer needs, including services such as specialised testing, troubleshooting, one-on-one confidential research, joint development partnerships and strategic multi-party alliances.

Multi-disciplinary research teams can be assembled to provide the full range of skills needed for any given project. We can also call on our national and international partners to help bridge gaps between ideas, research, technologies and commercial needs.



About Scion

Scion is the Crown research institute that specialises in research, science and technology development for forestry, wood and wood-derived materials, and other bio-material sectors.

Scion's purpose is to create economic value across the entire forestry value chain, and contribute to beneficial environmental and social outcomes for New Zealand.

For more information

Alec Foster

Portfolio Leader, Bioproducts and Packaging
alec.foster@scionresearch.com

Christophe Collet

Microbial Biotech Team Lead
christophe.collet@scionresearch.com

Gareth Lloyd-Jones

Forest Genetics and Biotechnology, Research Group Lead
gareth.lloydjones@scionresearch.com

visit www.scionresearch.com

