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FlexBIO Capabilities & Case Studies

IBioIC

FlexBIO

IBioIC Bioprocessing Scale Up Facility

Offers a comprehensive approach to support your innovation journey and training needs.

Scan for course overview and dates

www.ibioic.com

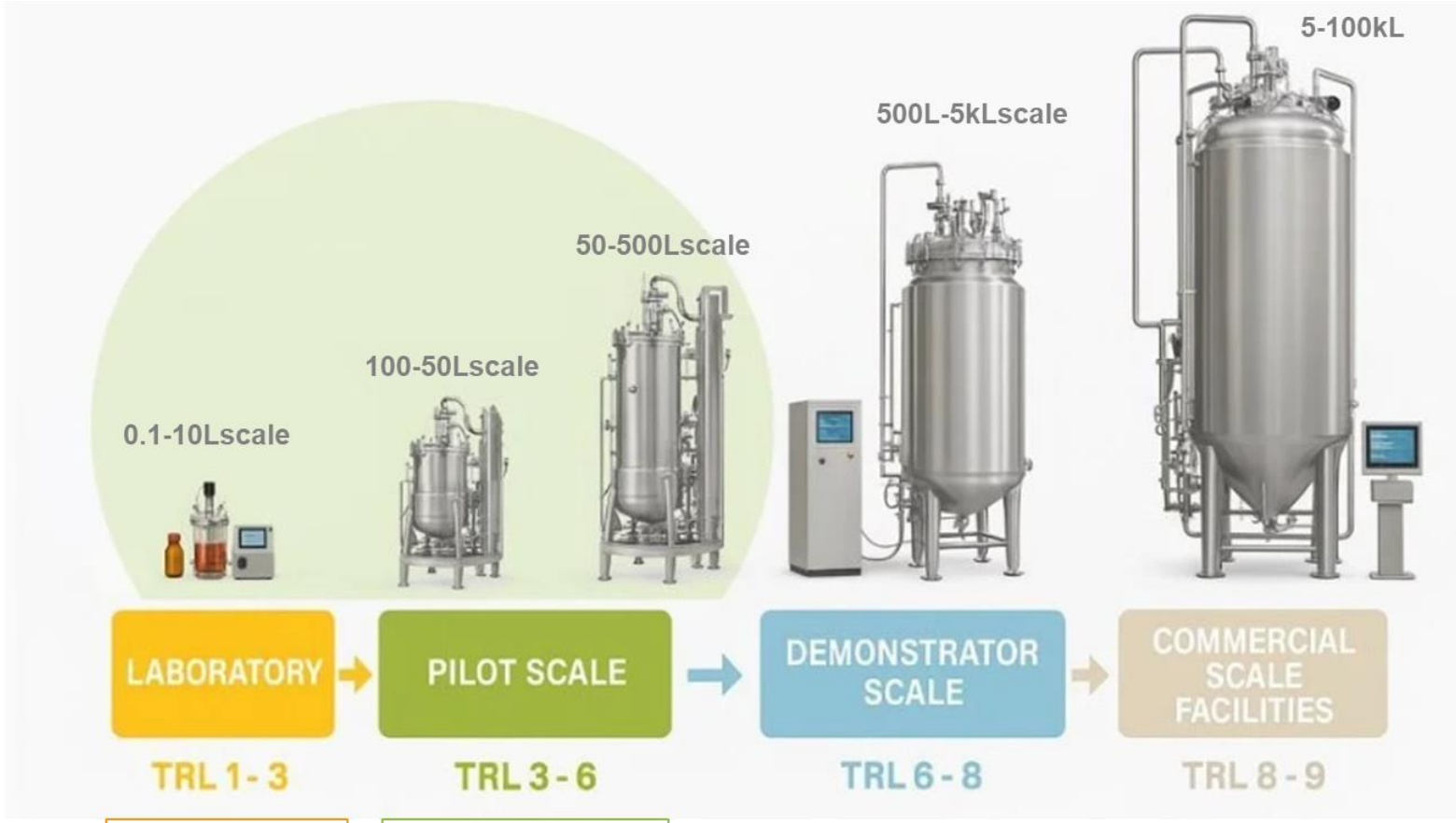
LOCATION & PARTNERS

John Coulson Building,
Heriot-Watt University, Edinburgh
EH14 4AL, Scotland.

- The IBioIC's FlexBIO Scale-Up Centre is hosted by **Heriot Watt University**
- FlexBIO is recognised as **a RESILIENCE UK Medicines Manufacturing**
- **Skills Centre of Excellence**
- Member of the **Pilots4U European scale-up network.**
- We are one of four **BioPilotsUK Open-access Centres** partnering to develop UK bio-based value-chains.

CORE SERVICES

- Know-how & Networks
- Innovation Support
- Bench to Pilot-Scale Infrastructure
- Training & Collaboration



FlexBIO IBioIC Bioprocessing Scale Up Facility

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FlexBIO UPSTREAM Capabilities

The FlexBIO Scale-Up Centre accelerates bioprocess innovation from bench to pilot-scale.

Upstream Platform supports:

- Micro-well plate & flask culture capabilities
- Submerged fermentation (0.5-300L scale)
- Solid-state fermentation (up to 2L scale)
- Photobioreactor (0.5-7L scale)
- Mammalian cell culture (0.5-20L scale)

Expertise spans:

- bacteria, yeast, fungi, algae, plant, mammalian and co-culture

BIOMASS / CO-PRODUCT | MAMMALIAN 1-20L | MICROBIAL 1-300L




FlexBIO DOWNSTREAM Capabilities

FERMENTATION | CLARIFICATION | HOMOGENISATION | FILTRATION | PURIFICATOIN

INTEGRATED DSP

or DSP ONLY

Downstream Platform further supports:

- Biomass pre-treatment e.g. maceration
- Handling in walk-in fume cabinet and walk-in fridge-freezer
- Freeze-drying and oven-drying capabilities

Expertise spans:

- Whole cell products, complex proteins & small molecules

STRAIN CHARACTERISATION Capabilities

FlexBIO's Cellular Analytics Platform

Biolog's OmniLog® Phenotype MicroArray™ Technology

Broad applicability for **genotype-phenotype characterisation** as well as for **determining optimal conditions** for cellular growth, sporulation and germination, production of secondary metabolites, or enzymatic activities in cell lines.

BMG LABTECH CLARIOstar® Plus

A versatile, **multi-mode microplate reader** designed for advanced assay development.

SCOPE OF EXPERTISE & CASE STUDIES

Whisky Distillery Co-Products


© Ramon L. Farinos


© Springbank Distillers.

TRANSFORMING WHISKY WASTE TO VALUABLE MATERIALS

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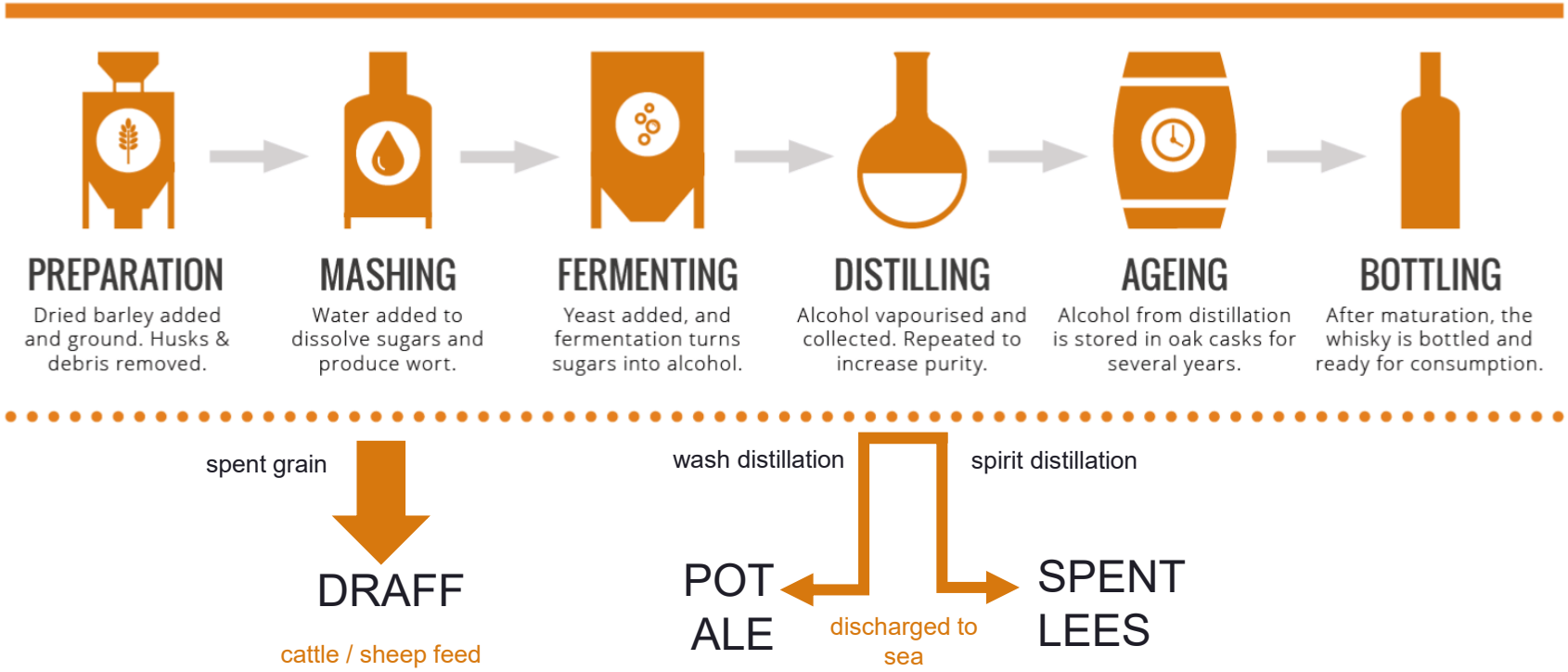
Whisky Distillery Co-Products

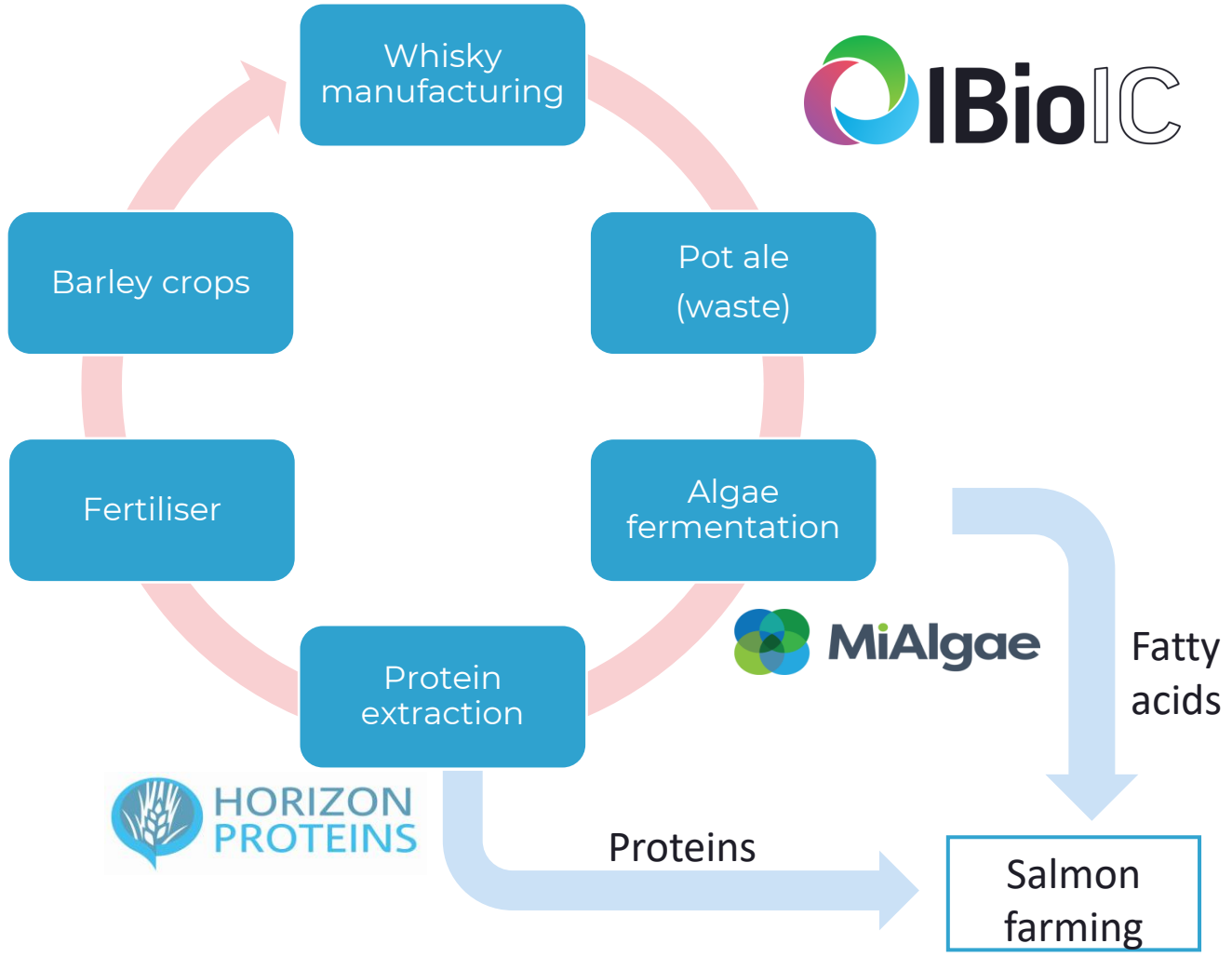


Case Study – co product valorisation

The Whisky Project:

Three IBioIC member companies, **Horizon Proteins**, **MiAlgae** and **BioPower Technologies**, worked collaboratively with **IBioIC** on this sustainability-driven project to explore further ways to extract maximum value from whisky co-products.

MiAlgae's algae cultivation process uses whisky pot-ale to produce an omega-3 rich whole-cell feedstock.
Their zero-waste approach has gained worldwide attention after qualifying as a 2024 EarthShot Prize finalist.

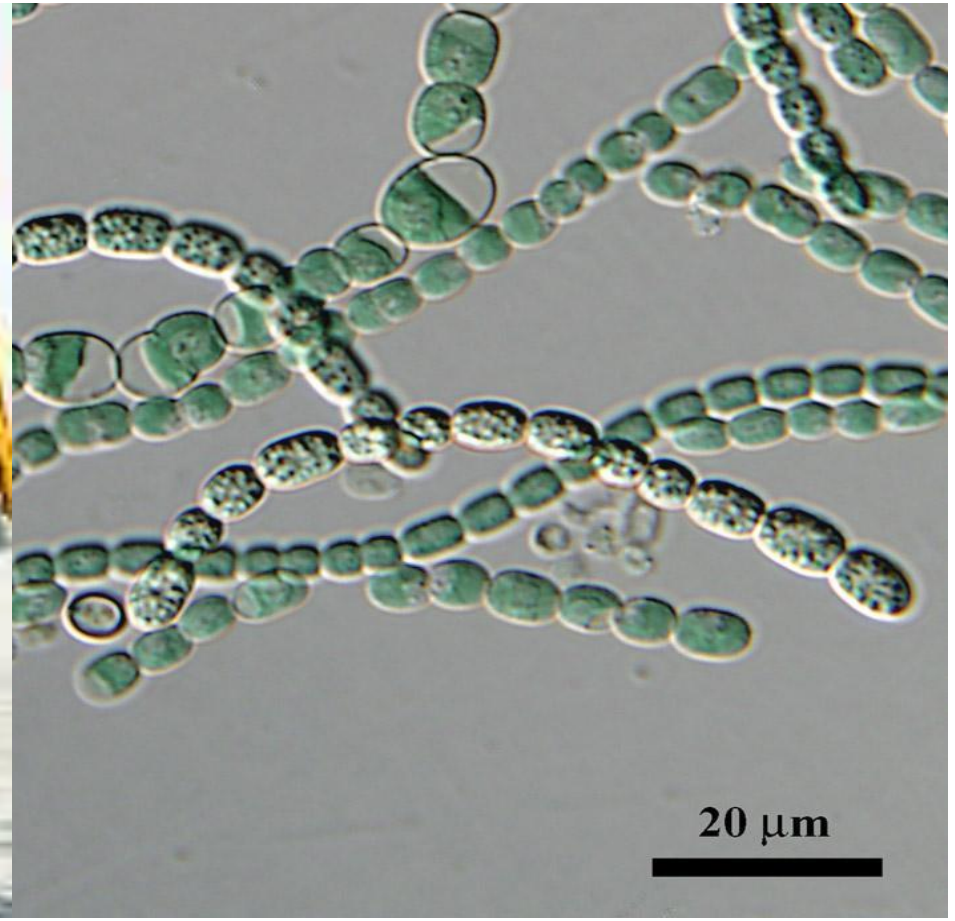



IBIOIC NEWS

Whisky industry and biotech innovators collaborate to find new sustainable solutions

An exciting new project launches this week that brings together Scotland's most successful export industry and leading biotechnology innovators to find new sustainable solutions from whisky co-products. The Whisky Project is led by the Industrial Biotechnology Innovation Centre (IBioIC), co-funded by Zero Waste Scotland, and with additional support from the Scotch Whisky Research Institute (SWRI), the industry's leading research organisation.

Algal Bioprocessing Innovation



IMPROVING SUSTAINABILITY, STABILITY & NATURAL PRODUCT VALUE

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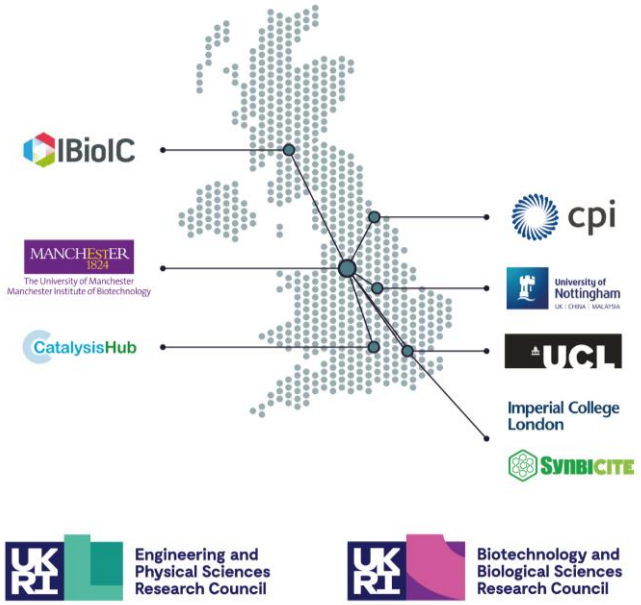
Case Study – carbon capture

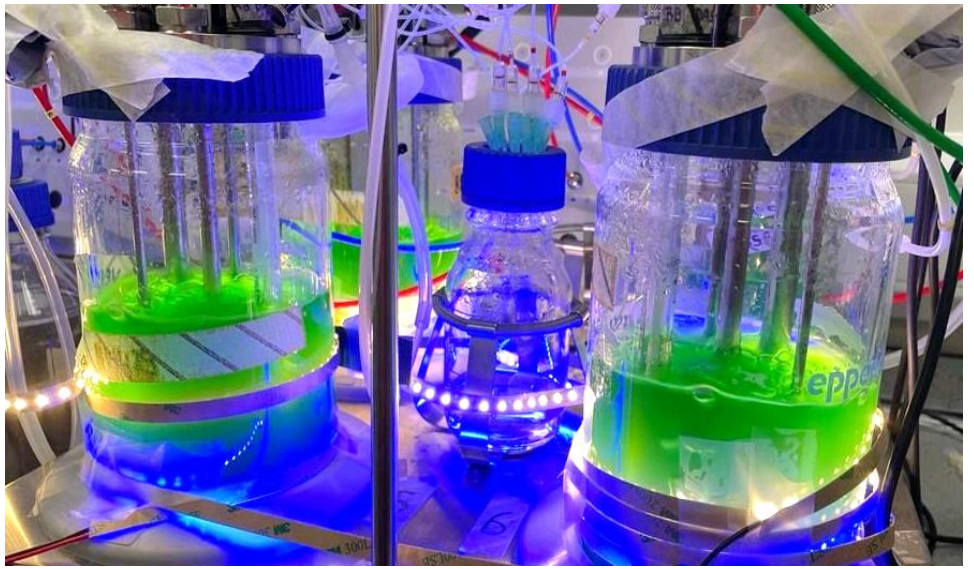
Future Biomanufacturing Research Hub

In-house and collaborative Design of Experiments (DOE)

Scale-up of cyanobacteria to increase production of Perspex precursor

Carbon capture





FUTURE BRH

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Case Study – seaweed stabilisation

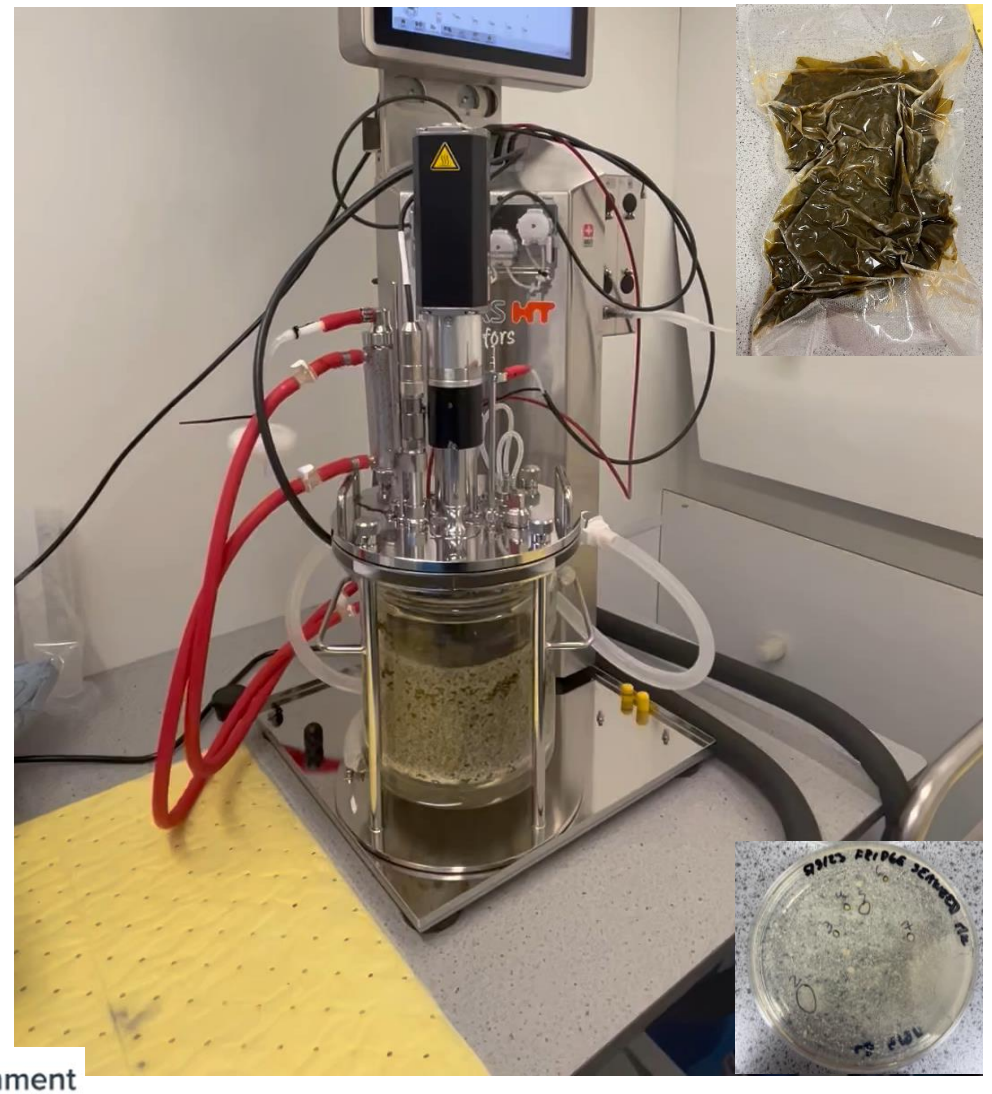
Oceanium develop high quality, high purity nutraceuticals from sustainably sourced seaweed.

FlexBIO has assisted **Oceanium** with scale-up support on several projects

Seaweed stabilisation remains a huge sector challenge

FlexBIO commissioned **Scotland's first seaweed fermenter** (solid-state) to look at stabilisation methods for Oceanium

Work included strain isolation and growth optimisation



OCEANIUM®

FlexBIO
IBioIC Bioprocessing Scale Up Facility

Scottish Government
Riaghaltas na h-Alba

Alternative Protein

NOVEL AND SUSTAINABLE FOOD INNOVATION

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Case Study – mycoprotein

IBioIC supported ENOUGH (formerly) **3FBio** by:

- Incubated scientists in our Scale-up facility
- Funded 4 collaborative projects totalling ~£237k
- FlexBIO assisted with downstream processing studies
- Enabled full proof of concept leading to investment.

ENOUGH has since:

- Secured significant funding (Series A and B)
- rebranded to ENOUGH and constructed a pilot plant (Glasgow) before full scale manufacturing in Netherlands (10,000T/yr)
- secured supply agreements with Marks & Spencer and Unilever and has delivered 56 new jobs as a result.

Case Study – cultivated meat

Roslin Technologies (RT) develops pluripotent stem cells (PSCs) from livestock species, for cultivated meat.

An initial project (2022) supported by the IBioIC Facility Access Fund (FAF) enabled the technology transfer and training of FlexBIO scientist in livestock stem cell culture and gave RT access to FlexBIO's scale-up expertise.

FlexBIO researchers successfully adapted a 7L benchtop microbial bioreactor to support PSC culture.

The FAF project outcome was used to leverage new grant funding to develop scale-up protocols and demonstrate the scalability of various cell types within their PSC pipeline (2025).

FlexBIO was introduced to a new opportunity in the novel foods space and has received good press coverage.

Non-Conventional Feedstocks & Processes

BIORECOVERY FROM UNCONVENTIONAL SOURCES

Case Study – metal bio recovery

- The Horsfall Group at the University of Edinburgh developed a bioremediation method for extracting metals from end-of-life lithium batteries.
- Engineered microbial strains were developed by the Edinburgh Genome Foundry to support this process.
- FlexBIO successfully transferred the lab-scale process and scaled it up to 30 L to isolate biogenic metal nanoparticles.

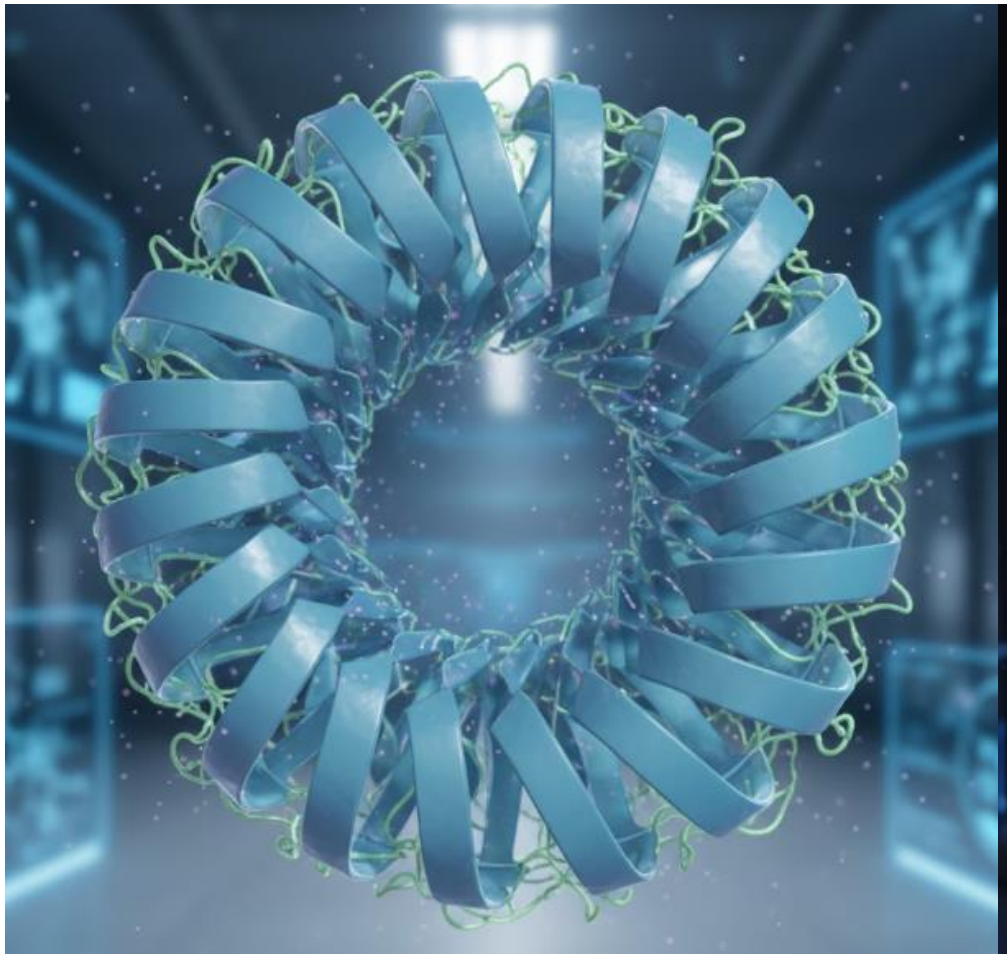
THE FARADAY INSTITUTION ReLiB
REUSE & RECYCLING OF LITHIUM ION BATTERIES

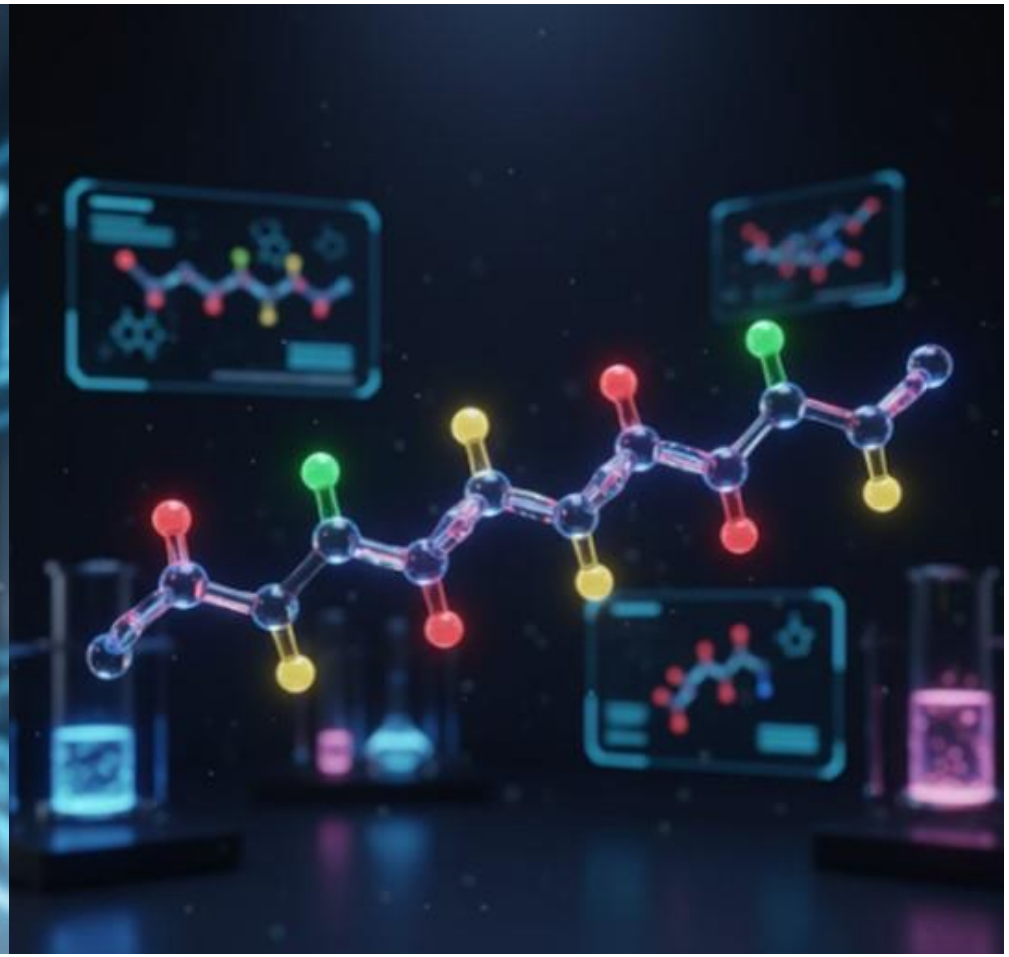
SynthSys
Centre for Synthetic and Systems Biology

FlexBIO
IBioIC Bioprocessing Scale Up Facility

THE UNIVERSITY of EDINBURGH

Conventional Expression & Purification





Bioproduction, Optimisation & Separation

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Case Study – novel bacterial enzymes

Scale-up of Enzyme Production for Cyclodextrin Biomanufacturing

- Cyclodextrins are naturally occurring cyclic oligosaccharides used in pharmaceutical, personal care, food, and household products.
- Cyclodextrins are produced from starch using bacterial enzymes.
- NCIMB awarded Innovate UK Biomanufacturing Launchpad to develop and scale-up a novel enzyme used to modify a cyclodextrin.
- NCIMB culture collection is a valuable repository of novel products. The microbial isolate and process developed here was anaerobic.
- FlexBIO scaled the process to 7 L and successfully purified material with an optimised downstream process.

NCIMB

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Industrial Biotechnology Innovation Centre

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Services Webpage

Please contact: scaleup@ibioic.com

Pilots4U Powered by CoPilot Bioeconomy Innovation Community & Database

www.ibioic.com

STUDY SESSIONS

Group A: RESILIENCE

VR/AR Training

Experience the latest technical and CPD training tools for training the next generation of staff in medicines manufacturing and biomanufacturing

Group B: Pilot Scale

Microbial Fermentation

Experience a run through of FlexBIO's 30L and 300L stainless steel microbial fermenters

Group C: Downstream

Harvest to Purity

A walk through of FlexBIO's downstream processing including disc stack centrifugation, filtration, homogenisation and chromatography

Group D: Small-Scale

Microbial Development

Experience how FlexBIO uses parallel fermentation to accelerate process development and see our solid-state fermentation

Group E: Mammalian

Cell Process Development

See how FlexBIO scale cell culture from flask to stirred tank using glass and single use systems. Learn how to 'Build-a-bioreactor' yourself

STUDY GROUPS

	Laura / Nicole	Sheena	Prayag	Lis / Caroline	Luke / Emily
	A RESILIENCE VR/AR	B PILOT SCALE MICROBIAL	C DOWNSTREAM PROCESSES	D BENCH SCALE MICROBIAL	E BENCH SCALE MAMMALIAN
11:05-11:40	Group 1	Group 2	Group 3	Group 4	Group 5
11:45-12:20	Group 5	Group 1	Group 2	Group 3	Group 4
12:25-13:05	LUNCHBREAK				
13:05-13:40	Group 4	Group 5	Group 1	Group 2	Group 3
13:45-14:20	Group 3	Group 4	Group 5	Group 1	Group 2
14:25-15:00	Group 2	Group 3	Group 4	Group 5	Group 1