Training course

Technologies for discovery, development and production of high value biorenewables

University of York, 22-23 September 2020

This interactive course with specialist lecturers and practical demonstrations throughout the two days will cover the key technologies and techniques required to underpin many HVB pipelines. The course will be delivered by the Bioscience Technology Facility, University of York and course content will include:

Genomics

Lecture on modern genomics methods to introduce the latest technologies for sequencing DNA, assembling genomes and gene discovery to provide the basis for enzyme and pathway discovery.

Protein Production

-Protein discovery: A lecture-based exercise to explore the application of protein production in the discovery of new enzyme pathways.

-Bioreactor studies for efficient characterisation of synthetic biology constructs: Lecture and practical demonstration to discuss bioreactor set-ups for microbial production factories and an in-depth look into the practical set-up of a bioreactor suite for the characterisation of synthetic biology cell lines.

Metabolomics: Lecture and practical demonstration to demonstrate the workflow for untargeted small molecule analysis including considerations for sample preparation, analysis by LC-MS/MS, feature detection and data reduction, and techniques and tools for annotating unknowns.

Protein Identification and proteomics: Lecture and practical demonstration to explore how protein identification is validated against expected molecular weight and sequence using top-down and shotgun approaches. Sample preparation, analysis by MALDI-TOF-MS/MS and LC-MS/MS, and software for data analysis will be explored.

Molecular Interactions and Biophysics

-Protein QC lecture to explore methods to assess protein structural properties such as solution size, oligomer state and secondary structure content, and stability measures. Techniques will include circular dichroism, SECMALLS and DSF.

-Lecture on methods to confirm and quantify protein interactions with other molecules, such as titration calorimetry, surface plasmon resonance and microscale thermophoresis.

-The practical session will include stability measurements by DSF.

Session on Biorenewables Raw Materials and Waste at the Biorenewables Development Centre (BDC) in York

-Lecture will include analysis of feedstock for high value biorenewables, case studies of HVB, scaling up HVB production and tour of key equipment

-Tour of BDC scale-up facilities