# PLANT SYNBIO AUSTRALIA

**TRANSFORMING AGRICULTURE AND BIOMANUFACTURING THROUGH PLANT SYNTHETIC BIOLOGY**



## Biomanufacturing

### at Plant SynBio Australia

Plants are highly versatile biological systems that can be harnessed as powerful platforms for a wide range of biomanufacturing applications.

Through advances in plant synthetic biology, photosynthetic organisms can be repurposed from natural producers of biomass into precision manufacturing systems that convert carbon dioxide, sunlight, and simple nutrients into high-value products.

**plantsynbio.au**

Plant SynBio Australia is funded through Bioplatforms Australia under the National Collaborative Research Infrastructure Strategy (NCRIS) and institutional partners

NCRIS National Research Infrastructure for Australia An Australian Government Initiative

BIOPLATFORMS AUSTRALIA

Adelaide University

Government of South Australia

# Biomanufacturing

## Producing high value molecules

Plant SynBio Australia (Plant SynBio) works with our partners and clients to utilise, optimise, or redesign native plant metabolic pathways, as well as to engineer entirely new synthetic pathways, to deliberately tailor the innate productivity of plants.

These approaches enable plants or plant cell cultures to produce complex high-value proteins, industrial enzymes, and biologics, including molecules that are difficult to manufacture using traditional microbial or mammalian systems. In addition, valuable small molecules — such as specialty chemicals, nutraceuticals, and bioactive compounds — can often be produced in plant-based systems at a fraction of the cost of mammalian cell culture, with lower biosafety risks and reduced capital and operating expenses.

## Complex compounds

Beyond recombinant proteins and biologics, plant systems can be engineered to directly produce biomaterials, biofuels, and improved material feedstocks. This includes the biomanufacture of structural polymers, sustainable fibers, and functional ingredients for food and nutrition applications.

The synthetic biology platforms offered by Plant SynBio support the production of proteins and functional food ingredients with tailored properties, enabling innovation across agriculture, food, pharmaceutical, materials, and industrial biotechnology sectors.

## Advancing production systems

Plant-based biomanufacturing systems are inherently scalable and flexible. Production can be implemented through plant cell suspension cultures, controlled growth rooms, vertical farming facilities, or large-scale field plots, depending on product requirements and market needs. These platforms can be established

rapidly, enabling distributed and decentralised manufacturing models that reduce supply chain risk, improve resilience, and support regional or on-demand production.

By leveraging the natural ability of plants to capture atmospheric $CO_2$ and sunlight, Plant SynBio enables sustainable manufacturing pathways that align with net-zero and circular economy goals.

## Research connections

Plant SynBio is part of Bioplatforms Australia, a national infrastructure network providing research facilities and expertise to support life science research tackling national challenges in health, agriculture, food, and biodiversity. This allows us to support an integrated approach to research projects spanning genomics, proteomics, metabolomics and bioinformatics projects.

As part of Australia's National Collaborative Research Infrastructure Strategy (NCRIS) we are connected with over $4 billion worth of state-of-the-art infrastructure, data and expertise help address complex research challenges. These connections include the Australian Plant Phenomics Network (APPN), the Australian Genome Foundry and IDEA-Bio.

## Availability

Biomanufacturing services are available through Plant SynBio Nodes at Adelaide University, ANU Canberra, La Trobe University Melbourne, and the University of Western Australia Perth.

*How can Plant Synthetic Biology Australia help you transform environmental $CO_2$ and solar energy into high-value products today?*

**plantsynbio.au**

**Email us:**
Adelaide University:
psba@adelaide.edu.au