

2026 WESTERN CAPE ECONOMY INNOVATION AWARDS

Engineering Biological Consistency through **Circular** **Bioconversion**

La Grace Bio — A Western Cape biotechnology platform transforming agricultural biomass into reproducible industrial-grade biological materials.

Zero

Added Water Processing

LC-IMS- MS/MS

Analytical Validation

Multi-Sector

Downstream Applications

Circular

Economy Model

01 Overview of the Innovation

La Grace Bio is a Western Cape-based biotechnology platform developing a process-defined bioconversion system that converts underutilised agricultural biomass into reproducible biological materials suitable for industrial use.

The innovation addresses a fundamental challenge in biotechnology and natural-resource processing: **biological variability**. Traditional extraction approaches produce inconsistent outputs due to variation in raw materials and uncontrolled biological processes. This limits industrial scalability, reproducibility, and economic value.

La Grace Bio's solution is a controlled bioconversion process that:

- Utilises agricultural biomass, including *Citrullus lanatus* (watermelon) by-products, which are often discarded or underused.
- Applies a zero-added-water fermentation matrix to constrain biological pathways.
- Produces reproducible biochemical outputs validated through analytical fingerprinting.
- Enables downstream industrial applications in skincare, biomaterials, and future health-related sectors.

The innovation is not defined by a single product. Instead, it represents a **platform technology** that transforms biological waste streams into higher-value, process-defined materials that can be licensed or integrated into multiple value chains.

02 Implementation & Current Stage

The innovation has moved beyond concept development and is currently implemented at pilot level through the following activities:

Process Implementation

- Pilot-scale bioconversion using locally sourced agricultural biomass.
- Development and optimisation of a zero-water processing system designed to stabilise biological outputs.
- Production of prototype materials used in early formulations and validation exercises.

Independent Scientific Validation

The process has undergone analytical fingerprinting with independent scientific collaborators in the Western Cape:

- Advanced LC-IMS-MS/MS analysis confirming reproducible metabolomic profiles, conducted with independent Western Cape scientific collaborators.
- Identification of consistent biochemical classes across batches, demonstrating process reliability.

Ecosystem Integration

- Agricultural supply networks providing biomass inputs.
- Scientific institutions supporting validation and analytical work.
- Early industry discussions exploring licensing and integration opportunities.

03 Economic Impact & Contribution

Value Creation from Agri-Waste

Agricultural biomass that typically has minimal economic value can be transformed into high-value biological materials, creating additional income opportunities for farms and suppliers, new processing and manufacturing activity within the Western Cape, and reduced environmental disposal costs.

Job Creation & Skills Development

Scaling this innovation supports:

- Technical roles in fermentation and bioprocessing.
- Manufacturing and processing employment.
- Scientific and quality-control positions.
- Local supply-chain participation.

These jobs are knowledge-based and aligned with growing global demand for sustainable biotechnology skills.

Export & Licensing Potential

The innovation supports licensing models with international partners, technology transfer opportunities, and high-margin intellectual property value creation originating in the Western Cape — creating potential inward investment and international visibility.

04 Breadth of Impact

The innovation benefits multiple businesses and sectors rather than a single organisation. Potential beneficiaries include:

- Agricultural producers supplying biomass.
- Local manufacturers and formulation partners.
- Scientific laboratories and academic institutions.
- Export-oriented businesses seeking sustainable biological materials.

Because the platform produces biologically consistent outputs, it can support multiple downstream applications across industries — creating an **ecosystem effect** where one upstream innovation enables value creation for several downstream participants.

05 Novelty & Innovation

The novelty lies in shifting the focus from ingredient extraction to **process-defined biological control**. Traditional approaches rely on extracting compounds and managing variability after production. La Grace Bio instead controls variability upstream through process design.

Key novel elements include:

- Zero-added-water bioconversion matrix that constrains biological variability.
- Process-defined reproducibility validated through analytical fingerprints.
- Platform approach enabling multiple applications rather than a single product.
- Circular economy integration through agricultural biomass utilisation.

While fermentation itself is not new, this application represents a significant adaptation within the Western Cape context by combining circular resource use, controlled bioprocess engineering, and industrial reproducibility.

06 Evidence of Success & Recognition

The innovation has already received recognition and support from multiple independent innovation ecosystems, reflecting both technical credibility and economic relevance.

Key milestones include:

- **GCIP-SA Semi-Finalist** (UNIDO-supported Global Cleantech Innovation Programme) — recognising the platform's contribution potential to sustainable industrial development and circular bioeconomy innovation.
- **SA Startups Finalist** — acknowledgement within the national innovation ecosystem for scalable commercial and economic potential.
- **Sweat Africa Deeptech Finalist** — selection among high-potential African deep-technology ventures addressing systemic industrial challenges.
- **WIPO-LESI Inventor Assistance Programme Beneficiary** — receiving international IP and licensing support focused on enabling responsible commercialisation and global industrial partnerships.
- **International Patent Cooperation Treaty (PCT) Application Filed** — protecting the core process-defined bioconversion methodology and positioning the innovation as an exportable intellectual-property asset originating from the Western Cape.

Additional indicators of implementation and progress include:

- Pilot-scale deployment and early distribution of prototype materials.
- Independent analytical fingerprinting confirming reproducible biochemical outputs generated through the process.
- Ongoing collaboration with Western Cape scientific institutions supporting validation and technical development.
- Active engagement with industry stakeholders exploring licensing and commercial integration opportunities.

Collectively, these recognitions and implementation milestones demonstrate that the innovation has progressed beyond early-stage experimentation and is increasingly recognised by both national and international ecosystems as a credible, scalable innovation with measurable economic potential.

These milestones demonstrate growing external validation that the innovation can contribute to provincial economic development while positioning the Western Cape as a source of exportable deep-technology IP.

07 Sustainability & Long-Term Impact

The innovation contributes directly to sustainable economic development by:

- Reducing agricultural waste.
- Enabling circular resource utilisation.
- Minimising water usage through process design.
- Supporting scalable local manufacturing.

Sustainability is not treated as a separate feature but as an **integrated economic mechanism**. Waste reduction and resource efficiency translate directly into economic opportunity.

The long-term vision is to establish the Western Cape as a leader in process-defined circular biotechnology, where biological resources are transformed into high-value industrial inputs through reproducible systems.

Conclusion

La Grace Bio represents an implemented, systems-level innovation that strengthens the Western Cape economy by transforming underutilised biological resources into scalable industrial value. By focusing on process-defined biological consistency, this innovation enables new opportunities for collaboration, investment, and job creation across multiple sectors within the province.