

Snapshot Report

Assessing the value of soil conditioner derived from red meat processing AD digestate

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Project Description

This project assesses the market feasibility of a red meat digestate-derived biofertiliser in Australia by identifying target segments, consumer acceptance, and economic viability. Given the abundance of by-products from the red meat and other industries in Australia, a circular economy approach was explored by proposing a biofertiliser produced from combined digestates—organic residues remaining after anaerobic digestion.

Conducted by Tessele Consultants, the project reviews existing research, evaluates the quality of the biofertiliser compared to current market options, and examines Australian regulations for its potential application. Key stakeholders include a WA meat processor, a WA renowned fertiliser company, and the University of Western Australia (UWA).

The WA meat processor, is collaborating with Tessele Consultants to analyse a bioresource recovery facility on-site, incorporating wastewater treatment, biogas, and biofertiliser production. The WA fertiliser company is a national garden product manufacturer and operates a biogas plant on their site, with digestate currently unused but holding potential for a combined biofertiliser production.

UWA’s School of Agriculture and Environment conducted an online survey to assess social license perceptions and consumer preferences for biofertiliser from AD digestate.

This project paves the way for a sustainable and innovative product, outlining the feasibility of a biofertiliser plant and fostering environmental and economic benefits for the industry.

Project Content

This project content is shown in Figure 1 below.

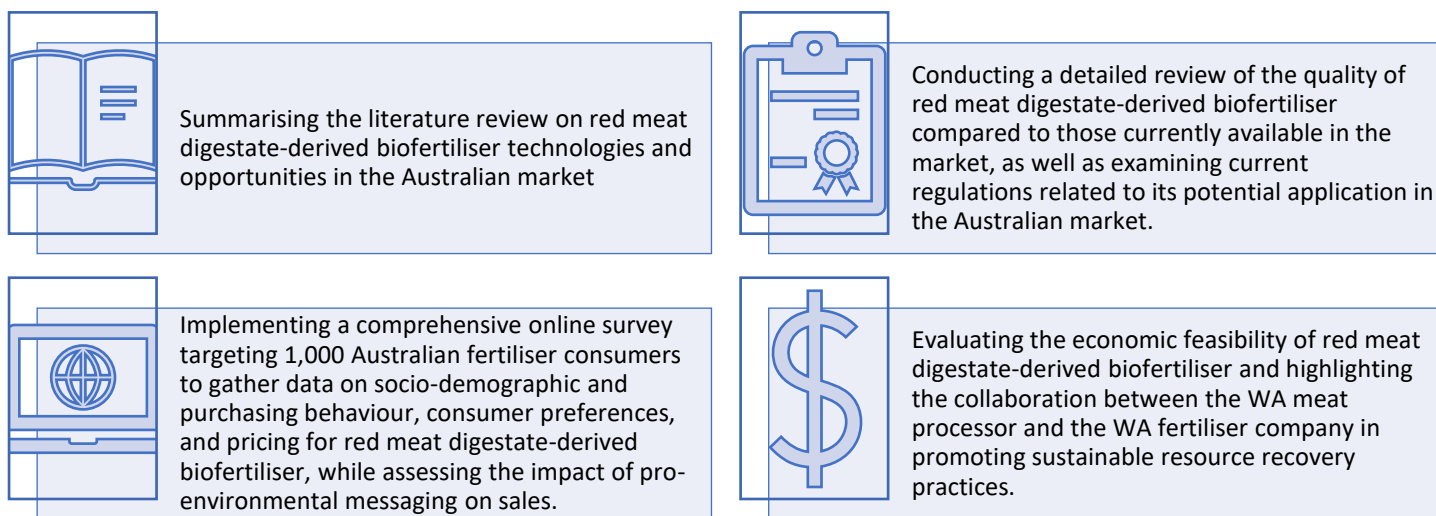


Figure 1. Project content.

Project Outcome

The feasibility assessment confirms that a red meat digestate-derived biofertiliser is a viable and sustainable alternative to conventional fertilisers. Various technologies and processing routes were evaluated to enhance the market value of the recovered resource. The use of a centrifuge for dewatering the digestate, followed by a drying and pelleting process to produce a solid biofertiliser, emerged as the most effective approach.

A market survey conducted under Project 2022-1081 assessed demand and the potential adoption of digestate-derived biofertilisers across key sectors, including forestry, commercial off-takers, landcare, natural resource management, mining, and municipal applications (Figure 2). The findings highlighted that product quality, pricing, and regulatory compliance are critical factors for successful commercialisation in Australia.



Figure 2. Industry sectors for bio-based fertiliser use.

A detailed review of red meat by-products, such as anaerobic pond sludge and pasteurised digestate, demonstrated that these materials have a nutrient-rich composition with lower contaminant levels than traditional biosolids, aligning well with regulatory benchmarks for safe land application. Additionally, integrating food waste digestate with red meat digestate was found to enhance its overall nutrient content.

Given that Australia lacks specific national regulations for digestate-derived biofertilisers, The national biosolids regulations were used as a benchmark for quality standards. International guidelines from Canada and the UK were reviewed for comparison, with Canada regulating digestate under the National Fertilizers Act and the UK setting limits on key quality parameters, excluding organic contaminants like PFAS and PAHs. Victoria has introduced state-level guidelines for digestate management. Ensuring regulatory compliance will help repurpose red meat processing by-products, adding value to the recovered resource and promoting circular economy principles.

The consumer purchasing behaviour survey conducted by UWA provided key insights into economic feasibility. The results indicated that consumers are willing to pay AU\$12 more for Certified Organic fertilisers and AU\$8 more for digestate-derived fertilisers, assuming nutrient value remains unchanged. Among digestate-derived products, those sourced from food waste were preferred, while fertilisers made from meat processing waste or biosolids were expected to sell for approximately AU\$1 less than food waste-derived alternatives.

Economic scenario analyses were performed to evaluate different biofertiliser plant locations, including the WA red meat processor site, the WA fertiliser company location, and an independent biofertiliser plant in Bunbury, Western Australia. Variations in nutrient levels in the final product were also considered. A detailed assessment of feedstock from the WA red meat processor and the WA fertiliser company production to the biofertiliser plant was undertaken. The most well-presented and realistic economic scenario simulated a product sales distribution of 20% in retail, 30% in direct sales, and 50% in horticulture and agriculture—along with enhanced nutrient levels, resulting in a projected payback period of 7 years, confirming the financial viability of the project. However, refining assumptions and conducting internal discussions with stakeholders to review feedstock characteristics and product specifications, as well as assess operational approval in the selected location, is recommended.

The involvement of key stakeholders, including the WA red meat processor, the WA fertiliser company, UWA and Tessele Consultants underscores the collaborative effort required to validate market potential and regulatory compliance for this innovative biofertiliser. The recommendations from this project are focused on refining assumptions, conducting further tests on the biofertiliser plant feedstocks (digestates), finalising product specifications, and securing operational approvals. These efforts will ensure the successful production and

commercialisation of the red meat digestate-derived biofertiliser while promoting circular economy principles and sustainable agricultural practices in Australia.

Benefits for Industry

This project confirms the feasibility of producing and commercialising a digestate-derived biofertiliser incorporating by-products from the red meat industry. This approach strengthens the sector's ability to grow sustainably by repurposing by-products that are currently costly to dispose of. Through anaerobic digestion, these by-products, along with other types of waste, can be processed to generate biogas, providing both thermal and electrical energy on-site. Meanwhile, the remaining digestate can be transformed into a valuable biofertiliser (Figure 3), effectively closing the circular economy loop within the industry.

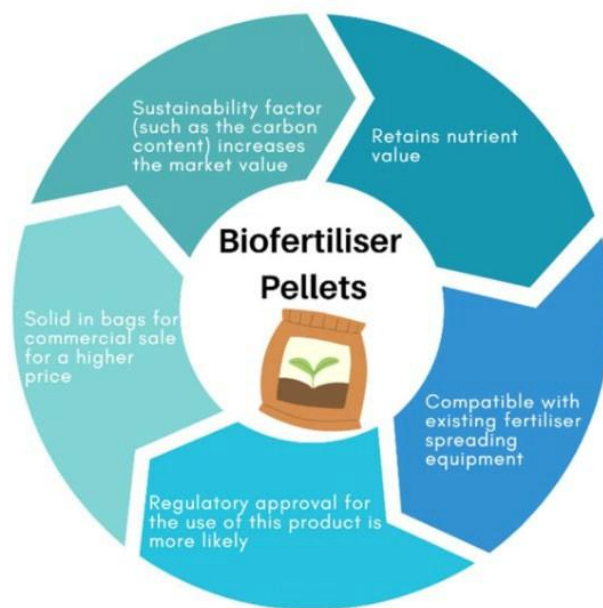


Figure 3. Pelletised bio-fertiliser advantages.