



MDC case study: Bioplastics from bloodmeal

What: Making bioplastics from bloodmeal
Funders: MLA Donor Company (MDC) and Aduro Biopolymers
Provider: Aduro Biopolymers
Why: Extract more value from bloodmeal created during red meat processing

A fantastic bioplastic

Traditionally, bloodmeal generated by red meat processing is dried to a powder for use as a protein component in pig and poultry feed or garden fertiliser.

This project took bloodmeal a step further by converting it into bioplastics for use as rectal plugs in sheep or cattle processing (Figure 1). Earlier research had found that contaminants such as clips and plugs used in processing were a costly problem for the pet food industry, which consumes 35,000 tonnes of meat and bone meal annually.

Fast facts

- MLA has been investigating new value-add opportunities for bloodmeal from abattoirs.
- Research and development resulted in Novatein[®], a bioplastic created from bloodmeal.
- Novatein[®] can be manufactured at a much lower price than competitor bioplastics.
- It can be formed into a range of useful products, including rapidly degradable lamb or cattle rectal plugs to replace conventional clips and plugs that can contaminate rendering and wastewater treatment processes.
- Payback period for equipment to make Novatein[®] was shown to be less than a year.

Figure 1: An overview of the process



“MDC funding was highly beneficial in developing bioplastics from bloodmeal in two ways. Firstly, it gave the project validity which helped attract further investor funding; secondly, it certainly helped bring it to the marketplace much faster. Through the MDC and its funding, doors opened to us that we would have had trouble opening ourselves. Processors were happy to help us and talk to us about the project and then sought information on how it could fit with their businesses.”

Darren Harpur, CEO of Aduro Biopolymers

CASE STUDY

Bioplastics from bloodmeal



Australian company Bestaxx Innovations had already developed the BumDum™, a plug made of polypropylene that seals the rectum of small stock from the point of application through to evisceration. Other plugs on the market are made from sponge, cardboard and polymers.

Aduro worked with Bestaxx Innovations to design the Port Jackson Rectal Plug using Novatein®. More than 10,000 Port Jackson plugs were trialled on empty and full-bellied lambs and sheep during processing. The trial found that compared with the traditional plug, the Port Jackson Rectal Plug, offered:

- Biodegradation overcoming problems associated with plastic contamination in rendering, wastewater treatment process and product supply to the pet food industry.
- Much higher retention rates of the Port Jackson plug compared to traditional rectal plug. Less than 2% failed to make it through to the bung drop station, compared to the anecdotal evidence of 5-15% loss with traditional plugs.
- A reduction in the risk of faecal contamination.
- A small trial was also carried out in bobby calves with mixed results, which suggested modification of the plug would be needed if calves were a large potential market.

What's the cost?

Traditional polymers cost about \$1,000/tonne to produce, biopolymers about \$4,000/t and Novatein® about \$2,000/t.

Global biopolymer demand is estimated to be greater than 258 million tonnes. Research suggested about 1,000t/year of Novatein® would be required to meet initial demand for the Port Jackson plugs alone, supplying an industry that processes 22 million lambs and 10 million sheep annually, and additional demand for the other identified products, such as biodegradable plant pots.

Total capital investment in machinery to create 1,000t/year of Novatein® was estimated at just over \$1 million. With plugs valued at \$2-3/head the payback period was less than a year.

What's next?

Aduro is manufacturing the Port Jackson plug in New Zealand and plans to produce 12 million in 2016-17. Once the system is established in New Zealand, there are plans to duplicate the Novatein manufacturing operation in Australia.

Aduro has been working with processors interested in partnering with the company for Novatein production and parts manufacturing.





Bioplastics from bloodmeal

The news on Novatein®

Novatein® is a bioplastic that can be reformulated, modified and optimised to suit a chosen product's attributes. Aduro has found a way around the traditional problems associated with the degradation of protein polymers at high temperatures.

Bioplastic products are generally expensive because the production of the material can be energy intensive and involves complex science, which means significant investment in research and development and manufacturing facilities. Novatein® granules use a simple, low cost manufacturing process.

The benefits of Novatein® include:

- More environmentally friendly than conventional plastics, with a lower disposal cost as material is biodegradable.
- Reduction of wastewater contamination and treatment system blockages due to plastic clips and plugs.
- Reduced contamination risk to products such as pet food
- A significant new source of demand for bloodmeal.
- Cost competitive with conventional plastics and lower cost than competitor bioplastics.



Further information

For more information contact
Aduro Biopolymers www.adurobiopolymers.com

Read the final report at: [Bioplastics from blood](#)



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