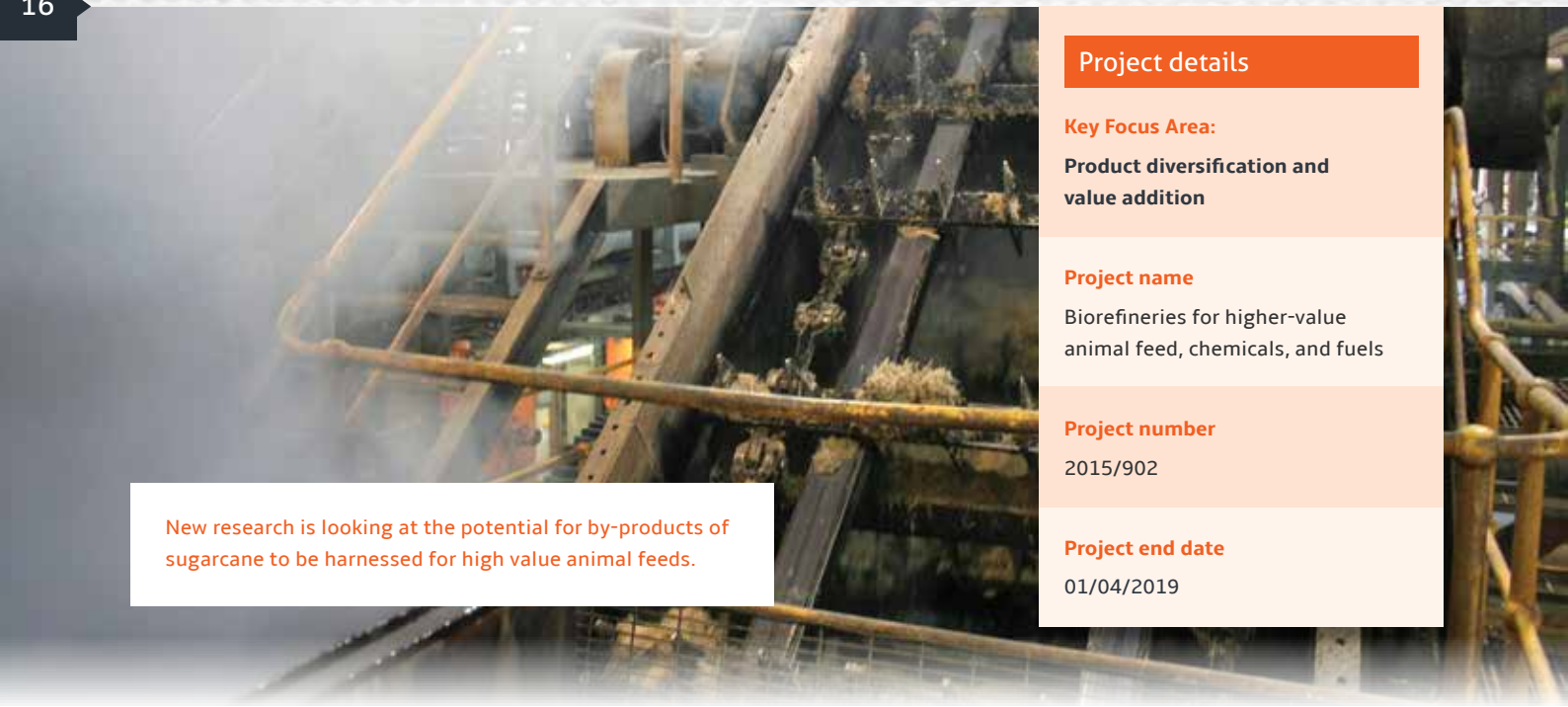

New research is looking at the potential for by-products of sugarcane to be harnessed for high value animal feeds.

Project details

Key Focus Area:

Product diversification and value addition

Project name

Biorefineries for higher-value animal feed, chemicals, and fuels

Project number

2015/902

Project end date

01/04/2019

Harnessing cane's potential for animal feed

New value-adding research is looking at capturing the value of the sugarcane biomass and putting this into the context of other important competitive advantages that currently exist for the Australian sugarcane industry.

When sugarcane growers and millers talk about animal feed, the first thought is typically molasses.

But a major new research project is looking beyond molasses and investigating other possibilities for turning sugarcane by-products into animal feeds and feed-additives.

The research is part of the major Commonwealth Government Rural R&D for Profit Programme as part of a project called *A profitable future for Australian agriculture: bio-refineries for higher-value animal feed, chemicals and fuel*.

Other aspects of the project are investigating other potential value-add products that can be created from sugarcane by-products, as well as by-products from other industries such as cotton and forestry.

SRA is the lead agency for the project with funding from the Australian Government Department of Agriculture, along with Forest and Wood Products Australia Limited, the Cotton Research and Development Corporation, Australian Pork Limited, and the Queensland Government Department of Agriculture and Fisheries.

Queensland University of Technology (QUT) is leading the research with support from NSW Department of Primary Industries and Southern Oil Refining.

One of the goals of the project is to look at each product from a sugar mill and develop chemical and biological tools that could be used to turn these products into animal feed products.

The project is focused on feed products for the pork industry, but is also looking closely at the beef industry because of the potential benefits that the cane and beef industries share through their proximity.

Dr Mark Harrison from QUT's Centre for Tropical Crops and Biocommodities is leading this part of the project and he said tremendous potential already exists within sugar mills.

"With sugarcane we have a cropping system that functions quite differently to other crop industries," he explained.

"We produce a huge amount of plant biomass and transport a large amount of it to a central processing facility, while other industries such as grains are leaving a lot of their biomass in the paddock."

"The coastal location of sugar mills is important because it puts sugarcane production and processing close to many of the beef feedlots in both Queensland and NSW.

"The higher rainfall environment also means that the industry is producing biomass during the winter, which is a time when it is typically drier in western grazing country and there is an increased need for stock feed.

"We are also seeing cattle production in Queensland developing more sophisticated supply chains where cattle from west of the Divide are trucked to feedlots closer to the coast, which is also where sugar mills are located."

The project is investigating five main avenues to create animal feed products from sugarcane:

1. Leaf protein

It is already well-understood that any plant leaf contains protein, and that there are existing (but expensive) processes that can extract this protein and could create a feed protein product.

"With this research, we are investigating if there are new methods that could be used at scale to isolate that leaf protein and create an enriched protein product that could go into animal feed," Dr Harrison said. "There seems to be increasing interest in whole-crop harvesting, so this could be an opportunity to bring in green leaf and tops to send into one revenue stream, and send the billets in another direction."

2. Plant-derived bio-actives

Bio-actives for human consumption have become a growing trend in recent decades and have extended beyond the market of inner city urbanites to underpin the growth of a multi-million dollar 'nutraceutical' industry.

"We gain a lot of health benefits by having anti-oxidants in our diet," he said. "And just likes us, pigs are one-stomach animals, so we are investigating these products to enhance their health. As part of that we are looking at both traditional and cutting-edge extraction technology that may be able to isolate some of these compounds for animals."

3. Improved digestibility

Bagasse is a very low quality cattle feed. It has been estimated that once bagasse constitutes more than 5 percent of a ration then cattle weight gain becomes limited. But can things be done to the bagasse to make it more digestible? This part of the project is looking at two approaches to improving the digestibility.

The first is through high temperature treatments, and the second through 'chemical ensilage', a process where an agent is added to the bagasse and it is allowed to sit at room temperature for a period of time. "We have proof of concept from previous research, but we want to find the most economical way to do it."

4. Liquid sugar products

The researchers are also investigating liquid sugar products other than molasses, such as converting bagasse into a liquid sugar syrup. This research is asking questions such as: what treatments would need to be used? What treatments would work best? How much energy would be in the product?

"We are using advanced analytical techniques to identify what is in the liquid sugar syrups. We need to be certain that these products don't contain compounds that actually inhibit the ability of an animal to take up nutrients from their feed."

This research is possible thanks to multi-million dollar investment that has been made previously by QUT in a Central Analytical Research Facility with both cutting-edge equipment and the skilled staff to both maintain and operate it.

5. Solid-state fermentation

Different types of yeasts and fungi are already fed to animals, and this part of the project is investigating if these micro-organisms can be grown safely from the residue of cane production, with a focus on improving the protein content.

If those micro-organisms can also produce fats and oils, as well as protein, then the research project (as a whole) is moving another step closer to producing everything that we need to produce a complete animal feed from sugarcane by-products.

Conclusion

Dr Harrison said that this research project was about creating a new revenue stream and helping to improve industry profitability.

"A sugar mill is not necessarily going to become a formulator of stock feeds, but they could be a supplier of valuable ingredients that go into a feed," he said.

"Fibre is an important part of animal diets and cane factories have a lot of fibre. So we are looking at: what can we do to it to ensure that the nutritional value is improved.

"At the end of the day this is about helping the industry to make money."

Australian Government
Department of Agriculture and Water Resources

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More information

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