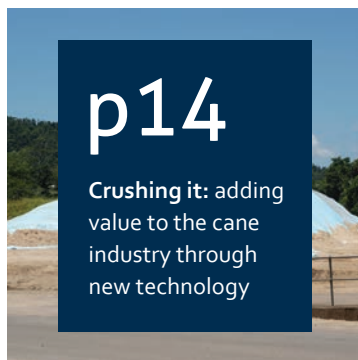
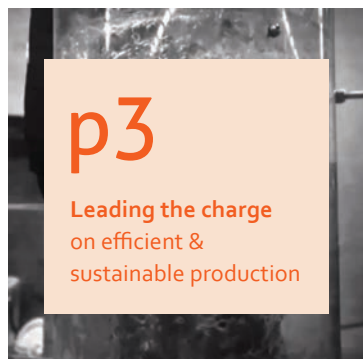




MillingMatters

Summer 2017



Leading the charge on efficient & sustainable production



Project name: Improved modelling of wet scrubbers
Key Focus Area: Milling efficiency and technology
Project number: 2012/55



Queensland University of Technology (QUT) researchers have used a scale-model of a wet scrubber to provide valuable information for sugar millers on how this piece of milling equipment functions – and to recommend possible modifications and improvements.

Wet scrubbers have made a strong contribution to environmental sustainability of the sugar industry through their removal of dust from boiler flue gas.

They are used by some sugar mills, and within other industries, to clean gas, which allows the industry to reduce its environmental footprint and comply with government regulations.

However, their operation can sometimes be improved. If wet scrubbers are not working optimally, there can be an increased risk of environmental nuisance. There is also a risk of a build-up of carryover material on the exhaust fans, which can lead to vibrations from the fan, and could lead to the fan having to be stopped and therefore the boiler.

Dr Anthony Mann with QUT was the lead researcher on the project. He said there was a strong incentive to ensure that wet scrubbers are working optimally.

A key element of the project was the construction of a scale-model test rig, which was used to visualise the flow of gas through a wet scrubber (pictured above).

High-speed photography was used to generate slow-motion videos of the patterns of movement of gas and water. In addition, Computational Fluid Dynamics (CFD) modelling was also used to model the flow patterns. This information provided a valuable foundation for the researchers to properly understand where improvements could be made.

"We found the results from the model were consistent with observations made during inspections of sugar factory wet scrubbers," Dr Mann said.

"From the modelling we were able to propose design improvements to the scrubbers and also implement some of these on the scale model. We consulted with milling industry users and scrubber manufacturers on the design modifications, and they provided us with good feedback and agreed with most of our recommendations. The initial indications are that the changes reduce water droplet carry-over, but we need to analyse this in more detail."

Dr Mann said that one factory had already made some of the modifications and there had been interest from other factories. "While some of the changes are expensive, most of them are cheap to implement, and the biggest advantage is that we are talking about modifications to what exists already, rather than whole new wet scrubbers, which would cost several million dollars to install."

Dr Mann said the project brought more precision to making improvements to wet scrubbers, which could lead to efficiencies in investment decisions for sugarcane mills. It provides a cost effective alternative to the traditional "rules of thumb" approach used in wet scrubber design.

The research was structured around a PhD by Dr Hassan Ali, with further work from other QUT researchers including Dr Floren Plaza, Mr Neil McKenzie, and Dr Phil Hobson. The work occurred as part of the SRA-funded project, *Improved modelling of wet scrubbers*.

For more information contact Dr Anthony Mann on a.mann@qut.edu.au or (07) 3138 1333.

Milling news

> *In brief*



Small milling research project initiative

The SRA Board has approved the development of a new Small Milling Research Project initiative, in response to feedback and discussion with milling investors and stakeholders. The initiative will be subject to the following principles:

1. Project investment will be capped at \$75,000 per project with a maximum cap for the initiative of \$250,000 per year;
2. The application must clearly describe how the project fits with milling and SRA RD&A priorities and the potential industry benefit ("business case") from adopting project outcomes;
3. The project personnel do not need to be from a research institution and could be from a milling organisation, equipment manufacturer/supplier, consultant or other organisation, but at least one applicant must be from a milling organisation;
4. SRA's investment in this initiative will be included in the total investment in Key Focus Area 5: *Milling Efficiency and Technology* and not be considered as additional investment;
5. The potential attractiveness of investment proposals would be enhanced by financial co-investment within the project; and
6. SRA will provide a "window" for the receipt of Small Milling Research proposals from mid-December concluding at the end of February, with successful projects to start within the 2018 crushing season.

More information on this initiative will be available via the regular SRA enewsletter, which can be subscribed to via the links at our website. Information will also be available at www.sugarresearch.com.au.

Milling info online

With the permission of Australian sugar mills, SRA publishes some mill area statistics each year on our website, under the *Millers* section. This information was previously published in the Australian Sugar Yearbook, which has been discontinued as a publication. The statistics are available under <https://sugarresearch.com.au/growers-and-millers/milling/>.

Also within the milling section you can find previous editions of the *Milling Matters* magazine, and the *Laboratory Manual for Australian Sugar Mills*.

Final reports from SRA-funded research projects are found in the SRA elibrary, at <http://elibrary.sugarresearch.com.au/>



SRA Board visits Tully and Ingham

The SRA Board met with growers, millers and industry stakeholders during visits to Tully (August 16) and Ingham (August 17).

The SRA Board regularly meet with investors across the industry to discuss their priorities for research, development and adoption (RD&A) from SRA. The Board hold six meetings per year, three of which are in regional cane-growing areas.

Meetings in Tully included a visit to TSL and a tour of the mill, field talks with Tully Cane Productivity Services Limited, and a visit to the SRA Tully research station. Talks there included SRA's work on nutrient management and managing Pachymetra root rot.

The Board also met with Tully CANEGROWERS and visited growers in the region to hear about their priorities. It was the SRA Board's first formal visit to Tully since the formation of SRA in 2013.

The Board met with investors in Ingham, including Wilmar, and also looked at research activity in the region including plant breeding (new varieties), engineering (harvest efficiency), nutrient management, water logging, and farm business management.

SRA thanks everyone for their support for the visit.

Above (left): Directors Ms Lindy Hyam and Dr Guy Roth (front) meeting with Tully Sugar General Manager, Mr Barry Dun.

Above (right): SRA Director Dr Ian Johnsson, Research Funding Panel member Mr Gary Longden and General Manager, Mr Barry Dun.

Opposite page: SRA Director Dr Guy Roth getting a close look inside the Tully mill.

Construction of MSF Sugar's green energy power plant forges ahead

Civil works for MSF Sugar's new \$75 million green energy power plant at the Tableland Mill have been completed, paving the way for work to start on the major component – a high-pressure boiler which will turn biomass waste into energy.

Construction of the plant started in May of this year and is on track to be completed by July 2018.

The plant will use a 100 per cent renewable sugarcane fibre to produce 24 megawatts of electricity – enough to power every house in the Tableland region.

MSF Sugar Tableland Green Energy Power Plant Project Manager, Mark Magnanini, said with all of the design and engineering now complete, the team is excited to be moving into the construction phase.

Seamless transition to new ProFoss NIR system at Isis



ProFoss near infra-red (NIR) systems have been installed at several Australian sugar mills in 2017 with the help of milling researchers at Sugar Research Australia (SRA).

At these mills, the new system is a replacement for the Direct Light NIR instrument, which is no longer being supported by its suppliers, thus creating risks such as a difficulty sourcing spare parts.

SRA Leader for Milling Efficiency and Technology, Steve Staunton, leads the NIR team at SRA and said his team had been working with mills to make the transition as smooth as possible for the installation of the instruments, which are crucial for measuring parameters for cane payment such as CCS and fibre.

One mill that has had the ProFoss NIR in operation for the final weeks of the 2017 crush is Isis. They made the switch in September after running both instruments in parallel from the start of the season.

Production Superintendent with Isis Central Sugar Mill, David Pike, said the mill identified that the hardware support for the Direct Light units was at risk, as Foss service contracts for these type of instruments expire at the end of the 2017 season. Isis had been running the Direct Light NIR system since 2007.

"The transition to the ProFoss was quite smooth, but not without some challenges," Mr Pike said.

"Our internal IT team had to realign the ProFoss data string with our cane receivals system and we also had some timeout and windows OPC server problems.

"These were resolved quickly by the SRA team and without their ongoing maintenance support of the software and calibration platforms, the new ProFoss

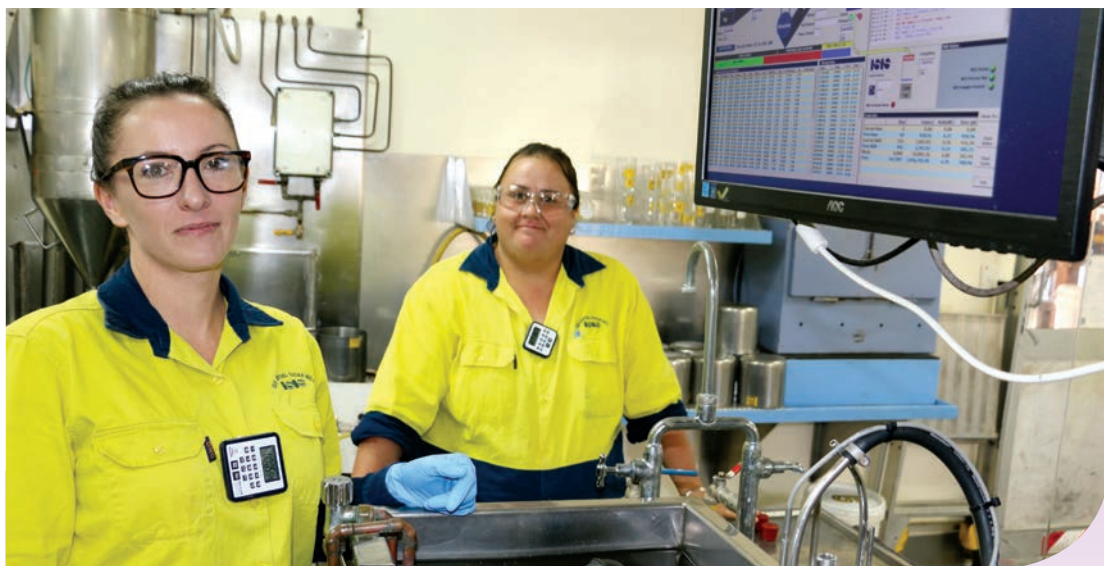
NIR system would not function to the level of confidence required for cane payment."

He said the support from SRA was paramount to the installation and operation. Mr Staunton said: "In running the systems in parallel, and based on that data, we saw that the new system was outperforming the old, and Isis were able to make the switch seamlessly. "We had a turnkey solution available, which is a bolt-on with no moving parts."

The ProFoss systems are calibrated to the laboratory methods for Australian sugar mills for cane parameters such as brix in juice, pol in juice, cane fibre and cane CCS. A continuous series of check samples are analysed by the mill laboratory using the traditional wet chemistry methods and compared to the ProFoss results to ensure the system is both accurate and precise.

The statistical parameters that demonstrate acceptable performance of the system are:

1. The standard error of prediction (SEP); this metric shows the standard difference between traditional laboratory analysis and the online ProFoss analysis. Acceptable SEPs for each parameter are defined in the calibration process and are monitored using the laboratory results plotted as control charts to ensure the system is within acceptance limits.
2. Prediction bias; this metric describes the average difference between the laboratory and ProFoss results for the laboratory check series.

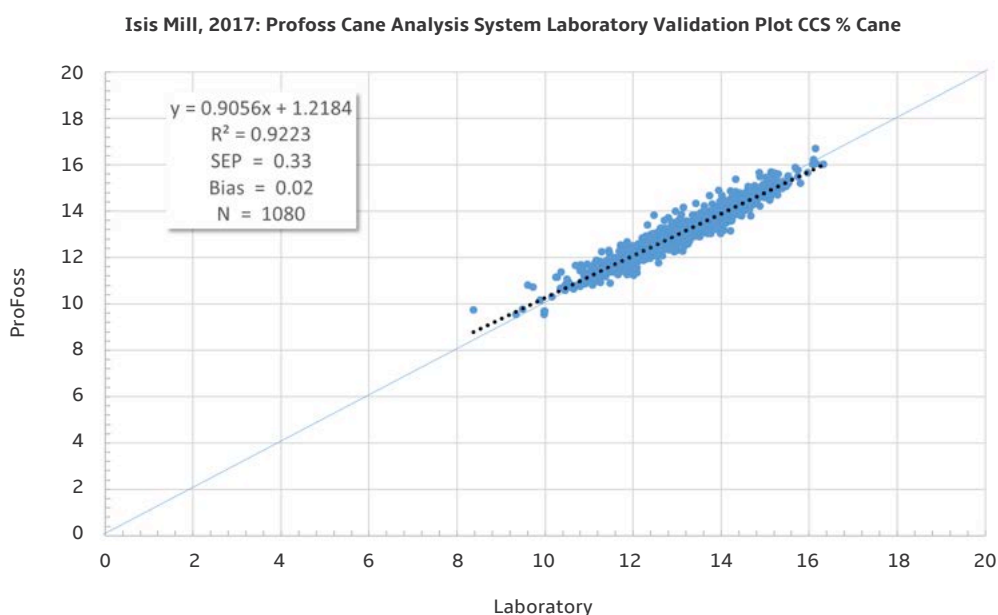


3. Linear regression between the laboratory and the ProFoss results for check samples. Linear regression parameters such as slope of the regression line and the co-efficient of determination (R^2) describe how similar the two sets of results are to each other from the highest to the lowest values. Linear regression slope should be between 0.90 – 1.10 and the co-efficient of determination should be as close to one as possible (one being a perfect match).

Opposite: Production Superintendent David Pike.

Above: Tanyia Rainbow and Kim Swan with Isis Central Sugar Mill validating the ProFoss NIR instrument with traditional cane payment methods.

Below: An example of a linear regression line, with SEP and Bias, for ProFoss CCS in Cane at ISIS mill is shown in the figure. The results for the ProFoss shown in the figure meet all the requirements for cane payment.





Taking the next step forward in biofuel technology

New research is looking at not only the potential to turn bagasse into biofuel, but also adding value to it by transforming it into advanced forms of biofuels such as jet fuel.

The production of ethanol from sugarcane juice and molasses is well understood.

But it is the potential to create advanced biofuels – such as aviation fuel – from bagasse that could be the next step forward for the Australian cane industry.

This is the focus of a major research project that is looking at adding value to the sugar industry by providing a research foundation to create biorefineries alongside the existing sugar industry.

The project is funded by the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program, along with funding from Sugar Research Australia and the Queensland University of Technology (QUT).

One aspect of this project is looking at the conversion of bagasse into products called microbial oils, which can then be used as a feedstock to create advanced biofuels.

This part of the project is being led by Dr Jan Zhang at QUT, where he and his team have studied different ways of converting bagasse into microbial oils and ensuring maximum yield.

“These oils created from bagasse have very similar properties to algae oil and vegetable oil, and can be used to create biodiesel,” Dr Zhang said.

“However, we know that we can generate greater value by targeting the production of advanced fuels.”

Why aviation fuel?

Fuel for aviation, whether it be consumed by major commercial airlines or other users such as defence departments, has much higher quality requirements than traditional fuel.

It needs to be able to withstand the risks of icing and explosion and comply with other safety and regulatory requirements. This means it is a higher value product than traditional fuel.

In addition, there is a growing appetite for the production of sustainable aviation biofuels. Australian airlines such as Virgin and Qantas have previously signalled their intent to increasingly use biofuels in their fleets, and successful demonstration flights have already occurred using alternative aviation biofuels.

Defence forces have also expressed their desire to increase their consumption of biofuel. The US Navy has made a commitment to source 50 percent of its fuel from renewable sources by 2020. Last year, they also signed an agreement with the Queensland Government that outlined a commitment to explore research, development, supply and sale of advanced drop-in alternative fuels.

A CSIRO road map on biofuels for aviation indicated that the percentage of bio jet fuel in Australia could be up to 40 percent by 2050.

What is needed

End-users are looking for biofuels to be drop-in products to replace fossil fuels, so they can avoid any changes or redesign to aircraft and systems. They also need to continue to meet the high safety standards already in place, while reducing carbon emissions.

The cane industry

Biofuel – and high value biofuel – can be produced from a wide range of sources and feedstocks. But this research is helping the Australian sugarcane industry into a position to assess the viability of this fuel production, prove the concept, and then capitalise on opportunities when they occur.

The research

The first part of the process is converting the molasses and bagasse into microbial oils, with the research teams using micro-organisms for this process. They have worked on two different approaches: one using filamentous fungi and another using yeast.

To be successful, a process would need to deliver a high oil content (50 percent to 70 percent), as well as a high biomass. This means ensuring a high yield of oil from the bagasse. Dr Zhang said that there were challenges with both, as well as opportunities.

Using the filamentous fungi creates a risk of quality control because it can grow in various morphological forms, as well as posing cultivation problems that mean not enough biomass is created.

However, he said that they had developed a morphological control method and used one strain of the fungi that could accumulate up to 70 percent of its dry biomass as oil, which is very high.

“Currently we can achieve more than 20 grams (gm) per litre of microbial oils from fermentation of molasses. That is a very significant achievement. When we started the project in 2016, the concentration was less than 5 gm per litre, and we are still working on improving the concentration further, and replacing molasses with lower-cost substrate–bagasse,” Dr Zhang said.

The second process, using yeast, does not present the same control problems as the fungi, meaning it may produce more biomass. However, the oil content may be lower. One current strain of yeast accumulated up to 45 percent of its biomass as oil, based on preliminary screenings.

A PhD student is working on this part of the project and will develop it further to improve oil production by the yeast.

The next step

A process called hydrothermal liquefaction (HTL) is used to convert the oleaginous microbial biomass into bio-oils, from which advanced fuel is produced through catalytic cracking processes.

QUT researchers are working on the HTL process and will collaborate with Southern Oil Refining to test and demonstrate the oil-upgrading process for advanced biofuels.

There remain a number of policy and infrastructure hurdles for the development of this technology, but the research is providing a valuable foundation for the future.

As the project also involves other industries, other aspects of the project are looking at research avenues such as using animal waste products to create the advanced biofuels, and also if the bagasse-based oils can be turned into nutraceuticals, which are in turn much higher value than the advanced fuels.

The Biorefineries for Profit project is funded by SRA and QUT and the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program.



Adding value to bagasse as an animal feed



As part of a major value adding research project, scientists are looking at the potential for transforming bagasse into a complete animal feed.

Even for animals with four stomachs and an appetite for hay, sugarcane bagasse is not particularly nutritious. It is high in fibre, and any energy in the bagasse is very difficult to access for polygastric animals such as cattle, meaning it is of little value beyond more than 5 percent of a feedlot ration. For monogastric animals (those with one stomach, such as pigs) there is even less value.

But new research is looking at ways in which the nutritional value of bagasse could be captured in order to add value to this generally low value by-product that is produced by sugar mills.

Part of this research is looking at ways to increase the digestibility of the bagasse, with an additional component looking at the potential for supplements that could add even more value to such a new feed and further increase its digestibility. This part of the research is being conducted by QUT researchers Dr Leigh Gebbie and Associate Professor Robert Speight (pictured above).

"There is already research underway as part of this project looking at ways of softening the bagasse and making it more digestible. That research intends to release some of the energy from the feed, but it is not yet a complete feed at that point," A/Prof Speight said. "To make it a complete feed, you need protein and other nutrients. So our research is looking at those other factors and how we can create a more complete feed and end up with a higher value product."

It is common that existing animal feeds contain probiotics and enzyme supplements that can enhance digestion. Probiotics are live microbial cells that enhance the health and performance of an animal, and enzymes are added to help break down feed to release extra energy and nutrients.

"We are developing new probiotic and enzyme supplements specifically for inclusion in sugarcane bagasse-based livestock feed," Dr Gebbie said. In the search for prospective candidates, she said the best starting point was the bagasse itself. "Part of the reason for doing that is that we want microbes that are compatible with bagasse in the feed. It makes logical sense to look at bagasse and find out what might already be there."

They have already identified some candidates that could be useful. This includes bacillus microbes that could be used in probiotics, as well as some fungi and yeasts. They have isolated about 150 organisms that are part of the work, with an important step now being to understand the differences between them and their suitability.

"The criteria that they need to fit include being able to resist the acid in the stomach and other parameters such as the temperature at which they grow," Dr Gebbie said.

Once the researchers have identified the microbes with the best properties, they will be tested in the field.

The Biorefineries for Profit project is funded by SRA and QUT and the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program.



Australian Government
Department of Agriculture
and Water Resources



Research looking to improve harvest efficiency for the whole value chain



A new research project is looking at the front end of sugarcane harvesters to see if their components can be better matched to ground speed.

The idea is simple. Currently, on factory-standard machines, the spirals, basecutter and knockdown and fin rollers are not specifically coordinated with the forward speed of the harvester. All of these components play a crucial role in impacting quality of the cane supply, sugar loss, and ratoons, with previous research suggesting there is significant damage occurring even before the cane reaches the basecutters. The research is asking the question: can the front end be improved?

As part of that question, Norris ECT is working with QUT on a project that is part of the Rural R&D for Profit project, *Enhancing the sugar industry value chain by addressing mechanical harvest losses*, which is funded by the Australian Government Department of Agriculture and Water Resources, SRA and QUT.

In 2017, field trials have begun assessing modified John Deere 3520s at northern NSW and Childers and a Case 8000 with Wilmar in the Burdekin. We caught up with Stuart Norris from Norris ECT in August while field trials were underway in the Tweed Valley at a property managed by David Bartlett. "If you do some analysis, it looks like none of the front end components are really that well suited to the speeds and conditions we harvest at currently," Stuart said.

"By doing these trials, we are hoping to determine the impact of the current speed of those components and is there any negative impact on yields. Is there some way to fix it to allow us to continue to harvest profitability?"

The 3520 at Condong, run by Tweed Valley Harvesting, has had another controller added that allows control of the speed of the basecutters, spirals and fin and knockdown rollers, so their speed can be changed and also automatically linked to ground speed.

Working in a block of dual-row 1.9m one-year old burnt cane, the trial involved four treatments:

- Low speed at factory front-end settings (4 km/hour)
- Low speed at synchronised front-end settings (4 km/hour)
- High speed at front-end setting (8 km/hour)
- High speed at synchronised front-end settings (8 km/hour).

"We are measuring the yield from the treatments in four-row plots as well as sampling the trash blanket, which is added to the mill yield to give an indication of the total biomass before harvest," Stuart said.

"We will then follow this over the next three to four years to look at differences between the plots.

"As part of the trial, we also pick sub-plots of rows where we count the stalks and inspect for damage, to look for things that have been cut, or bent, or had multiple cuts, or come out of the ground."

Stuart said there was enthusiasm from the trial collaborators and some early positive indications. Full information will be communicated to industry as the project progresses over the coming years.

Stuart said that the project had already learnt valuable information about the front-end of modern Case and John Deere harvesters. For more information contact Stuart Norris by emailing stuart@schlot.com.au

This project is supported by funding from SRA, QUT and the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program.

New projects

SRA has announced a range of new research projects that began from July 1, 2017 to drive productivity, profitability, and sustainability for Australian sugarcane growers and millers.

These new projects have been announced following a call last year for new research projects that address critical research needs for the Australian industry. The projects span across the Key Focus Areas (KFAs) in SRA's new five-year strategic plan. The following provides a summary of new projects that have a direct link to the milling sector.

Project title:

Integrated standardised competency based training for sugar milling operators

KFA8:

Collaboration and capability development

Project summary:

This project will establish an appropriate learning management system (LMS) to act as a single training resource for Australian sugar industry training. It will develop a standard format for training packages and setup within the LMS, catering for operators and supervisors having no previous sugar experience through to a high level of sugar technology skills.

The project will map the training packages to the AgriFoods FDF10 knowledge competencies and develop assessment instruments to these same competencies. It will develop specific training packages for high-grade fagalling, sugar drying, low-grade fagalling and cooling crystallisation, using existing training materials where possible and developing new content if needed.

The project is led by David Moller at QUT.

Project title:

Investigations to mitigate the effects of sucrose degradation and acid formation in factory evaporators on sugar recovery and quality, corrosion and effluent loadings

KFA5:

Milling efficiency and technology

Project summary:

This project will determine the effects of sucrose degradation and acid formation in factory evaporators on sugar recovery, corrosion and effluent loadings and develop strategies to mitigate these issues.

The project is led by Darryn Rackemann at QUT.



Project title:

Evaporator liquor brix sensor

KFA5:

Milling efficiency and technology

Project summary:

The objective of this project is to test if Ultrasonic Time of Flight devices can operate successfully across the full range of (sugar) cane juice and liquor products, chemicals and water, which are processed through mill evaporators.

It will evaluate the impact of fouling on the instrument sensor between fortnightly evaporator cleaning cycles, identify the introduction of bias, drift or loss of sensitivity and determine instrument recovery from these conditions.

The team will test the hypothesis that Brix can be reliably measured in the range 20 to 80Bx (and establish lower and upper limits) through normal operation and staged calibration experiments including adverse conditions outside the normal operating envelope (down to 0 brix).

On successful completion of this project, the Australian industry will be in a position to determine if Ultrasonic Time of Flight technology is suitable for adoption in cane sugar mills or refineries as an alternative to conductivity, brix towers, microwave and in line refractometers for the purposes of evaporator product density measurement and control.

ProMtec will also be in a position to use this data to reinforce or support the suitability of TOF technology for this purpose.

Robert Stobie at Wilmar Sugar Australia limited leads the project.

Project title:

Reviewing and extending knowledge of fibre quality assessment and effects of cane varieties

KFA1:

Optimally adapted varieties, plant breeding and release

Project summary:

This project aims to improve knowledge of the significance of fibre quality measurement (FQM) data to improve its value for variety selection and to provide guidance on further research work to utilise FQM requirements to guide variety development.

This is in context to the release of recent new varieties such as SRA1[®] and SRA4[®] in the Southern Region. The project will increase the industry understanding by:

1. Better understanding the effects of location, crop class and maturity on fibre quality measurements for different varieties by reviewing historical data and conducting a designed experiment.
2. Assessing whether the condition of the SRA shredder, used to prepare samples for FQM, affects the measured values by comparing measured values before and after the shredder refurbishment in 2016.
3. Identifying how different varieties affect factory operation and performance by analysing historical data and seeking relationships between problem varieties and FQM.
4. Reviewing the safe range for existing FQM taking into account measurement variability and values known to cause problems in the factory.
5. Identifying other candidate FQM methods from other sugar industries and other fibre industries.
6. Recommending better ways to present FQM data for consideration by variety adoption committees.

It is led by Geoff Kent at QUT in collaboration with SRA Bundaberg Plant Breeder Roy Parfitt.

Crushing it: adding value to the cane industry through new technology



A recently completed PhD by Joshua Howard has examined the potential for the sugarcane industry to tap into value-adding through the use of by-products such as bagasse and molasses.

The PhD, through the Queensland University of Technology (QUT), focused on the potential for using these by-products to create platform chemicals, which are a starting point to create pharmaceuticals, fuels, or biomaterials. It was supported by investment from the sugar industry, including SRA.

According to Dr Howard, the Australian sugar industry is in an ideal position to make better use of its by-products because of its abundant and reliable source of bagasse and molasses.

"In Australia, it makes environmental and economic sense for us to be using our agricultural waste for something useful," he said. "And there is no way else that we can practically get these platform chemicals from any other renewable source than from biomass such as that from agricultural production."

Currently, around the world, most of these platform chemicals are sourced from crude oil, which has ramifications for pollution, sustainability, and end-of-life disposal of the products. With a rapidly growing world population headed toward 8.7 billion by 2030, there will be an increasing need to source these products from more sustainable and renewable sources.

"The cane industry is in a unique position in that we have a robust biomass of bagasse, and we also have

the less robust – but more amenable – biomass of molasses. I think a lot of these upgrading procedures I studied within the PhD can be applied to molasses, before we go to bagasse. Having that liquid amenable biomass – the molasses – puts the cane industry in a strong position to get value from this technology."

His thesis is titled *Catalytic Conversion of Sugar Manufacturing By-Products to 5-(Chloromethyl) Furfural and 5-(Hydroxymethyl) Furfural*.

It looked at using thermochemical processes to create platform chemicals, rather than the more readily understood biochemical processes, with the thermochemical process likely offering a more viable approach, according to Dr Howard. It also looked at pre-treatment processes for the biomass to more efficiently generate the platform chemicals.

The research has helped demonstrate that the technology is applicable to the sugar industry.

"We know we can manufacture the platform chemicals, but now we need a market for those chemicals, which is where you have consumer products that can be produced and sold," he said.

SRA currently invests in value-adding research projects through its five-year Strategic Plan and Key Focus Area six: product diversification and value addition.



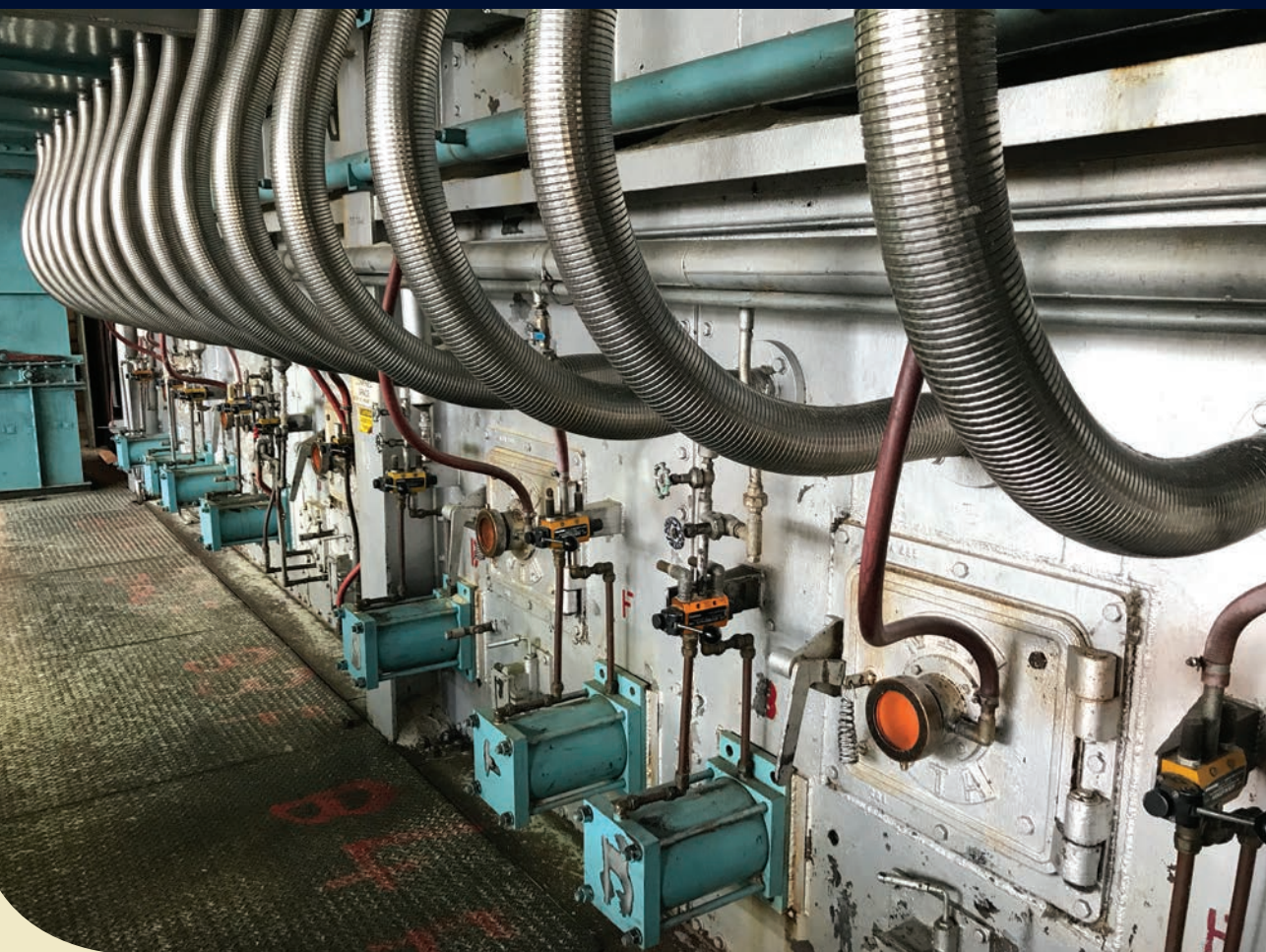
Project Title	Project Number	Principal R&D Provider	Chief Investigator	End Date
Key Focus Area 5 (Milling efficiency and technology)				
Real time harvest and transport system	2014/037	QUT	Geoff Kent	01/05/2018
Improving mill efficiency through rapid analysis methodologies	2014/051	SRA	Steve Staunton	01/09/2017
Managing aspects of raw sugar quality in the Australian sugar industry	2014/052	SRA	Steve Staunton	01/08/2017
Investigation into modifying pan boiling techniques to improve sugar quality	2015/013	QUT	David Moller	30/06/2018
Increasing capacity to undertake cane preparation research through modelling and experimentation	2015/018	QUT	Geoff Kent	01/05/2018
Develop a blueprint for the introduction of new processing technologies for Australian factories	2015/043	QUT	Ross Broadfoot	01/12/2017
Online analysis systems to measure the available nutrients in mill mud	2016/019	SRA	Steve Staunton	01/03/2020
Reducing boiler maintenance costs and deferring capital expenditure through improved technology	2016/020	QUT	Floren Plaza	01/07/2020
Evaporator liquor brix sensor	2017/003	Wilmar	Robert Stobie	31/12/2018
Managing aspects of raw sugar quality in the Australian sugar industry – Part II	2017/006	Griffith University	Chris Davis	30/06/2019
Investigations to mitigate the effects of sucrose degradation and acid formation in factory evaporators on sugar recovery and quality, corrosion and effluent loadings	2017/007	QUT	Darryn Rackemann	01/12/2020
Key Focus Area 6 (Product diversification and value addition)				
Process for making bagasse paper pulp	2012/053	QUT	Thomas Rainey	01/05/2018
A profitable future for Australian agriculture: biorefineries for higher-value animal feeds, chemicals and fuels (Rural R&D for Profit)	2015/902	QUT	Ian O'Hara	01/03/2019

The following projects have submitted final reports since the last edition of **MillingMatters**:

- Reducing the maintenance costs of mill rolls, QUT
- Improved modelling of wet scrubbers, QUT

The following projects have submitted milestone reports since the last edition of **MillingMatters**:

- Develop a blueprint for the introduction of new processing technologies for Australian factories, QUT
- Reducing boiler maintenance costs and deferring capital expenditure through improved technology, QUT
- On line analysis systems to measure available nutrients in mill mud, SRA



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