

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.

