

Potato dips, buns and ice cream: A way of the (waste-free) future?

Former University of Adelaide students Millie Shinkfield and Sophie Riley completed their Bachelor of Food and Nutrition Science degrees in 2015 and 2017 respectively, and both chose to focus on value-added potato projects during their Honours. They spoke to *Potatoes Australia* about their research and what they discovered about the humble spud.

As previously reported in this magazine, the Australian potato industry is the most significant but disproportionate contributor to horticulture production waste.

According to Potatoes South Australia, the state produces around 80 per cent of Australia's supermarket potatoes, as well as contributing heavily to the chipping industry. Of this total, approximately 80,000 tonnes of product is graded out as waste due to strict retailer standards.

Former University of Adelaide Food and Nutrition Science students Millie Shinkfield and Sophie Riley recognised this was an issue and decided to pursue research that focused on value-adding potato products.

Millie and Sophie were keen to gain knowledge in food technology rather than nutrition and dietetics research, as they were both interested in the technology components of their Bachelor of Food and Nutrition Science degree and wanted to pursue this area further. The opportunity arose to conduct a potato project as part of their Honours, which Millie began in 2016-17 and Sophie continued in 2018, and they were intrigued by the innovation aspects and benefits to the local community.

Spud study

Millie's project aimed to examine the attributes of four potato cultivars grown in South Australia, and explore the potential products in which each variety could be used.

"Potatoes naturally come in a huge variety of shapes and sizes, so I cut each potato into one-centimetre slices and boiled a standard weight of slices in a standard volume of boiling water. All were boiled for the same amount of time, except for the low-GI variety,

which required longer to soften due to the differences in composition," Millie explained.

"There were also a lot of variables to deal with due to measuring multiple attributes over multiple timeframes, but I ended up with a lot of interesting data."

Once the standardised method of cooking and mashing/puréeing potatoes was perfected, Millie measured changes in colour, pH, texture (pressure output from a standard probe), and moisture over five weeks' storage.

"The suitability of each potato cultivar in a dairy-free dip product was then explored. Further from Honours, I worked for the FOODplus Research Group to continue exploring applications for potato purée. This included potato buns, gluten free buns, wheat and gluten free crackers, gnocchi and savoury pies," Millie said.

Sophie continued this research by using the potato purée to create a basic ice cream base, which presented its challenges.

"We first incorporated the potato purée at a very high percentage to see how much we could utilise the purée to reduce waste," she said.

"However, due to the high starch and water content in the potato, the ice cream came out rock hard! As customers desire a fluffy, creamy and soft ice cream, we then decided to incorporate the potato at 0/10/20 and 30 per cent of the total. From here, we formulated the ice cream and conducted physical, chemical and sensory analysis of the iced dessert."

Key findings

During the project, Millie found there were big differences in certain aspects of the potato cultivars, which combined with the existing knowledge that some varieties are better suited to certain cooking methods than others.

"Overall, the white skinned potato was found to have the best versatility, but all performed well in the dip products (they did not split from the oil, were glossy and had good flavour). I was happy with the dips produced – especially the smoked salmon and dill dip using local smoked salmon off-cuts, which is an added waste-reduction bonus," she said.

"I would love to see this on the shelf as a South Australian product. The products I developed at FOODplus were successful



Millie Shinkfield



Sophie Riley



Mango soft serve containing potato purée.

too, with high whole potato purée contents (up to 30-40 per cent for some products). My favourites were the gluten free crackers and potato hamburger buns; I think these have a lot of potential if they are taken on by industry."

Meanwhile, Sophie's results showed that purée formulations of 20 and 30 per cent created a substantial decrease in total solids, fat, sugar and energy in potato ice cream. The addition of a potato purée caused significant increases in hardness and melting time, but a decrease in the overrun; that is, the air that adds to the 'fluffiness' of ice cream.

"The sensory evaluation findings reported no significant difference of potato purée in the appearance and aroma of the samples, but changes in sweetness, flavour and texture became significantly more undesirable ($p < 0.05$), particularly for the higher levels of potato. Overall, the ice cream could be very successful with a little more tweaking – especially with the rise in demand for plant-based and dairy-free iced desserts," Sophie said.

Further research

Currently Millie and Sophie are working for Mexex, a wholesale contract manufacturer specialising in sauce products. Millie is working as a Quality Assurance Assistant, and Sophie is a Customer Service/Freight and Logistics Assistant, but also works in quality assurance from time to time.


The pair is eager to continue working in the food technology sector.

"The pressing issue of food waste, and the requirement for innovation across multiple industries to alleviate this, is such an interesting area of research. I'd like to continue gaining experience in the local food industry before applying my skills to further my research in this area," Millie said.

Sophie agreed with her workmate.

"Definitely down the track it would be interesting and exciting to carry on with further study in the field of reducing waste in the food industry – whether it be further research and more depth into creating an ice cream with potato, or using another 'waste' fresh product," she said.

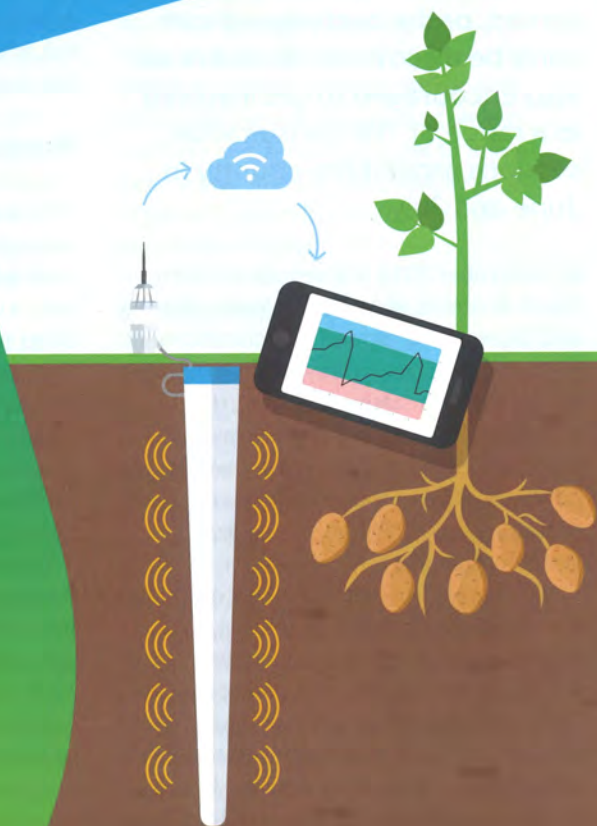
"After gaining experience in the food industry it would be good to see just how production lines work and the issues that can arise with sourcing ingredients or packaging."

Find out more 

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