

# Robots for teat preparation: optional or essential?

With the robotic rotary now operating at the Dornauf farm in Tasmania, dairyfarmers are starting to ask specific questions about how it works, and whether the optional extras, such as teat preparation robots are a good business proposition. In this article, FutureDairy researcher **RENÉ KOLBACH\*** reports on some of the findings from research conducted at the Camden prototype robotic rotary that has been operating for the past three years.

**KEY POINTS**

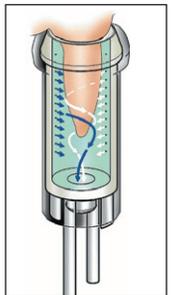
**ROBOTIC ASSESSMENTS**

- ✓ Pre-milking robot optional extra
- ✓ Research suggests good business case for its use



**Left: re-milking teat preparation cleans the teat and stimulates milk let-down.**

**Right: How the pre-milking teat preparation robot works.**



**O**NE of our first investigations looked at pre-milking teat preparation and its effect on system performance in terms of milking efficiency, attachment speed and success, milk let-down and cups-on time.

With the robotic rotary, pre-milking teat preparation is performed by one or two robots, depending on the herd size. Each teat is cleaned with warm water and air by a device that looks similar to a teat

cup. The foremilk is removed and discarded.

We were interested in this because the pre-milking teat preparation module is optional when buying a robotic rotary in Australia. As pre-milking teat preparation is not commonly practised in Australia, farmers may choose a robotic rotary without the pre-milking robot(s) to reduce the

initial cost of capital infrastructure.

However, in many countries, teat cleaning and pre-milking is mandatory by law. We wanted some research data to help farmers make an informed business decision about whether or not to invest in pre-milking teat preparation.

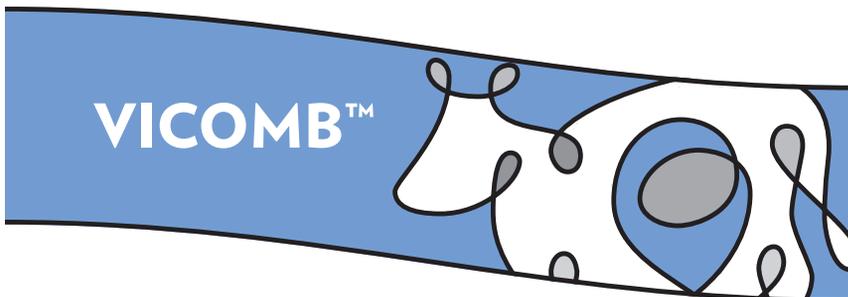
The most obvious purpose of pre-milking teat preparation is to clean the teats before cup attachment, which plays an important role in maintaining milk quality and potentially udder health. It can also result in an improvement in the bacterial content of milk because the foremilk – which is much higher in bacterial count than the rest of milk – does not end up in the vat. But that's not the only role of pre-milking teat preparation. The process results in the release of the hormone oxytocin, which stimulates milk let down.

The advantage of this is that pre-milking teat preparation is expected to result in a quicker and more complete milking. There's plenty of research evidence that shows that minimising cups-on time improves teat health.

Another effect of stimulating milk let-down is that it results in the udder being slightly firmer at cup attachment time. This makes it easier for the robots to locate the teats and attach cups.

Successful teat cup attachment is important with the robotic rotary, which is designed to operate most of the day and night without human intervention. If cup attachment is not successful, the cow will be returned to the yard for a second milking attempt. The issue is that unsuccessful cup attachment reduces the efficiency of the system's performance, which is particularly important when the system operates at full capacity.

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Research with the 'box style' automatic milking systems in Australia and New Zealand has shown that pre-milking teat preparation didn't affect cup attachment accuracy or milk production but it did reduce cups-on (milking) time. After taking into account the time spent cleaning the teats, it created a net increase in total crate time per cow of 30-60 seconds.

We also know from research in conventional dairies that manual udder cleaning (by humans) reduces milk quality unless it is done well.

**Camden trials**

Our trials were designed to assess cup attachment accuracy and speed in the absence of pre-milking teat preparation. We also looked at the effect on average and peak milk flow rates.

We found that cup attachment was more successful and faster when cows received pre-milking teat preparation (see Figure 1). We didn't find a significant effect of pre-milking teat preparation on milking speed, except for cows that returned to the dairy after short milking interval (less than eight hours between milkings).

Based on our results, and those from previous research, my view is that the pre-milking teat preparation robot is a worth-



The Dornaufs' robotic rotary has five robots: two for teat preparation, two for cup attachment and one for teat disinfection.

while investment when buying a robotic rotary. However, the robotic rotary is sold in modules. So those who choose to install a robotic rotary without the pre-milking teat preparation module can always have it fitted later on if they wish.

But farmers who choose not to install the pre-milking teat preparation module will need to consider how they will maintain high milk quality during challenging conditions when teats are soiled.

**On-farm experience**

Nick Dornauf and his partner Rebekah Tyler agree. They operate the world's first commercial robotic rotary – DeLaval's AMR (automatic milking rotary) – at Gala, one of the Dornauf family's dairy farms

near Deloraine in Tasmania.

Their dairy has five robots: two for pre-milking teat preparation, two for cup attachment and one for post-milking teat spray.

They milk 250 cows through the dairy but intend to expand the herd size to the system's capacity of 550-600 cows in the next three years.

"We were sceptical at first about the idea of pre-milking, as it's not common on Australian farms," Mr Dornauf said. "But once they were operating we were amazed at how much faster the cows milk out as a result of it; and the calming influence it has on the cows," he said. "We are getting really good milk let down."

View the pre-milking teat preparation robots at the Dornaufs on <http://sl.farmonline.com.au/multimedia/40487/robotic-rotary-pilot-gets-underway.aspx?page=4>. **D**

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*FutureDairy's major sponsors are Dairy Australia, Department of Primary Industries NSW, DeLaval and the University of Sydney.*

*\*René Kolbach\* is a Masters student with the FutureDairy team. This article is based on findings reported in his Master's thesis, which was submitted earlier this year.*

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