

Project update

P2c: Milk as a diagnostic fluid

Milk as a monitoring tool

This project aims to investigate opportunities to use milk samples as a monitoring and diagnostic tool in Australian dairy herds.

Milk samples have the potential to be used to monitor, predict and manage risks to dairy cow health, productivity and fertility. For examples, milk samples can provide insights about dietary imbalance, bacterial and viral diseases and parasitic infection.

These insights can be at a herd level (from bulk tank milk samples) or individual level (from herd test samples).

Why bother?

As a result of this work, the NSW dairy industry could use bulk tank milk as a cost-effective and fast way to automate and monitor herd health changes, potentially equipping veterinary services, or milk processors with new tools to assist farms as part of an efficient integrated farm service. While the work is NSW-focussed, the outcomes are potentially applicable to all Australian dairy herds.

Benefits

Using milk as a monitoring and diagnostic tool has potential benefits at the industry, herd and individual cow level.

Ultimately, the diagnostic capability of bulk tank milk could reduce the risk of disease spread within and among herds.

At an industry level this is vital for biosecurity as the detection of pathogens or specific antibodies in milk can be used for monitoring endemic diseases within a farm, region, or country.

For example, antibody testing for *Mycoplasma bovis* (which causes pneumonia, mastitis and arthritis in cattle) can be conducted at bulk tank

Unlocking the potential of cows

Dairy UP's P2 project aims to unlock the potential of dairy cows to achieve their genetic potential under NSW conditions.

P2 is a suite of seven projects that collectively explore ways to profitably increase both productivity and wellbeing in commercial settings.

P2a: Cattle Longevity: Age and Parity & Intensive Herds*

P2a: Longevity: Future*

P2b: Early alerts*

P2c: Milk as a diagnostic tool*

P2d: Heat stress*

P2e: Calf husbandry*

p2f: Infectious diseases ('Infectome')

This document provides an update on P2c: Milk as a diagnostic tool. This project is closely linked with P2f: Infectious diseases.

milk level.

Using bulk tank milk as a diagnostic tool on farm would help farmers make informed business management decisions to improve animal well-being, productivity, and profit.

For example, early and accurate detection of metabolic disorders can guide intervention strategies, while bulk tank milk urea and protein content are useful indicators of herd nutrition.

Bulk tank milk could also become a cost-effective and efficient assessment of a herd's disease status with this information supporting disease control programs for viral diseases.

At an individual level, the early diagnosis and treatment of infections and nutritional disorders improves animal health and welfare.

Progress update (Oct 2023)

The first stage of this project was a literature review, which was completed in 2023. The Dairy UP team explored and evaluated previous work, from a variety of authors, focusing on the role of milk as an indicator for health, production, and reproduction risks.

The findings from this review were summarised in a series of articles published in the Australian Veterinary Journal as invited reviews. The papers focused on milk as an indicator of dietary imbalance, milk as a diagnostic fluid for udder health management and milk as a diagnostic fluid to monitor viral diseases in dairy cattle.

This review also informed further consideration of the development of diagnostic tests using milk, in addition to those already commercially available.

Technology opportunities

Testing bulk tank milk is a fast and cost-effective way to monitor the health of Australian dairy cows.

But testing “pooled” milk does come with challenges.

For example, the accuracy of tests relies on achieving both low false positive and low false negative estimates together. This can be difficult and influences the value of the tests to industry.

Researchers concluded that the integration of new biotechnologies could enhance multiplexing and data interpretation for comprehensive surveillance.

In addition, new technologies such as matrix-assisted laser desorption/ionization time of flight (MALDI-TOF) or loop mediated isothermal amplification (LAMP) would offer new insights into intramammary infection, in the fight against mastitis, but aren't used with bulk tank milk yet.

Next steps

Priorities for the coming year include creating a path to on-farm and industry implementation.

The second stage will involve working with industry and government stakeholders such as the New South Wales Department of Primary Industries (DPI), herd recording business Dairy Express and milk manufacturers.

It's expected these groups will meet as part of a “round table” to develop a way to use bulk tank milk and herd testing samples for additional monitoring.

Stage three of the project will investigate the potential for external funding to conduct longitudinal monitoring – a research design involving repeated observations – of infectious diseases and implement tests for bulk tank milk at the NSW DPI Elizabeth Macarthur Agricultural Institute.

Collaborators

The P2f project is a collaboration between researchers from Dairy UP, University of Sydney, NSW DPI and Scibus.

More info

AVA Journal articles

[Milk as an indicator of dietary imbalance](#)

[Milk as a diagnostic fluid to monitor viral diseases in dairy cattle](#)

[Milk as diagnostic fluid for udder health management](#)

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