Analysis to support milk labeling

Using biomarkers to distinguish between grass-fed and conventional milk

By Mya Kidson

Accurate labelling of dairy products, including grass-fed or conventional milk products, can be verified using biomarkers found by U of G researchers.

Using a cow's feeding regime and analyzing milk composition, Dr. Arthur Hill and Dr. Maria Corradini, professors in the Department of Food Science, and their research team verified that two milk biomarkers could reduce misclassification of milk. This research can help develop local standards and certifications for grass-fed labelled products, Corradini says.
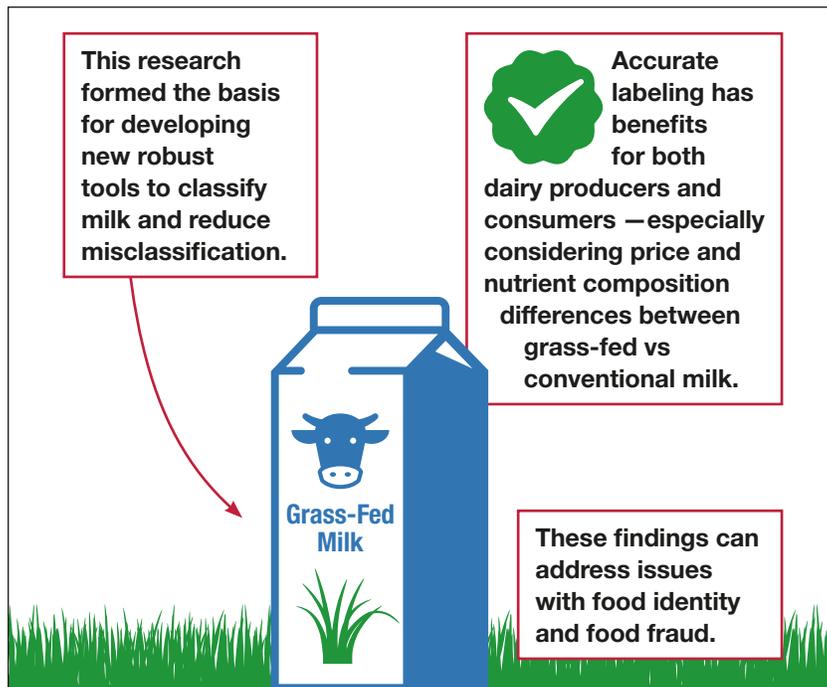
"I grew up drinking grass-fed milk and so it's extremely important to me that milk is labelled properly," says Corradini. "Consumers pay more for grass-fed milk, which is why it's crucial to ensure that they are getting the milk that they paid for."

Compared to conventional milk, grass-fed milk contains more omega-3 fatty acids that are important for maintaining good health.

Studying differences in fat profile helped the researchers identify a good biomarker to ensure milk types could be detected with minimal error.

Researchers collected four types of milk samples for the study: grass-fed-non-organic, grass-fed-organic, conventional-non-organic and conventional-organic.

They then analyzed the fatty acid profile for each milk sample to detect which fatty acids appear in the milk and in what proportion. Milk biomarkers—the types of fatty acids tested for in the milk—were then compared for their discriminative ability, or how easily they distinguished grass-fed milk from conventional milk.

The most robust tools for all four feeding regimes involved the ratio of linoleic acid (LA) and alpha-linolenic acid (ALA), as well as the ratio of omega-6 ($\Omega6$) and omega-3 ($\Omega3$) fatty acids. Linoleic acid is a type of omega-6 fatty acid while alpha-linolenic acid is a type of omega-3 fatty acid.

"The grass-fed organic and non-organic milk had lower LA:ALA and $\Omega6$:$\Omega3$ ratios," says Corradini. "This means that they were generally higher in omega-3 fatty acids. The opposite was found for conventional milk."

While the possibility of using these ratios have been previously reported, this research was able to verify that these were robust tools.

Both parameters led to a low misclassification percentage for the type of milk studied, which makes them useful tools to classify milk, says Corradini.

Seasonal variations were also evaluated to assess biomarker robustness. The team found that both biomarkers held up as study tools year-round.

This research provides dairy producers with tools to ensure that dairy products are accurately labelled.

"Reducing misclassification of dairy products can benefit everyone, including dairy producers and consumers," says Corradini.

This research formed the basis for developing new robust tools to classify milk and reduce misclassification.

Grass-Fed Milk

Accurate labeling has benefits for both dairy producers and consumers —especially considering price and nutrient composition differences between grass-fed vs conventional milk.

These findings can address issues with food identity and food fraud.

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