

Newborn dairy calves fed probiotic were healthier in crucial first weeks, student research shows

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Maddison Degenshein found that feeding newborn calves a probiotic supplement with gut bacteria from healthy cows helped protect their health in the first weeks before their immune systems are fully developed. Credit: University of Alberta

A probiotic developed at the University of Alberta shows promise in improving the health of dairy calves in the essential first weeks of life.

Normally, the young animals' undeveloped immune systems leave them susceptible to common ailments like diarrhea, which can stunt growth or even result in death. When fed a cocktail of four strains of beneficial gut bacteria, [newborn calves](#) appeared to be more protected against common disease-causing bacteria, with few falling ill.

"The findings are a step forward in ways to make [animal health](#) even better for dairy producers," says researcher Maddison Degenshein. Her research is the first to test particular bacterial strains derived directly from bovines. It builds the understanding of how probiotics could shield [calves](#) from disease until their natural immunity kicks in.

"The building blocks we give them at this vulnerable time could influence future factors like milk production," says Degenshein, who conducted the work for her master's in science in the Faculty of Agricultural, Life & Environmental Sciences.

A more sustainable probiotic

The bacteria Degenshein worked with were grown from healthy gut microbes collected from day-old dairy calves, so it was native to the animals when it was fed to them as a [probiotic](#) in milk supplements. That gave them a homegrown head start, she says.

"We know that this bacteria is what healthy cows already have in their guts. The calves would eventually develop it anyway, but with the probiotic, they'll have it sooner, and it works with their natural physiology."

Probiotic supplements developed from plant-based bacterial strains—such as the yeast used to make beer and [sourdough bread](#)—are commonly used in [cattle feed](#). But a strain native to bovines would be more sustainable, because it's readily available and easily cultivated from

the animals' own manure, she notes.

Besides preventing costly disease and loss of production, cow-derived probiotics could also benefit the [dairy industry](#) by being used to enrich early, poor-quality milk produced by the mothers that is usually considered a waste product. "Knowing it could instead be fed to the calves would keep it from being thrown away," Degenshein notes.

Window of opportunity to boost immunity

Degenshein's research also helped pinpoint the window of time that calves are most vulnerable to illness: the first six to nine weeks of life.

"That tells us when their immune systems are starting to function, which allows producers to have more focused care before that time period. And we now know that after nine weeks, the calves will be hardier and more capable of fighting off potential diseases."

The findings help open the door to further exploration of calf health, she says. "It gives more insight into what's going on in early life and it helps support scientists who are considering areas that need more exploration, like immune system research. They can go from there."

Degenshein's work is part of a ruminant nutrition research program headed by professor Anne Laarman in the Department of Agricultural, Food & Nutritional Science, and Degenshein helped develop the probiotic in the lab of animal nutrition researcher Leluo Guan. Her findings will be supplemented by analysis in Guan's lab to further measure the effectiveness of the probiotics on calf gut health.

"If we see more positive results, it could eventually be made available to industry. That would make more probiotics available that are safe and productive for calves," Degenshein says.

Provided by University of Alberta

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