

APRIL 2016

Milk Producer

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EARLY DETECTION

New cow-side device will help farmers maintain a healthier herd

Your cows can be vulnerable to metabolic disease during their postpartum period. When assessing a cow's condition, having quick answers can help you find solutions faster, resulting in a healthier cow. A new device engineered at the University of Guelph will let you evaluate cows faster and easier by bringing the lab to the farm.

Professor Suresh Neethirajan, school of engineering, developed a new tool called Gryphsens. It is a small handheld device resembling a glucometer, a human blood glucose measurement device. It can detect low levels of metabolic disease markers in the blood, letting producers treat their cows at the earliest sign of illness, reduce complications and speed-up recovery.

"Having this device on the farm provides an immediate solution for dairy farmers by acting as an early warning sys-

tem to monitor herds before disease occurs," says Neethirajan.

Dairy cows increase their energy expenditure without increasing their food intake during the postpartum period. This causes them to lose weight, which is metabolically classified as negative energy balance (NEB). A NEB can suppress the immune system, placing a cow's health at risk by increasing its chance of developing metabolic disease, such as ketosis.

NEB also stimulates the breakdown of fat stores, releasing free fatty acids (FFA) and ketones. Both signify fat is being used for energy. Elevated levels of FFA in the circulatory system indicate an early sign of metabolic disease.

Current testing for increased FFA and ketone levels include drawing several vials of blood and sending them to a laboratory for multiple tests with results taking up to five days.

The Gryphsens is able to detect low lev-

els of circulating FFA and ketones using only a single drop of blood or milk, almost immediately. A drop of blood can be taken from the cow's tail and placed onto a cartridge containing two electrodes, each coated with an enzyme to detect FFA or ketones. The cartridge is then inserted into the handheld digital reading system.

A number appears on the screen quantifying FFA and ketones in the blood within seconds. The number also corresponds with a green checkmark or a red 'X' to show if a cow's levels are within or outside the clinically healthy range.

Neethirajan says the Gryphsens device is also cost effective. Current blood samples sent to the lab cost about \$10 to \$20 to be tested. The cost will be reduced to \$2 to \$3 per test with the Gryphsens, he adds.

Neethirajan and his team want to develop the same sensor for the in-line robotic milking machines that will monitor the levels of FFA and ketones of the herd individually every time they are milked, saving the farmer the time it would take to test each cow separately.

Neethirajan estimates Gryphsens will be on the market in about two years. 



» A NEW TOOL called Gryphsens can detect low levels of metabolic disease markers in a cow's blood. This lets producers treat their animals at the earliest sign of illness.



Amber Hutchinson is a student writer for the University of Guelph's Office of Research. This research is funded by Dairy Farmers of Ontario and the Natural Sciences and Engineering Research Council of Canada.