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Up close

New diagnostic tool could change the way you monitor your cows' health

Getting an early warning about what's ailing your cows could get much easier with the help of an encapsulated telemetric bolus.

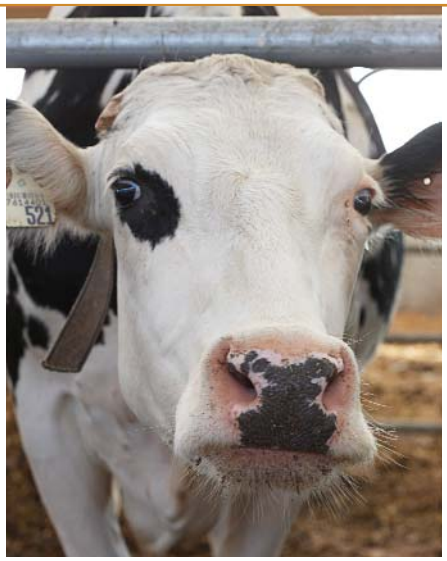
Created by University of Guelph researchers, the diagnostic tool can detect common illnesses before clinical symptoms appear. Its use on farms could transform the way you monitor your cows' health.

Administered orally, the weighted bolus sinks to the bottom of a cow's rumen where it remains. The 120-gram cylindrical plastic monitoring device records temperature readings inside the cow. A tiny radio transmitter with its own unique frequency transmits readings to a field receptor. The receptor picks up the signals and transfers the data to a main receiver which sends them to your computer.

"We've worked with veterinarians, engineers and mathematicians to develop the telemetric bolus as a reliable tool for farmers," says animal science professor Brian McBride, who developed the device with post-doctoral researcher Ousama Alzahal. "It could soon be possible for producers to use their laptops to monitor their cow's health or receive updates on individual cows from information sent to their cellphones."

For example, this new device could monitor sub-acute ruminal acidosis (SARA), a costly digestive disorder common in high-producing dairy cows. SARA is notoriously difficult to diagnose because affected cows don't seem sick.

Until now, SARA has been detected during rumenocentesis, a minor surgery that punctures the rumen with a long needle to extract a fluid sample or by using stomach tubing. Both processes are stressful for the cow and expensive. Researchers want to create a cheaper and more effective diagnostic system to treat SARA.



Researchers aim to create cheaper and more effective diagnostic tool.

"If we go back a generation, we would be lucky to get one such measurement for the animal, whereas with the telemetric bolus, we get one measurement a minute," says McBride.

McBride and Alzahal used the bolus to measure the rumen's acidity and temperature, and discovered a useful relationship between the two measurements.

"We found that increased acidity corresponded to higher ruminal temperatures," says McBride. "This means we could diagnose SARA by monitoring temperature with an internal bolus. We could also potentially detect other systemic illnesses or infections that cause elevated temperatures."

The researchers' previous studies found ruminal temperatures of 39 to 41 degrees C corresponded to ruminal acidity levels associated with SARA. Readings taken three hours after a cow eats most accurately detected SARA.

McBride and Alzahal plan to conduct more trials to determine the effect of ruminal temperature ranges and fluctuations on a cow's health. They want to develop guidelines and recommendations by linking these measurements with different illnesses or bodily processes.

The sheer volume of data produced by the bolus led to collaboration with mathematicians to develop equations to integrate all the measurements. Understanding the information transmitted by the device is just as important as receiving it, say the researchers.

Christina Crowley and Natalie Osborne are students with the University of Guelph's office of research. Collaborators include Guelph professors Todd Duffield, population medicine, and James France, animal and poultry science, and Ilias Kyriazakis of Newcastle University in England. *Funding has been provided by Dairy Farmers of Canada, the Natural Sciences and Engineering Research Council, and the Ontario Ministry of Agriculture, Food and Rural Affairs.*