Clay as a feed supplement in dairy cattle has multiple benefits

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Dairy producers frequently add clay as a feed supplement to reduce the symptoms of aflatoxin and subacute ruminal acidosis (SARA) in lactating cows. In a new study from the University of Illinois, researchers show that clay can also improve the degradability of feedstuffs.

"Farmers are giving this clay, but they want to know if the corn silage or hay the cow is eating is affected. We found that yes, the clay is changing the way the cow degrades feedstuffs," says Phil Cardoso, associate professor in the Department of Animal Sciences at Illinois and co-author of the *Animal Feed Science and Technology* study.

Cardoso and his team tested the degradability of six feedstuffs—dried alfalfa hay, grass hay, wet brewer's grains, ground corn, corn silage, and soybean meal—along with no added clay, 1%, or 2% of dietary dry matter.

The researchers placed the feedstuffs into mesh bags and inserted them directly into the rumen through a cannula or fistula, a surgically installed portal that allows the contents of the rumen to be sampled for research purposes. The bags were then drawn out at multiple time intervals (two hours to four days) and analyzed.

"There were some differences in how the feedstuffs degraded over time. When clay was added to grass hay at 2% of dietary dry matter, the digestibility and usage of the fat in that material was maximized. It's better. And we didn't see a decline in degradability of the other

feedstuffs, either," Cardoso says. "Overall, to maximize the benefits of clay, we'd recommend adding it at 1 to 2% of dietary dry matter."

Cardoso's previous research has shown that multiple types of clay are effective in handling aflatoxin, a toxic substance produced by fungal contaminants on feed. When the toxin is bound up by the clay, it is simply excreted from the cow's body, rather than being absorbed in the bloodstream. And a 2018 study by Cardoso's team showed that aluminosilicate clay improved cows' immune function and reduced liver inflammation during an aflatoxin challenge.

Cardoso says, "From all of our work on this, I can tell producers whenever they are facing the risk of aflatoxin, they should consider using clay without worrying about it binding other minerals or hindering forage digestibility. Rather, we've shown digestibility could increase. Of course, it's important to ensure the specific clay product has been tested."

Clay's benefits don't stop there. Because the material attracts and binds positively charged ions, clay can make the rumen less acidic. This is important particularly given the popularity of increasing grain concentrates in TMR feed, which can lead to SARA. In a 2016 study from Cardoso's group, cows challenged with excess wheat in a TMR diet produced more and higher-quality milk and had higher rumen pH when fed bentonite clay at 2% of dietary dry matter.

"Basically, clay has all these benefits: It reduces aflatoxin toxicity, works as a pH buffer, and also improves the degradability of some feedstuffs," Cardoso says. "Producers should know this."

The article, "Improvements of in situ degradability of grass hay, wet brewer's grains, and soybean meal with addition of clay in the diet of Holstein cows," is published in *Animal Feed Science and Technology*.

More information: M.E. Hollis et al, Improvements of in situ degradability of grass hay, wet brewer's grains, and soybean meal with addition of clay in the diet of Holstein cows, *Animal Feed Science and Technology* (2019). DOI: 10.1016/j.anifeedsci.2019.114331

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