Cleaning cows from inside out

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U.S. Department of Agriculture (USDA) scientists and their collaborators have conducted a series of studies that explore non-antibiotic methods to reduce foodborne pathogens that are found in the gut of food animals.

The team consists of Agricultural Research Service (ARS) microbiologist Todd R. Callaway, with the agency's Food and Feed Safety Research Unit in College Station, Texas; ARS animal scientist and project leader Jeffery Carroll with the agency's Livestock Issues Research Unit in Lubbock, Texas; and John Arthington at the University of Florida in Ona.

ARS is USDA's principal intramural scientific research agency, and this research supports the USDA priorities of promoting international food security and ensuring food safety.

Early studies showed that citrus products provide cows with good roughage and vitamins, and the essential oils in such products provide a natural antibiotic effect.

Callaway's early data showed the feasibility of using orange pulp as a feed source to provide anti-pathogenic activity in cattle. He also showed that consumption of citrus byproducts (orange peel and pulp) by cattle is compatible with current production practices, and the byproducts are palatable to the animals.

Callaway then shed light on how to exploit the essential oils inside the

peel and pulp that are natural antimicrobials. Collaborations with researchers Steven Ricke and Philip Crandall at the University of Arkansas in Fayetteville also have identified specific essential oils that kill the pathogenic bacteria.

From the time Callaway began studying citrus as an animal gut cleanser, he recognized that citrus peel can be heavy and expensive to ship long distances, so his latest studies have investigated the use of processed orange peel pellets.

For one study, the team fed dried orange peel pellets to sheep as a model for cows for eight days. They found a tenfold reduction in *Salmonella* populations in the animals' intestinal contents. Callaway received a grant from the National Cattleman's Beef Association (Beef Checkoff funds) to help fund the study. Results from the 2011 study were published in Foodborne Pathogens *and Disease*.

More information: Read more about this research in the November/December 2011 issue of Agricultural Research magazine.

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