

Feeding microbes to chickens leads to mysterious immune response

September 12 2012

A paper recently published in the *Journal of Animal Science* helps researchers further understand how microbes and probiotics affect poultry health.

Researchers at the North Carolina State University and Chung Jen College of Nursing, Health Sciences and Management (Taiwan) conducted a study to investigate the effects of direct fed microbes on [energy metabolism](#) in different tissues of [broiler chickens](#). The researchers wanted to learn how consuming microbes and probiotics could change energy use and immune function. Typically, direct fed microbes and probiotics are used to improve livestock health, but how they actually work is not fully understood.

These findings could have long standing implications as producers feel the pressure to move away from the sub-therapeutic [use of antibiotics](#).

"Microbes are not a direct replacement [for sub-therapeutic antibiotics] but an opportunity through a different mechanism," said Matthew Koci, coauthor of the study and assistant professor in the department of [poultry science](#) at North Carolina State University.

In the study, 192 one-day-old broiler chicks were assigned to two different diets. One of the diets was a standard control starter diet (CSD) and the other was a CSD with direct fed microbes (DFMD). The researchers then injected twelve broilers from each diet group with sheep red blood cells at days seven, 14 and 21. The presence of sheep

[red blood cells](#) challenged the chicks' immune systems without actually causing illness.

"We wanted to give the immune system something to respond to and didn't want to change the metabolism with a disease," said Koci.

Researchers measured several parameters, including body weight, whole-body [energy expenditure](#), tissue respiration rates, and energy metabolism.

Over a 28-day period, the researchers found no difference in body weight or feed efficiency between broilers fed CSD or DFMD. In fact, there was no difference between the two treatments in any of the response criteria.

But Koci believes there may have been something going on behind the scenes. He theorizes that the interaction between direct fed microbial species and intestinal cells results in a change in the energy consumption in the small intestine. This leads to an increase in the amount of energy available to the immune system. The results of the present experiment are the first to indicate that direct fed microbials leads to increased energy expenditures by the immune system.

Through some unknown mechanism, broilers fed the microbial diet may have a faster, not better, response in their [immune system](#). The DFMD was not promoting growth, but under disease stress, the bird would be able to get back to optimal growth in fewer days than birds not fed microbials.

Koci cautioned that individual producers may see different results from microbial use in the diet depending on the production system. He also said that not all body tissues were studied, so there could be energy directed toward other tissues that were not accounted for.

In the future, the researchers are looking to study which mechanism or microbial is directly responsible for [immune](#) responses.

"We hope to look at the physiological effects and trace them back to the signaling pathway," said Koci.

More information: This study is titled "Direct fed microbial supplementation repartitions host energy to the immune systems." It can be read in full at www.journalofanimalscience.org/

Provided by American Society of Animal Science

Citation: Feeding microbials to chickens leads to mysterious immune response (2012, September 12) retrieved 9 April 2024 from <https://phys.org/news/2012-09-microbials-chickens-mysterious-immune-response.html>

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