

Pressemitteilung

Evonik Industries AG

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Simulating not speculating: Evonik is working on a dynamic simulation model of the chicken gut

Essen, Germany. Research on microbiota, microbiomes, metabolomes, and genomes is booming. Many new technologies whose names end in “omics” have evolved over the past few years to help understand the interaction between microorganisms and their human or animal host. Numerous research activities aim at opening up these technologies to the industrial use of microorganisms and their bioactive products.

Since December 2015 Evonik has worked in the framework of the GOBI* innovation alliance on developing an innovative dynamic simulation model of the chicken gut. It will offer an in-vitro model of the numerous interactions between feed, the immune system, and intestinal microbiota in chickens with scientific methods. “We hope to clarify fundamental questions on metabolic and immune processes in the chicken gut and to create a comprehensive system that helps us to identify bioactive ingredients for animal health,” says Prof. Dr. Stefan Pelzer, head of the Gut Health & Diagnostics innovation area in the Animal Nutrition Business Line of Evonik.

Evonik’s gut simulation model consists of a cascade of glass reaction vessels that are connected in a specific sequence, representing a certain digestive segment of the chicken gut. The scientists are using the experience of ProDigest BVBA in the field of human intestinal simulation. However, the chicken gut has some very distinct characteristics: For example, chicken digestion is subject to different temperatures and intestinal pH values. Instead of a long colon, chickens have two ceca, and their microbiota has a different composition than in humans.

Each vessel is designed to simulate the physical, chemical, and microbiological conditions of a certain digestive segment of the chicken gut as realistically as possible. To do so, researchers must know, among other things, how specific nutrients are digested and absorbed in the individual segments, and what the composition of a bacteria mix looks like that simulates the intestinal flora as precisely as possible. This will be worked on successively, validating in-vitro experiment results in in-vivo feeding tests.

In the fall of 2017, the gut simulation model will move from its current location with the partner company ProDigest in Ghent, Belgium, to Evonik in Halle-Künsebeck, Germany. “The system will then allow us to rationalize the development of new additives for animal nutrition,” says Pelzer.

They are needed, for example, to keep chickens and other livestock animals healthy without the use of antibiotic growth promoters (AGP) as has been the practice over decades. Feeding AGP has been banned in the EU since 2006, and the U.S. are seeing a consumer-driven anti-AGP trend, too.

Functional additives such as probiotics, prebiotics, organic acids, enzymes, plant extracts, and mineral zeolites are already used as alternatives. They are associated with numerous positive effects on feed conversion, health, and animal growth. However, the mode of action of some of these feed additives are still not fully clear. The gut simulation model is

supposed to change this.

Read more about it in edition 58 of elements, Evonik's innovation magazine: www.evonik.de/elements.

* The six-year GOBI ("Good Bacteria and Bioactives in Industry") innovation alliance was founded in late 2015 and is funded by the German Federal Ministry of Research as part of the funding program "Innovation Initiative for Industrial Biotechnology" under the funding code 031B0074 A - C. In addition to Evonik, the alliance includes the biotech enterprise Organobalance, and Bionorica SE.



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