

## Health

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# Evaluating the effect of probiotics in broilers

**The effect of probiotics on the development and health of broilers was studied by veterinarians from the Dutch Health Centre for Poultry (GVP) in the city of Emmen. Researcher, Gerwin Bouwhuis shares some of his findings.**

Developing good colonisation resistance at a young age works on two fronts. On the one hand it is important in the context of reducing the use of antibiotics. On the other hand it stimulates the development of the broiler. To study both aspects of the effect of probiotics, 40 individually examined chicks were divided into two groups and placed in mesh chick rings in the middle of a broiler house. The researchers concerned, Gerwin Bouwhuis and Branislav Gmuca, worked with the product Orgabase of the company Panagro, which contains several varieties of probiotics which are coated on bran.

Shortly before the day-old chicks were placed, the probiotic was added on top of the starter feed on chickpaper with a dosage of 0.5-1 gram per chick. "It was vital for the product to be added shortly before the chicks were placed, to ensure the chicks could eat the probiotics while still fresh," Bouwhuis explains. When both the treated group and the control group were examined at the age of 14 days, the researchers noticed a remarkable difference in the length of the intestinal villi, in favour of the treated group (see *Table 1*).

**Table 1 - Results of trial into the effects of a probiotic on poultry gut health.**

	Control group	Orgabase group	Difference
<b>Length of the villi</b>	636 µm	663 µm	4.20%
<b>Weight of the glandula stomach and gizzard</b>	16.15 grams	16.30 grams	0.90%
<b>Body weight at day 14</b>	485.5 grams	486.9 grams	0.30%

"The study showed that chicks who were given the probiotic had a healthier gastrointestinal tract. A higher weight of the glandular stomach and gizzard testify to this," explains Bouwhuis. A higher weight of the glandular stomach and the gizzard is accompanied by good growth potential, as it increases the digestive capacity. "This also applies to slower growing strains," Bouwhuis says. "A higher weight of the glandular stomach and the gizzard facilitates digestion, and subsequently good food conversion."

## **Importance of the intestinal villi**

The villi are an important indicator of the quality of the gastrointestinal tract. "Longer villi increase the absorption capacity, as the absorbing intestinal surface increases.

The larger the absorbing surface, the better intestinal mucosa cells are capable of taking up nutrients, and the more potential for growth. Longer villi are also a sign of health, as short villi indicate an intestinal disorder due to dysbacterioses, or a coccidiosis or an enteric virus.”

The difference in body weight between both chick groups was limited. “This is probably a result of the optimal conditions the chicks were kept in. Both groups showed growth which was above the Ross 308 norm. This standard states a target weight of 473 grams. In terms of weight both groups were 3% ahead of the Ross 308 standard.” Theoretically the chicks in the probiotics group could have realised this with a lower feed intake, because the immune system uses less energy when intestinal villi are healthier. “Further research is needed to prove this,” Bouwhuis says. “Our findings are in line with a scientific study of the Faculty of Veterinary Medicine of the University of Teheran. In 2013 they showed that the addition of probiotics brings about similarly good results as the addition of growth promoters to feed, as was done in the past.”



Researcher, Gerwin Bouwhuis of the GVP in Emmen, the Netherlands explains some of his findings on the effects of probiotics in poultry diets. Photo: Koos Groenewold

The effect of probiotics consists of several mechanisms. Probiotics live in the mucous lining of the gastrointestinal tract. The bacteria living on the surface create a certain acidity level. The pH of the mucous membrane lowers, making it impossible for pathogenic bacteria such as E.coli and Salmonella to grow. Probiotics bind to the surface of the intestinal mucosa and prevent pathogenic bacteria from attaching. They excrete antibiotic substances which kill pathogenic bacteria and stimulate the immune system. “Moreover they facilitate the digestion and absorption of nutrients, inhibit the production of ammonia, which harms the intestinal mucosa and neutralises residues of pathogenic bacteria.”

As probiotics repress harmful bacteria this effectively means that the immune system needs to work less hard to repair the damage. Nutrients can be used for growth instead of the healing processes, and this benefits feed conversion. “Another phenomenon – which is only known since recently – is that the immune system has feelers, which detect through the mucous membrane what bacteria are in the gastrointestinal tract. When probiotics are administered these feelers learn at a young age how to recognise good bacteria.” This provides a good immune response. Eventually this benefits feed conversion, as energy is saved because the immune system will not be activated.

### **Preconditions have an affect on probiotic effect**

Bouwhuis is convinced of the effect of probiotics. “Supplying probiotics is effective, but not at farms that do not fulfil cross-compliance requirements. As poultry farmers can’t change much about chick quality, but preconditions such as temperature, sufficient feed, light and clean drinking water – preferably acidified to prevent bacterial growth – play an important role in the exposure to harmful bacteria at an early age, and along with that the effect of probiotics.”

As a result of the disconnection of parent stock and breeding establishments both these shackles grew increasingly remote from each other. This makes it difficult to receive a healthy gut flora from the mother. Despite this, probiotics can support a good start. Supplying probiotics in order to give young chicks a healthy bacterial culture at an early age benefits the development of the gastrointestinal tract. In practice, certain flocks experience difficulty starting, resulting in a uniformity difference, growth retardations and infections. In case of an unstable gut flora at an early age adding beneficial bacteria can inhibit harmful bacteria. Applying probiotics however are only beneficial when chicks are reared under good circumstances.

“In the past, applied probiotics were finished off when antibiotics were used in case of losses in the first week. This destroys a probiotics treatment. Applying probiotics only fits flocks with healthy chicks. When a poultry farmer provides optimal circumstances, probiotics will manifest itself most effectively. When drinking water has a bacterial count of 100,000, when *E.coli* travels along from the breeder, or when the stable temperature is too low, the effect of probiotics is lost.”

On completion of the first study, Bouwhuis intends to scale up the study and use probiotics at critical moments, such as feed transitions when the body has to adjust to new feed and the bacterial culture becomes unbalanced. “At present there are searches in progress for possibilities to continuously administer probiotics. Heat treatment make feed less suitable. Adding probiotics via drinking water may be a better choice.”