BroilerNet Factsheet S2-C2-2

Optimizing Feeding with the Aid of Feed Mineral Digestibility

Author: The Finnish Poultry Association/Suomen Siipikarjaliitto ry

Intro to Good Practice

The feed values in the Finnish Feed Tables , such as mineral content and digestibility of minerals, are used both in feeding and feed planning and as a basis for calculations for environmental and production management decision-making. The values in the Feed Tables have a wide impact, as the reported mineral content of many compound feed products on the market is also based on values calculated from Feed Tables .

Incorrect or outdated feed mineral content and digestibility values used in feed design cause deviations of nutritional needs, affecting animal welfare and causing excretion of excess nutrients into feces and urine, and further with manure into the environment. The mineral content and digestibility values in Feed Tables form the basis for excretion calculation of livestock. Results of excretion calculation are used in numerous calculations assessing emissions and amount of livestock production, and further in the legislation and voluntary schemes.

Background & challenges

Monogastric animals are not able to make full use of the phosphorus in the feed, because phosphorus is mainly bound to phytate, which is poorly digested by digestive enzymes in monogastric animals. Excess and indigestible feed phosphorus is excreted in manure into fields, where it acts as a nutrient for plants, but also enters waterways, causing eutrophication of waterways. The digestibility of phosphorus varies between feed materials. Formulating and optimizing the phosphorus content of diets, to meet the animal's needs, the phosphorus content and digestibility of the feed materials are important information. Updated information on the phosphorus and other mineral content of the most common feed materials enables more accurate feeding planning. When the specified mineral and trace element content of feed materials and the availability of phosphorus for the animal (digestibility in the digestive tract) are used in the formulating diets, the amount of minerals and trace elements excreted in feces and urine is reduced.

Optimizing Feeding with the Aid of Feed Mineral Digestibility

Additional information

Together with the Finnish poultry industry, the Natural Resources Institute Finland (Luke) carried out a project to determine the mineral content and digestibility of phosphorus in the more common feed raw materials used in poultry. The Ministry of Agriculture and Forestry funded the project from The Development Fund for Agriculture and Forestry (Makera). For the most part, the mineral content corresponded quite well to the concentrations presented in the Feed Tables .

The phosphorus concentration of peas in the samples were slightly lower than the value in the feed table. The phosphorus content of faba beans in the feed table corresponded well to the average value of the samples.

In broilers, the small intestinal digestibility of phosphorus in wheat, oats, hulled oats, faba beans and peas was better than the values presented in the feed table. The newly determined mineral contents and phosphorus digestibility values will be updated in the Finnish Feed Tables. New determined mineral contents and phosphorus digestibilities are updated in Finnish Feed Tables . In addition, once the updated concentration and digestibility values are included in the feed formulation, the environmental impact assessment shall be calculated again.

Ileal digestibility of P in feed ingredients chosen, are 9-18 %-units higher than previously used and therefore amounts of added phosphorus formulated to the diets can be decreased, simultaneously lowering the feed cost (depending feed ingredients and mineral components used) and decreasing phosphorus excretion to the nature.

Figure: feed pellets

Benefits

In the future, updating feed values and feeding recommendations in the Feed Tables for poultry (concentrations and digestibility, requirement) requires several research studies. Example, confirming the results of feed values for legumes requires more domestic studies. The challenge is obtaining funding and the capacity of domestic research to ensure the functionality of the results with domestic animal material, feed materials and conditions.

- 5-10% less cost in feeds
- 5-15% less phosphorus in manure

Read more: Finnish Feed Tables and Nutrient Requirements
Abstract from the FOSIKANA - project

Hanke on saanut rahoitusta Maa- ja metsätalousministeriön maatilatalouden kehittämisrahastosta.

Publication date: 04-04-2025 *Version: 1 (EN)*

Funded by the European Union

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No101060979. It reflects only the authors view. The European Commission is not responsible for any use that may be made of the information it contains.