DIGESTIBILITY, AVAILABILITY, ABSORBABILITY... SOME CLARIFICATIONS

There are often confusion when it comes to talk about the P-digestibility/availability of phosphates. It is important to well understand these concepts in order to choose the correct value to give to a phosphates when formulating. With this article, Aliphos wants to make clear some concepts into P nutrition.

**AVAILABLE PHOSPHORUS**

It’s the proportion of phosphorus retained in the animal’s body. In other words, it’s the phosphorus that can be absorbed and made available to cover requirements of animals. Available phosphorus is sometimes expressed as relative availability compared to a highly available reference source, assumed to have a biological value of 100. Normally bone parameters are used as response criteria but various parameters not directly linked to absorption are also used.

**DIGESTIBLE PHOSPHORUS**

It’s the proportion of the intake phosphorus that has been absorbed through the intestine. It’s simply the difference between the P-intake and the P in the feaces. Most often we use the apparent digestibility because the endogenous losses are not taken into account:

\[
ADC = \frac{P \text{ intake} - P \text{ faecal}}{P \text{ intake}} \times 100
\]

This concept is generally used for pigs. And when we consider the endogenous losses in the calculation, we use the True Absorption Coefficient.

For poultry, where it’s difficult to separate the faeces from the urine, the apparent absorbable or apparent available phosphorus is used:

\[
APP = \text{Apparent Available Coefficient} = \frac{P \text{ intake} - (P \text{ faecal} + P \text{ urine})}{P \text{ intake}} \times 100
\]

*Source: IFP, Inorganic Feed Phosphate association*

The confusion might come because there are two different definitions of the available-P: the available-P based on the retention and the available-P based on the digestibility in poultry.

Attention must also be paid at the type of animals is used to measure the phosphate value.
Every year, Aliphos organises trials to evaluate the value of phosphates. Our recent works on poultry are in line with the WPSA protocol (World Poultry Science Association, Rodehutscord, 2013) for determination of phosphorus availability in poultry based on pre-cecal absorbability.

In this method, only the content of the terminal part of the ileum, defined as the terminal 1/3 of the ileum (length approx. 20 cm), is collected from the birds. The ileal content (=digesta) is sampled and then analysed for the P content.

A pre-cecal method for determining the P digestibility is more accurate to predict the true digestibility of P compared to a method based on the difference in P ingested and P excreted. Indeed this method is able to distinguish the undigested dietary P in excreta and the digested but unutilized P that is excreted via the urine. Moreover, the pre-cecal digestibility has also the advantage to be less sensitive to the P-level in the diet that other methods. (Rodehutscord et al., 2012).
