

Comparison of ytterbium oxide and acid insoluble ash for digestibility assessment in growing pigs

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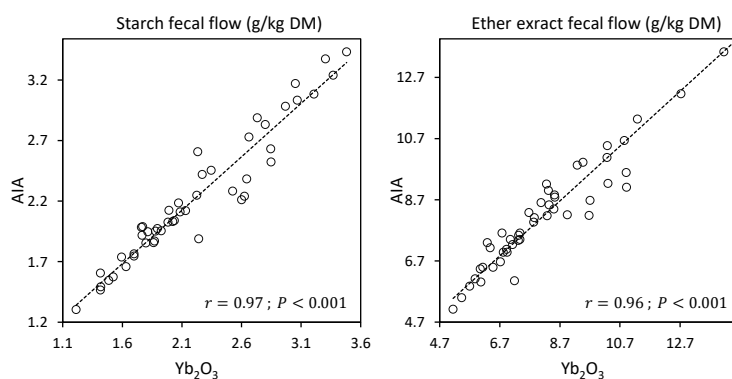


Figure 1 - Correlation between dietary flows in faeces (g per kg diet dry matter) using ytterbium oxide (Yb_2O_3) and acid-insoluble ash (AIA) as indigestible markers in growing pigs.

The use of indigestible markers is an essential tool in nutrition studies to evaluate digestibility of feed in various segments and over the whole digestive tract of animals, allowing for ad libitum feed access and shorter collection periods. Two inert markers, ytterbium oxide (Yb_2O_3) and acid-insoluble ash (AIA), were explored in a study to assess the effects of replacing soybean meal and/or corn with by-products on whole tract digestibility coefficients.

Four experimental diets were formulated: SBM, based on soybean meal (16%) and corn; RSM and SFM, with 100% replacement of soybean meal by rapeseed meal and sunflower meal, respectively; and RSM-SB, as RSM with additional 35% partial replacement of corn by sugar beet.

Diets were fed to 12 pigs over 4 periods in a 4×4 Latin square design (3 animals per treatment and period). Experimental diets included 50 mg/kg of Yb_2O_3 and 10g/kg of Celite. After 7 days of adaptation, faeces samples were collected over 2 days. Yb_2O_3 was assayed in diets and faeces acid hydrolysate samples using inductively coupled plasma mass spectrometry, and AIA was analysed following the method of European Commission Regulation n° 152/2009. Digestibility coefficients and nutrient flow in faeces (g or kcal per kg of diet dry matter) were calculated using the index method. The generalized linear mixed statistical function 'glmer()' in R Studio was used to analyse main effects and interactions of diets and markers, and Pearson's correlation was used to explore relationships between Yb_2O_3 and AIA estimates.

No significant interactions ($P > 0.05$) were observed between the marker type and the diet on organic matter, gross energy, nitrogen, starch, ether extract, phosphorus, and calcium digestibility coefficients. No significant differences ($P > 0.05$) were detected between the two indigestible markers in estimating these coefficients. As presented in Figure 1, starch and ether extract flows in faeces (g/kg DM) estimated using Yb_2O_3 correlated positively ($P < 0.001$) with AIA estimates.

The results above show that Yb_2O_3 inclusion at very low concentration in the diet (50mg/kg) provides similar values as AIA for estimating the flow of dietary energy and nutrients in pigs.

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