

From Discovery to Development

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animal



Standardized ileal amino acid digestibility increased with body weight of growing pigs fed faba beans, dehulled faba beans and peas, while unaffected by body weight when fed soybean meal, sunflower meal and rapeseed meal

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Introduction

The digestive capacity of pigs is improved with increasing body weight and age. Previous studies have mainly used compound diets to study the development in pig digestive capacity, whereas little attention has been given to the impact of individual feed ingredients.

However different characteristics among feed ingredients and differences in the degree of processing of the ingredients prior to purchase likely interacts with the digestive capacity of pigs at different body weight.

Objective

The objective was to determine the impact of bodyweight (BW) on amino acids (AA) digestibility of different protein sources fed to pigs between 40 and 60 kg.

Materials and Methods

In each of two experiments (Exp), eleven growing pigs were ileal cannulated at a BW of 33 kg to determine standardized ileal amino acid digestibility of different protein sources.

After surgery and recovery period, the pigs were used in a Youden square design with five groups (diets) and 8 time periods.

In each period, pigs were adapted to the diets for 5 days followed by two days of continuously ileal digesta collection for 9 hours per day.

Pigs were fed a cornstarch-based diets with following ingredients as the sole amino acid (AA) source in the two experiments (Exp-I and Exp-II):

- SBM-1:** 32% soybean meal-1 (Exp-I)
- SBM-2:** 35% soybean meal-2 (Exp-II)
- SBM-3:** 34% Soybean meal-3 (Exp-II)
- SFM:** 46% Sunflower meal (Exp-II)
- RSM:** 43% Rape seed meal (Exp-I)
- FB:** 64% Faba bean (Exp-I)
- DFB:** 60% Dehulled faba bean (Exp-II)
- PEA:** 78% Peas (Exp-I)

The number of replicates were 15 (SBM-1, SBM-3, SFM, FB, DFB, PEA) or 16 (SBM-2, RSM).

Pigs were fed 43 g/kg BW. Yttrium in feed and feces (included in feed as Yttrium oxide at 0.508 g/kg) was used as indigestible marker to calculate apparent ileal digestibility (AID) of AA.

Standardized ileal digestibility (SID) of crude protein and amino acids was calculated based on AID and the determined basal endogenous loss (16.2 g total AA/kg DM).

The initial and final BW of pigs was 36 and 57 kg in Exp-I and 38 and 64 kg in Exp-II.

Basal endogenous losses of protein and amino acids were measured using nitrogen-free diets in Exp-I (n=18) and in Exp-II (n=20).

Statistical analysis was conducted including dietary group and body weight within dietary group as fixed effects and the pig and period as random effects.

Results

The SID of total AA was not affected by BW when fed SBM-1, SBM-2, SBM-3, RSM and SFM ($P > 0.10$).

The SID AA increased with BW by 0.27 %/kg in DFB, 0.35 %/kg in FB and 0.55 %/kg DFB ($P < 0.05$).

Discussion

The increased SID AA with increasing body weight likely reflects the development in the digestive capacity of the pigs with increasing age and body weight.

Increased degree of processing and heat treatment likely explains that meals of soybean, sunflower and rapeseeds were not increased as pig body weight increased.

Conclusion

SID AA in faba beans, dehulled faba beans and peas increased by approximately 6 %-point in the period from 40 to 60 kg.

SID AA of processed oil by-products was unaffected by pig body weight.

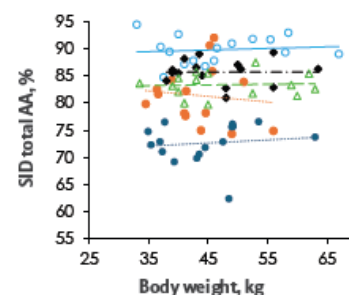


Figure 1. Relationship between SID AA and pig body weight at the time of sampling for three batches of soybean meal (SBM-1, SBM-2, SBM-3), sunflower meal (SFM) and rapeseed meal (RSM). The slopes (%-point/kg) for the ingredients and the P-value testing if slope = 0 is presented under the figure.

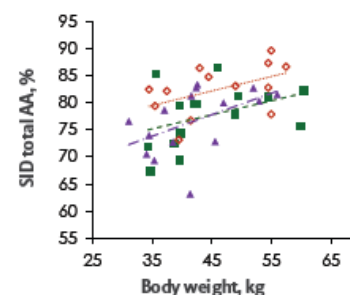
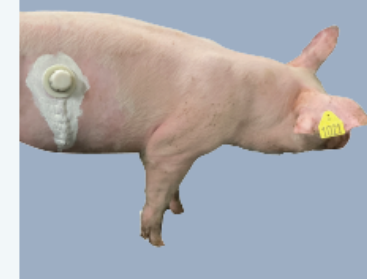


Figure 2. Relationship between SID AA and pig body weight at the time of sampling for faba bean (FB), dehulled faba beans (DFB) and peas (PEA). The slopes (%-point/kg) for the ingredients and the P-value testing if slope = 0 is presented under the figure.



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