

117 Determining high-lysine sorghum amino acid digestibility and the effects on nursery pig performance.

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Two experiments determined the SID of AA in a high-lysine sorghum cultivar, followed by a growth trial to determine its effects on pig performance using increasing feed-grade AA at the expense of soybean meal. In Exp. 1, ten barrows (initially 25.9 kg) were surgically fitted with a T-cannula at the terminal ileum and randomly assigned to 1 of 5 diets in a 5-period, cross-over design. Experimental diets included a corn-based diet, a diet containing high-lysine sorghum, or two diets with either white or red sorghum cultivars. The fifth experimental diet was N-free to determine endogenous AA loss. In corn, SID CP, lysine, methionine, threonine, and valine were greater ($P < 0.020$) than sorghum-based diets, with no evidence for differences among the sorghum cultivars. In Exp. 2, a total of 293 pigs (initially 9.6 kg) were used. Dietary treatments were randomly assigned 20 d after weaning and consisted of a corn-based diet, a diet based on conventional sorghum, and 4 diets with high-lysine sorghum with 10 replications/treatment. The corn-based, conventional sorghum, and the first high-lysine sorghum (low) diets each contained the same amount of soybean meal with varying amounts of feed-grade AA. The 3 remaining high-lysine sorghum diets included incrementally increasing amounts of feed-grade AA (low-medium, medium-high, and high), replacing soybean meal. Overall, there was no evidence for differences in ADG or ADFI between treatments. However, pigs fed the high-lysine sorghum with the greatest amount of feed-grade AA had decreased G:F ($P = 0.045$) compared with those fed other experimental diets. In summary, SID AA values for the high-lysine sorghum in this study were not different from sorghum cultivars; however, these values were all lower when compared with corn. When nursery diets were formulated on an equal SID AA basis, there were no differences in ADG among pigs fed any of the diets.

Table 1. Effect of high-lysine sorghum on nursery pig performance¹

| Item | High-lysine sorghum, AA addition | | | | | | SEM |
|-----------|----------------------------------|---------|------|------------|-------------|------|-------|
| | Corn | Sorghum | Low | Low-medium | Medium-high | High | |
| BW, kg | | | | | | | |
| d 0 | 9.6 | 9.7 | 9.7 | 9.6 | 9.7 | 9.6 | 0.20 |
| d 20 | 20.9 | 20.8 | 21.3 | 20.9 | 21.0 | 20.7 | 0.33 |
| d 0 to 20 | | | | | | | |
| ADG, g | 560 | 557 | 582 | 565 | 569 | 555 | 9.5 |
| ADFI, g | 858 | 851 | 881 | 856 | 872 | 898 | 17.9 |
| G:F | 0.65 | 0.66 | 0.66 | 0.66 | 0.66 | 0.62 | 0.011 |

¹A total of 293 pigs (DNA Line 241 × 600) were used in a 20-d experiment with 5 pigs per pen and 10 replications per treatment.

Key words: nursery pigs, sorghum, lysine

116 Direct vs. difference method to determine amino acid digestibility in ingredients fed to pigs.

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An experiment was conducted to test the hypothesis that values for standardized ileal digestibility (SID) of amino acids (AA) in cereal grains and fiber rich ingredients obtained using the direct method are not different from values obtained using the difference method. Sixteen ileal-cannulated barrows (69.45 ± 5.01 kg) were allotted to an 8 diets × 4 period Youden square design. Each period consisted of 5 d of adaptation and 2 d of ileal digesta collection. Four diets were based on soybean meal (SBM), corn, wheat, or wheat middlings as the only AA-containing ingredients. Three additional diets were based on a mixture of SBM and corn, wheat, or wheat middlings and a N-free diet was also used. The SID of AA in the 4 diets containing SBM, corn, wheat, or wheat middlings as the sole source of AA were calculated using the direct method. The SID of AA in corn, wheat, and wheat middlings were also calculated by difference from the 3 diets containing SBM and corn, wheat, or wheat middlings by subtracting the contribution from SBM of each AA from the SID values for the mixed diet. Data were analyzed using a model that included the method of determination of AA digestibility as the fixed effect, and pig and period as random effects. There was no difference between the direct and the difference method for the SID of most AA in corn, wheat, and wheat middlings, although the SID of Trp was lower ($P < 0.05$) for the difference method than values derived by the direct method for both corn and wheat middlings (Table 1). Therefore, values for SID of AA in cereal grains or fiber-rich ingredients could be obtained using either the direct method or the difference method.

Key words: amino acids, digestibility, difference method, direct method