RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: Energy and nutrient digestibility in 11 sources of wheat middlings – **NPB #15-114**

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Scientific Abstract

Two experiments were conducted. Exp. 1 was conducted to determine the standardized ileal digestibility (SID) of CP and AA in 10 sources of wheat middlings and in one source of red dog, and Exp. 2 was conducted to determine the apparent total tract digestibility (ATTD) of energy and fiber in the same ingredients. In Exp. 1, 10 diets that each contained one of the 10 sources of wheat middlings and 1 diet that contained red dog as the only source of protein and AA were formulated. An N-free diet was used to determine basal endogenous losses of CP and AA. Twelve pigs (BW: 29.23 ± 1.5 kg) were fitted with a T-cannula in the distal ileum. Pigs were allotted to a 12 × 8 Youden square design with 12 diet and eight 7-d periods. The initial 5 d of each period was the adaptation period, but ileal digesta were collected on the last 2 d of each period. In Exp. 2, 12 diets were also formulated with 1 diet being based on corn and soybean meal, and 11 diets were formulated by mixing corn and soybean meal and 39.5% of red dog or each source of wheat middlings. Twelve pigs were placed in metabolism crates and allotted to a 12 x 8 Youden square design with 12 diets and 8 14-d periods. In each period, feces and urine were collected for 5 d following 7 d of adaptation. Results of Exp. 1 indicated that the average SID of CP in wheat middlings was 61.2 ± 4.9% and there were no differences among the 10 sources of wheat middlings. However, the SID of CP in red dog (78.5%) was greater ($P < 0.05$) than in wheat middlings. The SID of Arg, His, and Asp in wheat middlings was 81.4 ± 2.7%, 77.7 ± 2.1%, and 66.4 ± 2.7%, respectively, and no differences among sources of wheat middlings were observed for these AA. The SID of Met (73.6 ± 1.9%) and the SID of Ala (54.8 ± 4.9%) tended ($P = 0.071$ and 0.090, respectively) to be different among sources of wheat middlings, and the SID of all other AA was different ($P < 0.05$) among the 10 sources of wheat middlings. There were no differences between red dog and wheat middlings for the SID of Arg, His, and Ser, and the SID of Cys was less ($P < 0.05$) in red dog than in wheat middlings, but for all other AA, the SID in red dog was greater ($P < 0.05$) than in wheat middlings. Results of Exp. 2 indicated that the average DE and ME in the 10 sources of wheat middlings were 2,990 and 2,893 kcal/kg DM, respectively, but DE and ME in red dog (3,414 and 3,300 kcal/kg DM, respectively) were greater ($P < 0.05$) than in wheat middlings. The ATTD of GE, DM, OM, ADF, and NDF were also greater ($P < 0.05$) in red dog than in wheat middlings. Both DE and ME in wheat middlings could be predicted relatively accurately (r2 = 0.95 and 0.93, respectively) from concentrations of GE, CP, AEE, ADF, NDF, lignin, ash and starch.

In conclusion, the AA composition of wheat middlings and red dog is similar, but the concentrations of AA are greater in both ingredients than previously reported. The SID of CP and AA in red dog are greater than in wheat middlings. Likewise, values for DE and ME in wheat middlings are less than some previous reports, but are greater in red dog than in wheat middlings.