

Effects of Wheat Middlings Inclusion, Grinding, and Carbohydase Supplementation in Isoenergetic Diets on Growth Performance and Carcass Characteristics of Grow-Finish Pigs

Pau Salgado-López¹, Jordi Bonet², Carme Soldevila², Jaume Coma²

¹Animal Nutrition and Welfare Service (SNIBA), Department of Animal and Food Science, Autonomous University of Barcelona, 08193 Bellaterra, Spain

²Vall Companys Group, 25191 Lleida, Spain

Keywords: carbohydase, fiber, grinding, swine, wheat middlings

This study evaluated the response of grow-finish pigs to varying wheat middlings inclusion in isoenergetic diets and the potential of carbohydase supplementation and wheat middlings grinding to improve nutrient digestibility. A total of 1,231 crossbred boars and gilts [Pietrain × (Landrace × Large White); initial body weight (**BW**) 33.8 ± 4.14 kg] were housed in 96 single-sex pens, blocked by BW, and randomly assigned to 4 dietary treatments, with 12-13 pigs/pen and 24 pens/treatment. Pigs were fed experimental diets for 89 d and individually weighed on d 0, 19, 40, 61, 77, and 89. Wheat middlings inclusion in growing diets (d 0-61) was 0.0, 6.0, and 12.0% (diets 3 and 4), and in finishing diets (d 61-89) was 0.0, 10.0, and 20.0% (diets 3 and 4). To maintain isoenergetic diets, diets 3 and 4 included 1.80% added animal fat in the growing phase and 1.40% animal fat plus 1.00% soybean oil in the finishing phase. Diet 2 was a 50:50 blend of diets 1 and 3. All diets, except diet 4, included wheat middlings grinding (average particle size 536 vs. 596 μ m unground) and carbohydase supplementation. Performance data were analyzed using a linear mixed model with treatment and sex as fixed effects and block as a random effect. Carcass data were analyzed with treatment and sex as fixed effects, hot carcass weight as a covariate, and pen and marketing group as random effects. During the growing phase, pigs fed 12.0% wheat middlings had lower ADFI than those fed 0.0% (1.59 vs. 1.65 kg; $P = 0.002$). As no differences were observed in ADG, FCR improved (1.95 vs. 1.99; $P = 0.001$), regardless of grinding or carbohydase supplementation. In the finishing phase, ADFI differed among treatments (2.16, 2.19, 2.10, 2.12 kg; $P = 0.046$), being lower in pigs fed 20.0% wheat middlings. Overall, high inclusion reduced ADFI by 3.6% ($P = 0.008$) without affecting final BW. High wheat middlings diets improved fat digestibility in both phases ($P < 0.001$) and neutral detergent fiber digestibility in the growing phase ($P < 0.001$) but reduced gross energy and organic matter digestibility in the finishing phase ($P < 0.001$). Hot carcass weight was lower in pigs fed the highest inclusion compared with those fed diets without wheat middlings (92.2 vs. 93.7 kg; $P = 0.006$), with increased carcass leanness (64.1 vs. 63.6%; $P = 0.007$) and reduced backfat thickness (13.97 vs. 14.66 mm; $P < 0.001$). In conclusion, at equal dietary energy, moderate wheat middlings inclusion (6-10%) had no effect on growth, feed efficiency, or carcass composition. High inclusion levels (12-20%) reduced feed intake, increased carcass leanness, and decreased

fat deposition. Grinding and carbohydrase supplementation had no additional effects on performance or carcass characteristics.