XII INTERNATIONAL SYMPOSIUM ON DIGESTIVE PHYSIOLOGY OF PIGS

PROGRAM AND
BOOK OF ABSTRACTS

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abundance was higher ($P < 0.05$) in the barrows than in the gilt. Our results suggest that the apical Na-neutral AA co-transporter B0AT1 expression is reserved during the weaning in pigs. These observations provide cellular mechanism for promoting dietary supplementation of crystalline neutral AA to improve gut growth and performance in weanling pigs with barrows likely being more responsive.

Key Words: early-weaned pigs, gene expression, sodium-neutral amino acid co-transporter B0AT1

1121 Cocoa husks in diets of Italian heavy pigs. D. Magistrelli,* L. Malagutti, G. Galassi, and F. Rosi, *University of Milan, Milan, Italy.*

According to their nutritional composition, some wastes from the agroindustry may have a potential for use in livestock production. In particular, by-products derived from chocolate production can be considered worth of interest for animal nutrition. Cocoa husks have a high concentration of lignin, but also a high content of proteins, lipids and NDF. Cocoa is also rich in antioxidants. To verify the possibility of using cocoa-derived products in pig nutrition, the effect of cocoa husks administration on liver composition of Italian heavy pigs was studied. Eight finishing pigs (Duroc x Large White) were divided into 2 homogeneous groups: a control group (C) fed a traditional pelleted diet, based on cereals, and a treatment group (T) fed a diet obtained by substitution of 10% of the control diet with coarsely-ground cocoa husks. Animals were kept into individual steel boxes, under identical condition for light and temperature. All the pigs were fed twice a day (8:00 a.m. and 5:00 p.m.) and water was always available. During the experimental period, individual dry matter intake was recorded daily, body weight was recorded weekly. Experimental diets were analyzed for nutritional composition and gross energy. After 6 weeks, all the pigs were slaughtered. Body, carcass, and liver weights were recorded and hot dressing percentage was calculated. Backfat thickness was determined using the Fat-O-Meter and liver samples were taken and analyzed for dry matter (DM), ether extract and total cholesterol. Data were analyzed by a one-way ANOVA, using the GLM procedure of SAS. Cocoa husks diet reduced individual dry matter intake by 10% ($P < 0.01$) and energy intake by 8% ($P < 0.01$). Neither body weight ($P = 0.90$) nor backfat thickness ($P = 0.63$) was affected by cocoa diet. Treatment did not influence carcass weight ($P = 0.83$) and dressing percentage ($P = 0.72$). Cocoa husks reduced liver weight ($P < 0.05$) and dry matter percentage ($P < 0.01$), but increased ether extract (% DM) ($P < 0.01$), without affecting liver cholesterol (mg/g DM) ($P = 0.79$).

Key Words: cocoa, liver, heavy pigs

1122 Microscopic matrix and in vitro pig model fermentation of wheat and corn distillers dried grains with solubles with supplemental carbohydrases and protease. R. Jha*[1], J. Li[1], M. R. Bedford[2], C. R. Christensen[3], T. Vasanthan[1], and R. T. Zijlstra[1], *[1]University of Alberta, Edmonton, AB, Canada, [2]AB Vista Feed Ingredients, Wilts, UK, [3]University of Saskatchewan, Saskatoon, SK, Canada.*

Digestibility of distillers dried grains with solubles (DDGS) by porcine enzymes is lower than that of grains. The physico-chemical basis for the difference is poorly understood. Thus, 3 DDGS samples (2 wheat DDGS, wDDGS1 and wDDGS2 and a corn DDGS, cDDGS) were pre-digested with pepsin and pancreatin. Residues were then subjected to in vitro fermentation in a pig large intestine model, using buffered mineral solution inoculated with fresh pig feces. The fermentation was carried out with or without enzymes, carbohydrases (C) or carbohydrases + protease (C+P). In a 3 × 3 factorial arrangement, gas production during in vitro fermentation was determined up to 72 h. The fermentation broth was analyzed for volatile fatty acid (VFA) content. The matrix of native DDGS and their residues after fermentation was analyzed using confocal laser scanning electron microscopy (CLSM) and scanning electron microscopy (SEM). Total gas production was higher ($P < 0.05$) for cDDGS than wDDGS, and was higher ($P < 0.05$) for C than control and C+P. Total VFA production was similar in pattern as total gas; but DDGS and enzymes interacted ($P = 0.003$). Total VFA production was highest ($P < 0.05$) for cDDGS either control or C, and lowest for wDDGS2 with C+P (6.5, 6.2, and 4.0 mMol/g, respectively). Principle component analysis revealed that total gas and VFA produced correlated negatively with ADF and CP, and positively with starch of DDGS. Using CLSM and SEM, the fiber-starch-protein matrix of wDDGS2 was highly interspersed and less degraded; even after fermentation with C or C+P. In contrast, the matrix of cDDGS was loosely imbedded. In conclusion, C unlocked the fiber-starch-protein matrix better for fermentation than C+P, indicating that the substrate for C hinders degradation of the DDGS matrix. The matrix of cDDGS is less imbedded and hence more fermentable than wDDGS.

Key Words: DDGS, enzymes, fermentation

1123 Microbial fermentation in the hindgut—Energy contribution to sows fed diets differing in dietary fibre source with and without addition of a live yeast. N. Canibe*[1], E. C. Soto[2], H. Jørgensen[1], K. E. Bach Knudsen[1], and B. B. Jensen[1], *[1]Aarhus University, Blichers Allé 20, 8830 Tjele, Denmark, [2]Estación Experimental del Zaidín (CSIC), Albareda, Granada, Spain.*

Microbial fermentation in the hindgut supplies the host with energy as short-chain fatty acids (SCFA). The contribution made by fermentation to the total energy economy of the animal is not clear. The amount and fermentability of substrates entering the hindgut depends to a great extent on the dietary fiber level and source. Live yeasts have been reported to stimulate growth and/or activity of fibrolytic bacteria and thereby potentially influence the degradation of dietary fiber. The aim of the present study was to measure the digestibility and assess, using an in vivo-in vitro methodology, the available energy from hindgut fermentation to sows fed diets differing in dietary fiber source amended or not the live yeast *Saccharomyces cerevisiae* ssp. boulardii CNCM I-1079 (SB). Sixteen sows were fitted with a simple T-shaped cannula at the terminal ileum and offered 4 diets: a wheat bran diet with and without SB, and a sugar beet pulp diet with and without SB.