

period were prepared to be totally consumed each day to equalize flavors intake. Flavors (anise or garlic, 0.0375%) were counterbalanced across replicates to act as CS+ or CS-. Double choice test between flavors dissolved in water (CS+ and CS-) were performed by selecting 2 pigs/pen on d 1, 6 and 8 after the training period. Solution intake was measured after 30 min. Data were analyzed by using the GLM procedure of SAS®. Piglets showed higher intakes for CS+ over CS- in G2 (212 vs. 76mL; 168 vs. 86mL; $P < 0.05$ and 195 vs. 78mL; $P = 0.15$) on d 1, 6 and 8, respectively. No differences between CS+ and CS- consumption was observed in G1. Present results indicate that weanling piglets can acquire strong flavor preferences resistant to extinction through associative learning between the flavor and the post-ingestive effects of sucrose. PDP failed in conditioning flavor preferences probably due to the negative 24 h exposure and possible post-ingestive effects of MSG. Learned flavor preferences may be used as a strategy to enhance voluntary intake in critical periods, such as weaning.

Key Words: learning, conditioning, post-ingestive

3028 Evaluation of two external markers for measurement of ileal and fecal digestibility of humanized diets.

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Appropriateness of different external markers for determination of nutrient digestibility has often been evaluated in conventional dry feeds, but very little in less conventional feeds such as humanized diets used in model studies. In the current study, 5 ileum-cannulated pigs were fed 5 soft bread based diets for 1 wk in a Latin Square design. The diets consisted of white wheat bread, milled rye bread, whole kernel rye bread or wheat bread supplemented with concentrated oat β -glucan or arabinoxylan from wheat. The diets were supplemented with whey protein, vitamins and minerals, and chromic oxide and Celite® (AIA) as digestibility markers. The inclusion levels of the markers were 2–3 g chromic oxide/kg DM and 5–6 g AIA/kg DM. Estimates of digestibility based on the 2 markers were compared by linear regression. Ileal contents were collected twice weekly for 5 h and pooled before analysis, while a fecal grab sample was obtained once per week. Ileal and fecal digestibility of organic matter (OM) and non-starch polysaccharides (NSP) was calculated relative to the 2 digestibility markers. Across dietary treatments and site of collecting there was a high correlation with coefficients of determination of $R^2 = 0.77$ for OM and 0.80 for NSP ($P < 0.001$), and a linear model close to unity between values obtained using the 2 different markers. Evaluating ileal samples alone, the correlation was much poorer, particularly for NSP, which had a coefficient of determination of only 0.09 ($P = 0.14$), while for OM it was 0.52 ($P < 0.001$). On the other hand, fecal grab samples had a very strong correlation with coefficients of determination of 0.92 and 0.96 for OM and NSP, respectively ($P < 0.001$). However, there was not unity between the estimates, as AIA gave higher values than chromic oxide in samples with lower digestibility, resulting in regression lines with intercepts

of 0.29 and 0.28 and slopes of 0.71 and 0.72 for OM and NSP, respectively. The discrepancy is presumably caused by analytical difficulties due to a very high fecal digestibility of OM and very high ash contents (14–44 g/kg DM) of feces from pigs fed the humanized diets.

Key Words: chromic oxide, acid insoluble ash, animal models

3029 Use of medium without reducing agent for in vitro fermentation studies by bacteria isolated from pig intestine.

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Over the past decade, several in vitro methods have been developed to study intestinal fermentation in pigs and its influence on health. Samples are fermented by a bacterial inoculum diluted in a mineral buffer solution. A reducing agent, such as Na_2S or cysteine-HCl, generates the required anaerobic environment by the release of H_2S inducing an imbalance between bacterial species by the production of such toxic metabolites. H_2S is also an end product of the fermentation of sulfur amino acids and its addition via the reduction agent impedes the use of in vitro methods to investigate intestinal protein fermentation. An experiment was conducted to study the impact of the reducing agent on fermentation patterns. Protein (soy proteins, casein) and carbohydrate (potato starch, cellulose) ingredients were fermented in vitro by pig intestinal bacteria from fresh feces of 3 sows fed an antibiotics-free commercial diet in 3 incubation media differing in reducing agent: Na_2S , cysteine-HCl or without reducing agent. Gas fermentation kinetics were monitored over 72 h and short-chain fatty acid (SCFA) production after 8, 24 and 72 h were analyzed and compared according to ingredient and reducing agent by the MIXED procedure of SAS ($n = 6$). Results show that the gas production was higher when fermenting carbohydrate than protein ingredients ($P < 0.05$). Whatever the ingredient, the fermentation patterns with Na_2S and without reducing agent were quite similar and differed from those performed with cysteine-HCl. Except for soy proteins, SCFA production after 8, 24 and 72 h was similar for a same ingredient regardless the incubation medium ($P > 0.05$). Comparison of SCFA molar ratios did not reveal differences when fermentation occurred with Na_2S and without reducing agent ($P > 0.05$). These results suggest that omitting the use of a reducing agent does not alter significantly the fermentation kinetics and the SCFA production. The saturation of the incubation medium with CO_2 seems sufficient to generate a suitable anaerobic environment. Further works on the samples involve the incidence on microbiota and on toxic metabolites production.

Key Words: in vitro fermentation, reducing agent, SCFA

3030 Direct and regression methods do not give different estimates of digestible and metabolizable energy of wheat for pigs.

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