

Impact of feeding level on nutrient digestibility and concentrations of plasma metabolites in transition sows

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This study investigated the impact of feeding levels in late gestation on apparent total tract digestibility (ATTD) of gross energy (GE), nutrients and concentrations of plasma metabolites in transition sows. We hypothesized that nutrient digestibility decline and concentrations of plasma metabolites increase with increasing feeding levels. Forty-eight sows were assigned to six feeding levels (1.8, 2.4, 3.1, 3.7, 4.3 and 5.0 kg/d) from day 108 of gestation until farrowing. Faecal samples were collected on day 114 of gestation, whereas plasma samples were collected at farrowing. Klason lignin measured as acid insoluble residues in the feed ingredients was used as an internal marker to estimate ATTD of GE and nutrients. Data were analysed using general linear mixed model by including feeding levels and parity as the fixed effects and sow as the random effect. Plasma concentrations of urea ($P < 0.001$), acetate ($P < 0.001$) and butyrate ($P < 0.001$) increased, whereas that of non-esterified fatty acids ($P < 0.001$) decreased linearly with increasing feeding level. The ATTD of GE ($P < 0.001$) and protein ($P < 0.001$) showed similar trends, in which ATTD were greatest at 1.8 and 2.4 kg/d, intermediate at 3.1 kg/d and lowest at ≥ 3.7 kg/d for both parameters. The ATTD of non-starch polysaccharides (NSP) was greatest at 2.4 and 3.1 kg/d, intermediate at 3.7 and 4.3 kg/d and lowest at 5.0 kg/d ($P < 0.001$). The ATTD of GE, fat and NSP were greater in sows than in gilts ($P < 0.001$). In conclusion, plasma concentrations of acetate, butyrate and urea increased with increasing feeding level, indicating increased fermentation and protein oxidation, whereas the decreased concentration of non-esterified fatty acids with increasing feeding level implied a reduced body reserve mobilization. Increased feeding level also decreased the ATTD of GE, protein and NSP but to different extents.