2015. J. Anim. Sci. 93:2154-2164

低蛋白日粮对生长猪氨基酸转运载体的表达、血清氨基酸浓度、生长性能和胴体组成的影响

A. Morales, L. Buenabad, G. Castillo, N. Arce, B. A. Araiza, J. K. Htoo and M. Cervantes

通常来说，饲喂蛋白质形式存在的氨基酸的猪只在空肠中氨基酸转运载体的表达比在十二指肠更高。但是关于合成氨基酸（可以在十二指肠被立即吸收）对十二指肠上皮细胞氨基酸转运载体的表达和生长性能影响的研究还比较少。将48头猪只（24.3kg初始重）分为4组，研究日粮CP水平和形式（氨基酸或蛋白）对小肠3各部分氨基酸载体表达、血清氨基酸水平、生长性能的影响。日粮是小麦豆粕型日粮，处理包括1）低蛋白日粮（14%CP），添加赖氨酸、苏氨酸、蛋氨酸、亮氨酸、异亮氨酸、缬氨酸、组氨酸、色氨酸和苯丙氨酸（LPAA）；2）同LPAA日粮，但是仅添加甘氨酸作为氮源（LPAA+N）；3）中蛋白日粮(16%CP)，添加赖氨酸、苏氨酸、蛋氨酸（MPAA）；4）高蛋白日粮（22%CP，HP），无氨基酸添加。试验结束时，LPAA和HP组选择8头猪只，取小肠黏膜、血清样品，并解剖胴体。试验处理对ADG、ADFI、G:F、胴体组成和内脏器官没有显著影响。HP组猪只大肠和肾脏重量较高（P＜0.01）。与HP日粮组相比，LPAA十二指肠b0,+的表达较高（P=0.036），但是空肠和回肠无差异。饲喂LPAA日粮组猪只回肠中y+ L的表达有提高的趋势（P=0.098）。LPAA组猪只十二指肠和空肠中b0,+的表达无显著差异，但是在HP组空肠中所有氨基酸载体的表达量均高于十二指肠和回肠（P＜0.05）。HP组猪只血清中精氨酸、组氨酸、异亮氨酸、亮氨酸、苯丙氨酸和缬氨酸浓度较高，但是赖氨酸和蛋氨酸含量较低（P＜0.05）。这些试验数据表明LPAA最高可以替代高蛋白小麦-豆粕型日粮8个百分点的蛋白而不会影响猪只生长性能。并且，日粮中添加合成氨基酸会影响血清中氨基酸的浓度，以及十二指肠中氨基酸转运载体b0,+的表达。

网站链接：https://www.animalsciencepublications.org/publications/jas/abstracts/93/5/2154

Low-protein amino acid–supplemented diets for growing pigs: Effect on expression of amino acid transporters, serum concentration, performance, and carcass composition

A. Morales, L. Buenabad, G. Castillo, N. Arce, B. A. Araiza, J. K. Htoo and M. Cervantes

Pigs fed protein-bound AA appear to have a higher abundance of AA transporters for their absorption in the jejunum compared with the duodenum. However, there is limited data about the effect of dietary free AA, readily available in the duodenum, on the duodenal abundance of AA transporters and its impact on pig performance. Forty-eight pigs (24.3 kg initial BW) distributed in 4 treatments were used to evaluate the effect of the CP level and form (free vs. protein bound) in which AA are added to diets on the expression of AA transporters in the 3 small intestine segments, serum concentration of AA, and performance. Dietary treatments based on wheat and soybean meal (SBM) were 1) low-CP (14%) diet supplemented with l-Lys, l-Thr, dl-Met, l-Leu, l-Ile, l-Val, l-His, l-Trp, and l-Phe (LPAA); 2) as in the LPAA but with added l-Gly as a N source (LPAA+N); 3) intermediate CP content (16%) supplemented with l-Lys HCl, l-Thr, and dl-Met (MPAA); and 4) high-CP (22%) diet (HP) without free AA. At the end of the experiment, 8 pigs from LPAA and HP were sacrificed to collect intestinal mucosa and blood samples and to dissect the carcasses. There were no differences in ADG, ADFI, G:F, and weights of carcass components and some visceral organs between treatments. Weights of the large intestine and kidney were higher in HP pigs (P < 0.01). Expression of b0,+ in the duodenum was higher in pigs fed the LPAA compared with the HP diet (P = 0.036) but there was no difference in the jejunum and ileum. In the ileum, y+ L expression tended to be higher in pigs fed the LPAA diet (P = 0.098). Expression of b0,+ in LPAA pigs did not differ between the duodenum and the jejunum, but in HP pigs, the expression of all AA transporters was higher in the jejunum than in the duodenum or ileum (P < 0.05). The serum concentration of Arg, His, Ile, Leu, Phe, and Val was higher but serum Lys and Met were lower in pigs fed the HP diet (P < 0.05). These results indicate that LPAA can substitute up to 8 percentage units of protein in HP wheat–SBM diets without affecting pig performance; nonessential N does not seem to be limiting in very low-protein wheat–SBM diets for growing pigs. Also, the inclusion of free AA in the diet appears to affect their serum concentration and the expression of the AA transporter b0,+ in the duodenum of pigs.