



Supplemental leucine and isoleucine affect expression of cationic amino acid transporters and myosin, serum concentration of amino acids, and growth performance of pigs

M. Cervantes-Ramírez¹, V. Méndez-Trujillo¹, B.A. Araiza-Piña¹,
M.A. Barrera-Silva², D. González-Mendoza¹ and A. Morales-Trejo¹

¹Instituto de Ciencias Agrícolas, Universidad Autónoma de Baja California, Mexicali, Baja California, México

²Facultad de Agronomía, Universidad de Sonora, Hermosillo, Sonora, México

Corresponding author: A. Morales-Trejo
E-mail: adriana_morales@uabc.edu.mx

Genet. Mol. Res. 12 (1): 115-126 (2013)

Received July 7, 2012

Accepted October 10, 2012

Published January 24, 2013

DOI <http://dx.doi.org/10.4238/2013.January.24.3>

ABSTRACT. Leucine (Leu) participates in the activity of cationic amino acid (aa) transporters. Also, branched-chain aa [Leu, isoleucine (Ile), and valine (Val)] share intestinal transporters for absorption. We conducted an experiment with 16 young pigs (body weight of about 16 kg) to determine whether Leu and Ile affect expression of aa transporters b^{0,+} and CAT-1 in the jejunum and expression of myosin in muscle, as well as serum concentration of essential aa, and growth performance in pigs. Dietary treatments were: wheat-based diets fortified with Lys, Thr, and Met; basal diet plus 0.50% Leu; basal diet plus 0.50% Ile, and basal diet plus 0.50% Leu and 0.50% Ile. After 28 days, the pigs were sacrificed to collect blood, jejunum, and semitendinosus and longissimus muscle samples. The effects of single and combined addition of Leu and Ile were analyzed. Leu alone or combined with Ile significantly decreased daily weight gain and reduced feed conversion. Leu and Ile, alone or in combination, significantly decreased expression of b^{0,+} and significantly increased CAT-1. Ile alone or combined with Leu significantly decreased myosin expression in semitendinosus and significantly decreased it in

longissimus muscle. Leu alone significantly decreased Lys, Ile and Thr serum concentrations; Ile significantly decreased Thr serum concentration; combined Leu and Ile significantly decreased Thr and significantly increased Val serum concentration. We conclude that dietary levels of Leu and Ile affect growth performance, expression of aa transporters and myosin, and aa serum concentrations in pigs.

Key words: Swine; Leucine; Amino acid transporter; mRNA expression; Isoleucine