

Title: Utilization of Crystalline Amino Acids by the Gut in Growing Pigs –
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Investigator: Nathalie L. Trottier

Institution: Michigan State University

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Abstract: The objective of this study was to determine if partial replacement of protein-bound AA with crystalline AA (CAA) increases portal blood appearance of AA. Six barrows (30 kg \pm 0.5 BW) were assigned to three diets in a repeated Latin Square design. Diets consisted of a 16.9% CP (Control: C), and a 14.5 (Medium: M) and 12.5 % CP (Low: L) containing CAA. The M diet contained L-lys, L-thr, and DL-met, and the L diet contained L-lys, L-thr, DL-met, L-trp, and L-cys to meet true ileal digestible requirements. Feed was given twice daily providing 2.6 times ME required for maintenance. A catheter was placed in the portal vein and blood samples were collected at times (t) -30, 30, 60, 90, 120, 150, 180, 210, and 240 min relative to feeding. Portal lys concentration ($\mu\text{mol/L}$) at t30 was higher ($P < 0.001$) in pigs fed L (347.38 ± 18.24) and M (296.4 ± 18.38) compared to C (210.32 ± 18.24). At t60, compared to C (268.42 ± 18.24), lys was higher ($P < 0.01$) in pigs fed L (362.01 ± 18.23) but similar in pigs fed M (286.35 ± 18.36). Post t60, lys did not differ between L, M and C. Portal thr concentration at t30 was higher ($P < 0.05$) in L (311.37 ± 17.13) than in M (257.61 ± 17.23) and C (229.09 ± 17.13). At t60, portal thr in L (333.08 ± 17.13) was higher ($P < 0.05$) compared to M (263.19 ± 17.23) and C (284.96 ± 17.13). Portal thr between M and C did not differ at any time point. Portal met concentrations at t30 and t60 were higher ($P < 0.05$) in pigs fed L (102.01 ± 7.37 and 104.82 ± 7.37 , respectively) compared to C (72.19 ± 7.37 and 85.40 ± 7.37 , respectively) and did not differ between M (87.70 ± 7.41 and 84.37 ± 7.41 , respectively) and C. Portal trp at t30 was similar in L (87.35 ± 4.61) compared to C (81.49 ± 4.61) and M (77.02 ± 4.64), but at t60 was lower ($P < 0.05$) in M (78.39 ± 4.64) compared to C (94.17 ± 4.61). At t60, portal trp was not different between L (88.60 ± 4.60) and C. Partial replacement of protein-bound AA with CAA increases AA concentrations in portal blood, implying that CAA are absorbed more rapidly than protein-bound AA even in diets formulated on true ileal digestible basis.

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For more information contact:

National Pork Board, P.O. Box 9114, Des Moines, Iowa USA

800-456-7675, Fax: 515-223-2646, E-Mail: porkboard@porkboard.org, Web: <http://www.porkboard.org/>