

PORK QUALITY

Tilte: Improved Meat Quality with Supplemental CLA – NPB #98-143

Investigator: Scott Mills

Institution: Purdue University

Co-Investigators: Melissa Heckart, Shawn Donkin

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Abstract: Selection of genotypes that provide a higher percentage of carcass lean has tended to produce carcasses with less desirable textural qualities. The fat is softer and the fat-muscle interface is often less cohesive. Lean pigs also have thin bellies, which presents two problems to the swine industry. First, thin soft bellies are difficult to process to bacon, and therefore, are sold at reduced value. Second, thin bellies produce thin bacon slices which may be unappealing to the consumer. The challenge to the industry is to produce lean pigs without compromising bacon quality. Conjugated linoleic acids have a variety of effects on the metabolism and growth of animals that may be exploited for improvement of pig production and pork quality.

Conjugated linoleic acids (CLA) are a group of geometric and positional isomers of linoleic acid. CLA are endproducts of bacterial metabolism of fatty acids and ruminant species absorb CLA from the digestive tract and incorporate these fatty acids in small amounts in milk and fat tissue. CLA isomers are also generated by heating linoleic acid in the presence of base. CLA has been linked to a multitude of metabolic actions, including reduced rates of fat accretion, increased saturation of fat, altered immune response, inhibition of carcinogenesis, and reduced serum lipids (Li and Watkins, 1998, Pariza et al. 2000). Of particular interest to animal scientist is the “nutrient partitioning” effect of CLA and the potential alteration of fatty acid profile. However, all of the listed responses are potentially beneficial to humans, so increasing the concentration of CLA in animal products has the added advantage of adding value to pork products. Therefore, interest in CLA extends beyond the potential benefits to the growth and composition of animals and into the role of animal products as a conveyor of therapeutic doses of CLA for human health.

Feeding CLA to rats dramatically reduces the rate of fat accretion and modestly increases the accretion of protein (Park et al., 1999). Work by several groups including our own suggests that the same beneficial effects occur in pigs (Heckart et al., 1999, Eggert et al., 1999). CLA may also effect the quality of pork. We and others have reported that CLA increases fat firmness and improves the quality of bacon and other products from lean pigs (Eggert et al., 1999). Numerous questions remain to be answered regarding the use of CLA including 1) are the growth and carcass quality

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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/>

effects observed in lean genotype pigs, 2) what are the mechanisms by which CLA mediates such a wide variety of effects, 3) what isomers mediate specific metabolic effects, and 4) which isomers are beneficial to humans and what concentrations in animal tissues are beneficial. This work addressed the first two questions to determine the effect of genotype on the response to CLA, and to identify mechanisms for altered body composition.