

# The importance of using crystalline amino acid supplementation as integral part of the EcoCare® Feed Program

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This technical bulletin is intended to reinforce the importance of using crystalline amino acid supplementation as an integral part of the EcoCare® Feed program, to maximize the reduction in ammonia emission from swine production systems.

Ammonia released from swine facilities is produced from degradation of nitrogenous compounds in swine manure, such as proteins and amino acids. Thus, ammonia emission from swine facilities is primarily associated with the amount of nitrogen excreted and incorporated into the pit. Diet formulation can dramatically impact the amount of nitrogen excreted, and therefore, the amount of ammonia released from manure.

Formulation of reduced protein diets with crystalline amino acids supplementation on an ideal amino acid basis is a well recognized method to reduce nitrogen excretion and, ammonia emission from swine production systems. Previous research results suggest 7 to 10% reduction in nitrogen excretion by grower-finisher pigs per each percentage unit reduction in dietary protein (Portejoie et al., 2004, Lachmann et al., 2006, Deng et al., 2007, Lachmann et al., 2007a, Lachmann et al., 2007b, Lachmann et al., 2008). Additionally, ammonia emission was decreased by 7 to 18% per each percentage unit reduction in dietary protein (Portejoie et al., 2004, Panetta et al., 2006, Lachmann et al., 2007, Lachmann et al., 2008). The magnitude of response in reduction of nitrogen excretion, and ammonia emission will be dependent on the protein level used as the reference value and the amino acid supplementation criteria used in diet formulation. Also, the reduction of dietary protein with addition of crystalline amino acids to the diet has been reported as an effective method to reduce nitrogen excretion from lactating sows (Bundy et al., 2007).

Therefore, formulation of EcoCare® Feeds diets with inclusion of crystalline amino acids could further reduce ammonia emission from manure, and ammonia concentration in the building, thereby, enhancing air quality in the building for the laborers and the pigs. It is recommended that producers rely on Land O'Lakes Purina Feed field nutritionists to formulate reduced protein diets, since successful use of this strategy involves balancing amino acids on an ideal amino acid basis, and accounting for the cost of crystalline amino acids in relation to cost saving by the reduction in dietary protein (soybean meal).

## References

- Deng et al., 2007. Nitrogen balance in barrows fed low-protein diets supplemented with essential amino acids. *Livest. Sci.* 109:220-223.
- Lachmann et al., 2008. Influence of dietary manipulation on the mass balance of N and P during the swine finishing phase. *J. Anim. Sci.* 86(Suppl. 3):68.
- Lachmann et al., 2007b. Influence of dietary reductions in CP, P, and trace minerals on DM, N, P, and mineral excretion in finishing pigs. *J. Anim. Sci.* 86(Suppl. 1):157.
- Lachmann et al., 2007a. Effects of reduced dietary crude protein and P on DM, N, and P excretion of finisher pigs. *J. Anim. Sci.* 85(Suppl. 2):74.
- Bundy et al., 2007. Influence of dietary manipulation on DM, N, and P excretion of lactating sows. *J. Anim. Sci.* 85(Suppl. 2):114.
- Lachmann et al., 2006. Influence of dietary manipulation on DM, N, and P excretion of pigs during an entire finishing period. *J. Anim. Sci.* 84(Suppl. 2):94.
- Panetta et al., 2006. Nitrogen excretion and ammonia emissions from pigs fed modified diets. *J. Environ. Qual.* 35:1297-1308.
- Portejoie et al., 2004. Effect of lowering dietary crude protein on nitrogen excretion, manure composition and ammonia emission from fattening pigs. *Livest. Prod. Sci.* 91: 45-55.

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