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## **Dietary Manipulation to Reduce Ammonia Emission from High-Rise Layer Houses**

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**Species:** Poultry (Layers)  
**Use Area:** Animal Housing  
**Technology Category:** Diet Modification  
**Air Mitigated Pollutants:** Ammonia

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### **System Summary:**

Ammonia (NH<sub>3</sub>) generation from poultry production is a result of microbial decomposition of uric acid and undigested nitrogen in bird feces. Ammonia emission is associated with nitrogen (N) content of the feces, which is influenced by feed composition and feed conversion efficiency of the bird. To reduce N content in feces, ration may be formulated with reduced dietary crude protein (CP) and supplemented with limiting amino acids (AA) to match bird dietary requirements, thereby improving digestive conversion efficiency. Utilization of lower CP diets with supplemented essential amino acids is a source reduction method to mitigate ammonia emission from layer hen production facilities. Lower N excretion in the bird feces due to lower total N intake can result in lower NH<sub>3</sub> emission from the system. The lower CP diet used in this study had 0.4 to 1.2% less CP than the standard or control diet during various feeding phases. The lower CP diet resulted in about 10% ammonia emission reduction. Formulation based on nutritional requirement at different feeding phases is required to achieve emission reduction without affecting bird performance, i.e. egg production and case weight. The cost of low CP diet is about 1% lower than that of the standard dietary formulation (2008 prices).

### **Applicability and Mitigating Mechanism:**

- Lower CP diet can have 0.4 to 1.2% lower CP than a standard diet during the various feeding phases.
- Soy content is reduced in lower CP diets, and crystalline AA DL-methionine, L-lysine.HCL and L-threonine is supplemented to maintain the same essential AA levels in both diets for a given feeding phase.
- Tryptophan and isoleucine in the lower CP diet may be slightly lower (from 0.02% to 0.06%) than those in the standard diets without affecting bird performance.

### **Limitations:**

- Crude protein in the diet can only be reduced to certain level to avoid negatively impacting bird performance.

### **Cost:**

The cost for the lower CP diet with supplemented crystalline AA DL-methionine, L-lysine.HCL and L-threonine is about 1% lower than that for the standard diet. The cost advantage is better now with the current higher grain costs than in year 2003 when the study was conducted.