Effect of Dietary S-Carb® Addition to Broiler Rations on Fecal Ammonia Release and Broiler Performance to 42 Days of Age.

Objectives:

The objectives of this trial were:

- To determine the effect of the addition of dietary S-Carb, sodium sesquicarbonate, to broiler chicken rations on litter ammonia release and broiler performance to 42 days of age.
- To determine effect of dietary S-Carb in broiler chicken rations on atmospheric ammonia and litter moisture.

Background:

Atmospheric ammonia levels from litter of >25ppm has been found to retard broiler performance. It has become an important factor in management of commercial poultry houses. The typical management is a multifaceted approach with litter amendments, dietary additions and ventilation. House ventilation requirements increase from a low of 0.5-1.5mph to >3.5 mph as birds grow larger and density increases, in order to maintain air quality. Increased ventilation rates utilize more expensive non-recoverable energy.

Because dietary ingredient components place about a pound of feed components onto each square foot of chicken growing area, providing ammonia deterrents in the feed is the most logical and has the greatest chance of being mixed well, where the protein components reside. Consequently, feed ingredients provide the greatest opportunity to control litter ammonia and subsequent atmospheric ammonia. S-Carb is current being used routinely in practical poultry diets to balance electrolytes, and help to improve litter quality. This trial will investigate the potential of added benefit of S-Carb addition on litter and atmospheric ammonia control.

Treatments:

	Treatment 1	Treatment 2	Treatment 3	Treatment 4
S-Carb %	0.2 %	0.3 %	0.4 %	0
Birds/replicate	10	10	10	10
Replicates	6	6	6	6

Birds were housed in atmospheric chambers to allow monitoring of ammonia levels. Floor space was a minimum of 0.70 ft^2 per bird. Chicks were randomized and hosed into each chamber on wire floors with holes to allow manure to drop into pans under

each cage. Chambers were completely enclosed with appropriate control of incoming air and outgoing exhaust.

Diets were nutritionally balanced and formulated to contain equal nutrient levels, except for the sodium levels. Minimum Chloride levels were maintained, and all diets were iso-Potassium. Broilers utilized in this study were Ross 708 male broilers. Diets were fed in three phases in accordance with standard commercial poultry production practice for a total of 42 days. Body weights and feed intakes were collected on 0, 21 and 42 days. Weight gain, feed intake and mortality-adjusted feed efficiency were calculated. All differences between groups were evaluated a $P<0.5$.

Daily individual chamber atmospheric ammonia emission levels were determined daily. Each chamber, within a block of chambers representing all treatments, was closely monitored, at a minimum of three times per day, and ventilation was adjusted as needed to maintain the desired 40 ppm NH_3 (+/- 3 ppm) for the Control (no added S-Carb®) and then all other chamber's ventilation rates adjusted to that Control level.

Results:

Chamber atmospheric ammonia levels were correlated with broiler performance and, more importantly, body weights *Coefficient of Variations*. With increasing levels of S-Carb®, body weights *Coefficient of Variations* decreased indicating that bird performance within flock (or within a single chamber) appeared to become inconsistent with no added S-Carb®. Significant differences ($P > 0.05$) were observed in body weights *Coefficient of Variations* (for both 21 and 42 days of age) when 0.40% S-Carb® was included in the ration continuously during the grow-out period.

Significant differences ($P > 0.05$) were observed in weight gain and mortality-adjusted feed conversion (for both 21 and 42 days of age) when 0.40% S-Carb® was included in the ration continuously during the grow-out period. In general, with increasing levels of S-Carb®, both weight gain and mortality-adjusted feed conversion improved. No differences were found in mortality between broilers consuming 0.20 to 0.40% S-Carb®, as compared to the control (containing no S-Carb®).