



## Effects of Ration Plus™ on Broiler Chickens Fed Antibiotic-Free Diets Added Pre- or Post-Pelleting in Heat Stress Environments.

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A 21-day trial was conducted with liquid and dry Ration Plus™ for Poultry (RP; AAFCO 36.11 Lactobacillus acidophilus fermentation product). RP was applied to antibiotic-free corn-soy based diets pre-pelleting with dry RP at 0, 0.05 or 0.10%, and post-pelleting with liquid RP at 0.05% in a soy-oil carrier. Pelleting was performed at 76.6°C (170°F). Straight-run Cobb 500 broiler (n= 768) chicks were randomly assigned to 32 pens of 24 chicks (8 replications/treatment). A live coccidia vaccine was administered at the hatchery. On day four, chicks were exposed to used litter from a healthy flock. Heat stress at bird-level was maintained at 35°C (95°F) on days 0-7, 38°C (100°F) on days 7-14, and 40°C (105°F) on days 14-21. Results showed that body weights were not affected by the supplement. Final results further demonstrated that the mortality adjusted feed conversion in the control group (1.46) was significantly (P<0.05) higher than in the 0.05% liquid RP group (1.30) and in both 0.05% and 0.10% dry RP groups (1.36 and 1.34, respectively). The three RP treatments, post-pelleted liquid, and pre-pelleted 0.05% and 0.10% dry, had significantly (P<0.05) lower mortality (13.1, 18.8 and 15.6%, respectively) than that of the control (30.7%). RP improved mortality adjusted feed efficiency and lowered mortality in broilers. Comparison of RP results pre- and post-pelleting indicated that RP was pellet stable under the reported trial conditions. These data suggest that RP dry formulation may be effective in minimizing broiler mortality caused by heat stress during the extremes of hot summer weather conditions.

Key Words: antibiotic-free, broiler, heat stress, pellet

### Pelleting Effects

Ration Plus™ applied in pelleted diets improved performance of broilers

Performance Parameter	Control	Ration Plus Application Dose (Method)		
		0.05% Dry (Pre-pelleted)	0.10% Dry (Pre-pelleted)	0.05% Liquid (Post-pelleted)
Body Weight (kg)	0.572 <sup>a</sup>	0.567 <sup>a</sup>	0.552 <sup>a</sup>	0.573 <sup>a</sup>
Mortality-adjusted Feed Conversion Ratio	1.46 <sup>a</sup>	1.36 <sup>ab</sup>	1.34 <sup>b</sup>	1.30 <sup>b</sup>
Mortality (%)	30.7 <sup>a</sup>	18.8 <sup>b</sup>	15.6 <sup>b</sup>	13.1 <sup>b</sup>

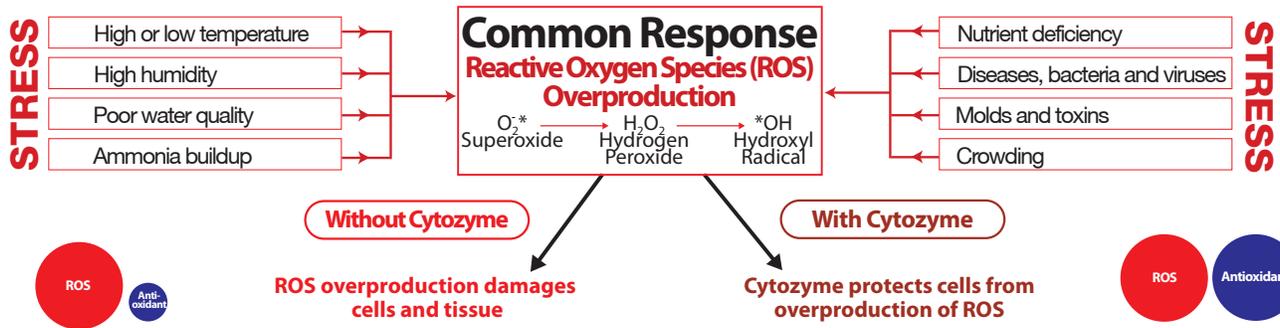
Means with different letters in a row indicate significant difference (P≤0.10 by LSD test).

Ration Plus™ supplemented through feed pelleted at 76.6°C (170°F) improved performance of Straight Run Cobb 500 broilers during 21 day evaluation under heat stress conditions.

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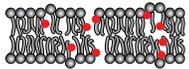
# Overcoming the Impact of Stress



Stress causes an excessive production of reactive oxygen species (ROS) in the cell structures. These molecules cause oxidative (free radical) damage to phospholipids (components of cell membranes), proteins and DNA. All these oxidation processes lead ultimately to cell death.

In a normal, healthy cell reactive oxygen species (ROS) are produced during processes involved in production of energy. ROS molecules act as important signaling molecules in a variety of cellular processes. In a healthy cell ROS are controlled and balanced by non-enzymatic antioxidant systems.

### Damaged membrane



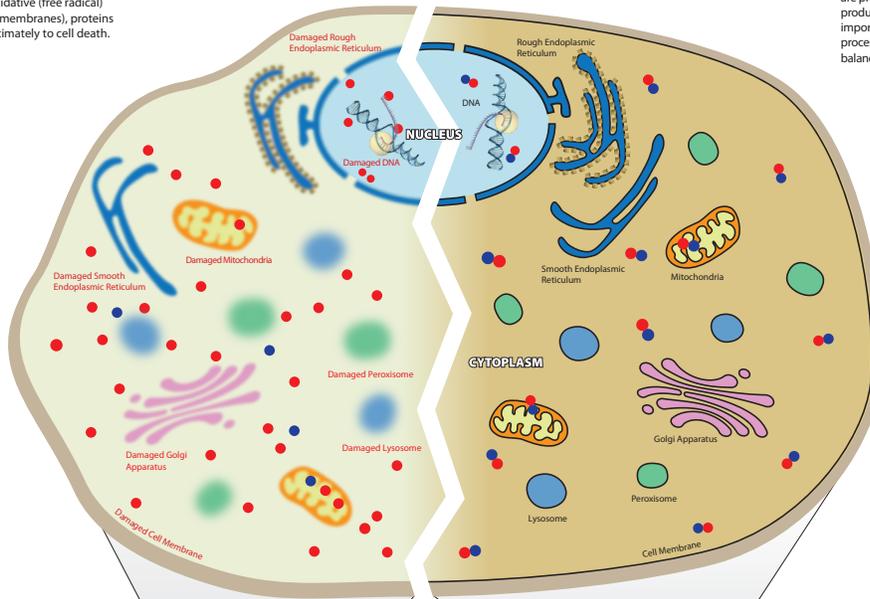
Oxidation of phospholipids leads to damage of membranes causing destruction of mitochondria, lysosomes, endoplasmic reticulum and cell membrane resulting in disintegration of cell structure.

### Protein breakdown and deactivation

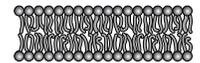


Oxidation of proteins leads to damage of their structure and deactivation of enzymatic activity resulting in disruption of metabolic processes.

### DNA damage mutations



### Healthy membrane



Membranes ensure cell compartmentalization and proper cell functions.

### Active proteins



Active proteins ensure optimal cell metabolism.

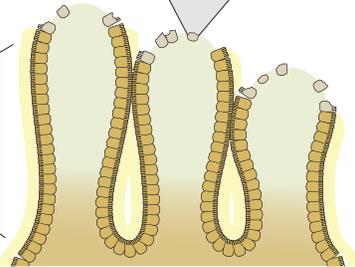
### Healthy DNA



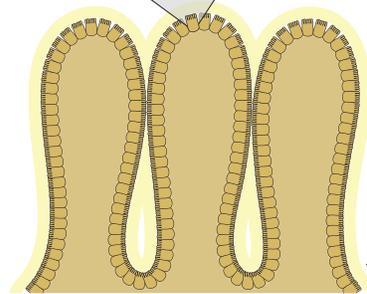
Healthy DNA ensures proper gene expression.



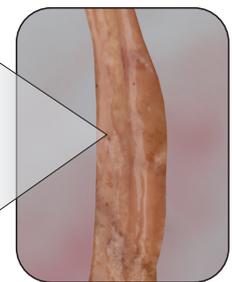
Lesion score 2



Cells damaged by excessive production of ROS lose their integrity and can not support functions of the epithelial barrier leading to tissue destruction, mucosal inflammation, infections and lesions in the intestinal wall. Damage of the intestinal wall causes reduction of digestion efficiency and poor nutrient uptake.



Cytozyme products help to protect tissue from overproduction of ROS keeping cells healthy and supporting overall gut functions.



Lesion score 0

**Conclusion: Cytozyme products protect cells from overproduction of ROS reducing the impact of stress on animal production and increasing performance.**