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AQUALYTE® SIGNIFICANTLY REDUCES HEAT STRESS IN TURKEYS

Dr. Mark E. Cook, Associate Professor at the University of Wisconsin, and Cheryl C. Miller have conducted a study examining the effects of **AQUALYTE®** on the performance of heat-stressed turkey toms. **AQUALYTE®** a water dispersible electrolyte/trace mineral powder manufactured by Dawe's Laboratories, was added to the drinking water of the turkey toms. **AQUALYTE®** was found to lower mortality and blood pH significantly. **AQUALYTE®** tended also to improve final animal weights, particularly when added immediately prior to acute heat stress.

Thirty-two, 13 week-old large white turkey toms were randomly assigned to treatment groups and placed in individual cages at the Biotron biological testing unit at the University of Wisconsin-Madison. Treatments consisted of distilled water (control), **AQUALYTE®** added to the drinking water for four weeks (beginning week 15 through week 18), **AQUALYTE®** added to water for two weeks (beginning at week 17 through week 18), and **AQUALYTE®** added to water for one week (week 18). **AQUALYTE®** was mixed daily at a rate of 227 g/128 gallons water.

Sixteen birds were housed in each of two chambers in the Biotron. Water and a pelleted feed containing Dawe's premix, **DQ TURKEY G/F WITH BIOGRO®** were provided ad libitum. Turkeys were placed on experiment after a one-week adaptation period. Temperatures were increased according to the schedule on Table 1. Temperatures were lowered to a high of 92° during week 18 due to high mortality. Blood pH and electrolytes were determined at the end of week 18. Birds were weighed and deprived of feed and water ten hours before slaughter at the University of Wisconsin Poultry Research Laboratory.

Table 1. Temperatures of the Biotron Chambers During Study a

Time	Period (weeks)		
	15 & 16	17	18b
8:00 AM - Noon c	75 ° - 85 °	75 ° - 90 ° -	75 ° - 95 °
Noon - 5:00 PM	85 °	90 °	95 °
5:00 PM - 10:00 PM c	85 ° - 75 °	90 ° - 75 °	95 ° - 75 °
10:00 PM - 8:00 AM	75 °	75 °	75 °

a Relative humidity = 75%

b Temperature range was 75 ° to 92 ° for the last five days of the study.

c Temperatures were gradually changed over the time period indicated.

Dr. Cook reported strong differences in response to heat stress between control birds and birds placed on **AQUALYTE®** just prior to the heat stress. For example, during week 18, when temperatures were increased to 95 °, mortality was quite high in the control group, but reduced for birds receiving **AQUALYTE®** for four and two weeks, and 67% lower ($P < .05$) in turkeys receiving **AQUALYTE®** beginning at week 18 (Table 2). Blood pH was also reduced ($P < .10$) for birds receiving **AQUALYTE®** beginning at week 18 compared with control birds and birds given **AQUALYTE®** beginning at week 15.

Table 2. Mortality and Blood pH of Heat Stressed Turkey Toms Receiving Water or Water with **AQUALYTE®** .

<u>Treatment</u>	<u>Mortality%^a</u>	<u>Blood pH^b</u>
Control	75	7.44
AQUALYTE® 4 weeks	67	7.45
AQUALYTE® 2 weeks	63	7.42
AQUALYTE® 1 week	25	7.35

a **AQUALYTE®** treatment (1 week) significantly differs from Control treatment ($P < .05$).

b **AQUALYTE®** treatment (1 week) significantly differs from Control and **AQUALYTE®** (4 weeks) treatments ($P < .10$).

Blood pH must be maintained within a very narrow range for the turkey to survive. Blood pH increases during heat stress in response to rapid respiration (panting). This increase in pH is partly responsible for increased mortality in heat stresses birds. Therefore, a reduction in pH may be responsible for decreased mortality in birds receiving **AQUALYTE®**.

AQUALYTE® tended to improve final turkey weights, with highest weights seen in birds receiving **AQUALYTE®** beginning the final week of the study. However, examination of overall animal performance in this study was limited, due to high mortality and reduced animal numbers. Field results have demonstrated improved weight gain and feed efficiency in turkeys receiving **AQUALYTE®**.

The small variation in mortality and blood pH between control birds and those receiving **AQUALYTE®** longer than one week, suggests that renal compensation may occur eventually during continuous intake of **AQUALYTE®**. Birds will begin to excrete through the kidney excess electrolytes, making them unavailable for reducing blood pH during heat stress. Perhaps such physiological adaptation may be avoided by a rotation system for **AQUALYTE®** (eg: one-week on, one-week off), or by increasing dosage. These alternatives will be the subject of future study, to determine whether the dramatic reduction in mortality already noted by Dr. Cook may be further improved.

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