

TECHNICAL SERVICE



BULLETIN



DAWE'S LABORATORIES USA: 3355 N. Arlington Heights Road • Arlington Heights, IL 60004 • (847) 577-2020 • FAX (847) 577-1898

No. 193-E

THE EFFECT OF ELECTROLYTES ON MOISTURE RETENTION DURING TRANSPORTATION STRESS ON TURKEYS

Robert W. Berg, PH.D., Professor and Extension Poultry Specialist
Dept. of Animal Science, University of Minnesota

There has been a considerable amount of interest in the loss of weight in turkeys being transported to market. Some of the loss is caused by the emptying of the digestive system. Many confined birds are loaded early in the morning and the birds have not eaten prior to loading. These birds will have less total loss but may have greater loss from dehydration if they are held on the truck more than six hours, especially in warm weather.

Studies have been conducted involving three processing plants in which electrolytes were given in the water 48 hours prior to loading. The electrolytes were given at the rate of 8 ounces of Dawe's Laboratories' **AQUALYTE®** per 128 gallons of water consumed by the turkeys.

Our studies involved weighing a sample of birds placed in the bottom cages on the truck at the time of loading. The birds were held over night on the truck and weighed at the processing plant just prior to killing. The same birds were weighed at time of loading and time of processing.

Table 1 shows the average weights of the turkeys at time of loading and the average weight at time of processing for the untreated and electrolyte-treated birds processed at three different plants.

TABLE 1. THE EFFECTS OF 48 HOUR AND NO ELECTROLYTE TREATMENT ON TRANSPORTATION
LOSS IN WEIGHT OF MARKET TURKEYS

DATE MARKETED	TREATMENT	AGE	SEX	AVERAGE LOADING WEIGHT (LBS.)	AVERAGE PLANT WEIGHT (LBS.)	AVERAGE TRANSIT LOSS (LBS.)	PERCENT TRANSIT LOSS
11/16/82	Controls	18 wks	Male	24.90	23.72	1.18	4.74
	Treated	18 wks	Male	25.14	24.04	1.11	4.40
02/21/83	Controls	20 wks	Male	28.28	27.29	.99	3.51
	Treated	20 wks	Male	28.83	28.08	.75	2.60
05/03/83	Controls	16 wks	Hens	14.37	13.88	.49	3.41
	Treated	16 wks	Hens	14.12	13.70	.42	2.97

From Table 1 there is a consistent advantage to the feeding of **AQUALYTE®** in the water 48 hours prior to loading for market. On November 16, 1982, the birds were without feed and water for 20 hours between weighings. Thus they show the highest loss in weight. The toms on February 21, 1983 were without feed and water 16 hours. The hens on May 3, 1983 were on the truck for 12 hours. This table indicates that the time on the truck does influence transportation loss. If one takes the results of the first test in which there was 0.07 pound advantage per bird for **AQUALYTE®** and apply that to 10,000 toms, it means 700 pounds

more turkey to market. Using the results of the second trial, where the advantage for electrolytes was 0.24 pounds per tom, this would mean 2,400 pounds more turkey. The hens show a 0.07 pound more per hen which equals 700 pounds more weight for 10,000 hens. This extra weight at the plant could mean dollars in your pocket.

The economic advantage from each test based on 10,000 birds calculates as follows:

Tom test November 1982 –

700 lbs. extra live weight valued at \$0.35 per lbs=		245.00
Less cost of AQUALYTE® at \$0.833 per packet x 28=		- <u>23.32</u>
Net Return		\$221.68

AQUALYTE® returned \$10.50 for each \$1.00 invested.

Tom test February 1983 –

2400 lbs. extra live weight valued at \$0.35 per lb. =		840.00
Less cost of AQUALYTE® at \$0.8333 per packet x 28 =		- <u>23.32</u>
Net Return		\$816.68

AQUALYTE® returned \$36.02 for each \$1.00 invested.

Hen test May 1983 –

700 lbs. extra live weight valued at \$0.35 per lb. =		245.00
Less cost of AQUALYTE® at \$0.833 per packet x 26 =		- <u>21.66</u>
Net Return		\$223.34

AQUALYTE® returned \$11.31 for each \$1.00 invested.

Note – Daily water consumption used for the calculations:
180 gallons per 1,000 toms and 165 gallons per 1,000 hens.

The toms marketed on February 21, 1983 were followed through the plant to also determine moisture pickup in the processing procedure. Table 2 shows the moisture pickup of the experimental birds.

TOMS TABLE 2

MOISTURE PICKUP OF ELECTROLYTE AND NON-ELECTROLYTE TREATED
GRADE A

	AVERAGE HOT EVIS. WEIGHT	AVERAGE CHILLED EVIS. WEIGHT	AVERAGE GAIN	PERCENT GAIN
	(LBS.)	(LBS.)	(LBS.)	(LBS.)
Controls	21.515	22.345	.830	3.858
Treated (48 hr)	21.681	22.493	.812	3.745

The fear of some processors that electrolyte-treated birds are going to absorb water like a sponge was not our experience. In fact, the controls took on slightly more than the 48 hour treated birds. This study indicates that **AQUALYTE®** has no effect on the moisture pickup of the muscles of the turkey. This demonstrates that the turkey has a very efficient and responsive kidney that does an excellent job of filtering out the excess electrolytes. The electrolytes may be increased in the blood stream, causing more

water to move out of the gut into the blood stream. But then the electrolytes are filtered out by the kidney. This may explain the cause of our results. There seems to be an immediate increase in the absorption of water but it has no effect on the muscle cells. This theory needs to be studied.

The use of **AQUALYTE®** in the water 48 hours prior to marketing at three different plants gave an advantage. Thus it seems logical that turkeys given electrolytes absorb more water out of the gut. But since turkeys do not urinate water, there is more water available to be eliminated through the respiratory system. Thus birds that are held on the truck for 12 to 24 hours lose less weight. One thing that needs to be measured is water consumption. Does the use of electrolytes increase water consumption and thus temporarily establish more water available to increase body fluids?

Another observation was an improvement in grade. The experimental toms marketed on February 21, 1983 had 56.67% grade A, whereas the controls had 43.33% grade A. These grades are very low because of the extra handling of these birds prior to loading. On May 3, 1983 the treated and non-treated hens were loading separately with one treatment to a truck. Over 1,500 hens were on each truck and they were processed as separate lots. Again, there was an advantage for the **AQUALYTE®** treated birds. The control birds graded 72.9% grade A whereas the treated birds graded 82.1% grade A. These hens were loaded with a mechanical loader and each lot handled as a commercial flock. Each lot had one bird condemned. Each lot was very similar in number of birds, mortality, and weight as they left the farm. The hens were processed as two separate lots and graded by the plant personnel, with no special treatment by the plant. From the production point of view, there should have been no reason for one group to grade better than the other. This was a very significant observation which needs further consideration.

The economics are significant for the hens on **AQUALYTE®** when considering that there is a premium of about \$0.04 to \$0.05 per pound processed weight for grade A birds. Applying the results of the hen test to a flock of 10,000 birds resulted in the following income:

AQUALYTE® birds at 82.1% grade A	=8210
Less control birds at 72.9% grade A	= <u>7290</u>
More grade A birds	920

Typical live weight at plant 13.75 lbs. x 82% yield = 11.28 lbs. processed weight 11.28
 lbs. processed weight x 920 birds = 10,377 lbs extra Grade A
 10,377 lbs. extra grade A x \$0.04 per lb = \$415.08 extra income

The hen test resulted in two cost advantages (more weight plus higher grade A) from **AQUALYTE®** as applied to a flock of 10,000 birds. The extra income is:

Extra income from weight retention	\$ 223.34
Extra income from more Grade A	+ <u>415.08</u>
	\$ 638.42

AQUALYTE® returned \$29.47 for each \$1.00 invested.

Extra income of \$1,039.88 from more grade A birds was realized in the tom test of February 21, as applied to a flock of 10,000 birds with a typical processed weight of 20.5 lbs. However, if the extra handling had not occurred, the grade difference probably would have been closer.

These studies involved three different flock and three different processing plants with each showing an advantage from the use of **AQUALYTE®** in drinking water 48 hours prior to loading for marketing.

No portion of this Bulletin may be reproduced without the permission of Dawe's Laboratories. Reprints are available upon request.