1976

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A.S. Series 76-9

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Previous experiments at this station have shown that we can expect a growth response of approximately 500 grams at maturity when extra copper (120 ppm of the diet) is fed to growing turkeys. This response is usually manifested during the later part of the growing period. Liver tissue analyses indicate that this level of dietary copper does not increase the amount of tissue copper. Since the extra copper apparently is not absorbed by the animal, perhaps part of the beneficial response comes from the effect of copper on the feed itself, i.e., by preventing growth of undesirable organisms. However, concern has been voiced that the extra copper in the manure of turkeys thus fed constitutes a pollutant and an environmental hazard. For this reason a fungicidin (Nystatin) was evaluated as a possible alternative for copper.

A total of 600 Large White poults were started and grown to market size in a windowless house containing 12 pens, each 3 x 4.25 meters in size. The four treatments consisted of the control series, control plus Nystatin at 50 gm per ton, copper at 120 ppm, and a combination of these levels of Nystatin and copper. Each treatment was replicated three times with 25 hens and 25 toms in each pen. During the growing period the poults were weighed individually and feed consumption was recorded on a pen basis. The hens were marketed at 16 weeks of age and the toms retained in their respective pens and on their treatments until 24 weeks of age. Five hens and 5 toms from each pen were slaughtered at market time to provide liver and artery samples. The poults were fed a series of low-protein diets, starting with 23% crude protein and stepped down at 4-week intervals to 12% during the final period. All diets were supplemented with methionine and lysine to meet the NRC recommended minimum levels. The energy values of the diets were formulated to 2800 Cal of M.E. per kg throughout the study.

There were no large weight differences due to dietary treatments. At 16 weeks of age, the hens fed the diets with Nystatin and Nystatin plus copper were significantly heavier than those fed the diet with only the copper supplement but were not significantly heavier than the controls. The weights of the controls and those fed the copper diet occurred in the same weight range. At 16 weeks, the toms fed the Nystatin diet were significantly heavier than the controls but not significantly heavier than those fed the copper diet. The weights of the toms fed the diets with copper alone, Nystatin plus copper, and the controls were not significantly different.

At 24 weeks of age, only the toms fed the copper diet were significantly heavier than the controls, although toms on the Nystatin and Nystatin plus copper treatments were included in this weight range. Also, weights of toms

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on the Nystatin and Nystatin plus copper treatments occurred in the range of the controls. Again, as in previous tests, the effects of added copper on growth became more pronounced at the end of the growing period.

The feed conversion ratios at both 16 and 24 weeks followed the same trend. Treatments 1 and 3 (control and Nystatin) allowed for slightly wider ratios (poorer efficiency) than treatments 3 and 4 which included added copper.

On a dry basis the copper content of the livers ranged from 13.2 to 15.2 ppm. There were no significant differences among treatments or among sexes. Based on observations in previous tests, seldom does the copper content of turkey liver exceed 20 ppm. Accordingly, these values shown here would all be considered well within the normal range.

In other trials it was found that feeding extra copper reduced the incidence of aortic rupture among toms. Also, there was a tendency to find a higher percentage of elastin in the birds fed extra copper. In this study, a small but significant increase in elastin of the anterior portion of the main systemic arteries was associated with the copper treatments in both sexes. In the posterior portion of the arteries, where the rupture usually occurs, there was a tendency toward higher elastin content. Only one death loss due to aortic rupture was observed in this test and it was found in a control pen.

Based on this test, it appears that the effects of Nystatin and copper on the growth of turkeys are comparable, with perhaps some advantage for feeding copper to toms over the longer growing period.

Table 1. Effects of Copper and Nystatin on the Market Weight, Feed Conversion, Liver Copper and Aortic Elastin of Growing Turkeys

Diet	Hens 16 wk	Toms 16 wk	Toms 24 wk
	kg	kg	kg
Market weights			
1. Control	6.813ab*	9.118b	14.575b
2. Control + Nystatin, 50 gm/T	6.907a	9.319a	14.732ab
3. Control + Nystatin + copper, 120 ppm	6.895a	9.115b	14.654ab
4. Control + copper, 120 ppm	6.751b	9.176ab	14.863a
Average	6.844	9.182	14.703

	Mixed sexes 16 wk	Toms only 24 wk
Units feed/unit gain		
1. Control	2.608	3.073
2. Control + Nystatin	2.608	2.982
3. Control + Nystatin + copper	2.492	2.938
4. Control + copper	2.510	2.915
Average	2.554	2.977

	Hens ppm	Toms ppm
Liver copper, dry basis		
1. Control	13.2	15.2
2. Control + Nystatin	13.8	14.6
3. Control + Nystatin + copper	13.8	14.2
4. Control + copper	13.5	14.2
Average	13.6	14.6

	Hens		Toms	
	Anterior %	Posterior %	Anterior %	Posterior %
Aortic elastin				
1. Control	11.4b*	2.4	12.4b	2.3
2. Control + Nystatin	11.2b	2.5	12.3b	2.1
3. Control + Nystatin + copper	12.0a	2.5	13.5a	2.7
4. Control + copper	12.6a	2.9	13.7a	2.6
Average	11.8	2.6	13.0	2.4

*Values within one column and parameter having the same superscript do not differ significantly (P>.01).