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Copper and Protein Levels as Affecting
Palatability of Turkeys

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Turkeys that were produced in the studies with copper and low and normal protein diets (see A.S. Series 71-11) have been evaluated for palatability using a taste panel, the Carver press for juiciness and the Lee-Kramer shear press for tenderness. The turkeys were slaughtered, eviscerated and water cooled, carcass yield and skin thickness were observed and the bagged carcasses held in frozen storage prior to cooking. None were held longer than 6 weeks. Broiler-type turkeys were roasted whole and the roaster-type as halves, four at a time, in an 160° C oven to an internal thigh temperature of 85° C.

Samples of the breast muscle (pectoralis minor) and thigh muscle (semi-tendinosus) were submitted to a taste panel for evaluation of appearance, flavor, tenderness, juiciness and overall rank. The breast (pectoralis major) and the remainder of the thigh were trimmed to fit the Lee-Kramer cell and the sheared sample then used in the Carver press. A portion of the sheared thigh meat (not pressed) was used to assay for total muscle fat and fatty acid analysis of that fat (see A.S. Series 71-12).

Neither the level of protein nor the copper supplement had any effect on palatability as shown by the summarized data in table 1 in that no marked effects were observed. The minor difference in tenderness scores may be real, in that not only did the taste panel indicate the turkeys fed copper to be slightly more tender, but also Lee-Kramer shear force values were lower for these treatments. The somewhat higher breast skin thickness scores, together with the slightly higher muscle fat contents, indicate that the copper-fed turkeys were carrying more finish. The copper treatment also allowed for greater dressing yield, to a greater extent on the low protein diets. This corresponds to the greater growth rates obtained with the copper and normal protein treatments.

The results from a third experiment just completed in general confirm the earlier results, see table 2. The 240 ppm copper treatment, although it allowed for the increased rates of growth and carcass yield, did not show evidence of any marked detrimental effects upon palatability. Although incidence of aortic rupture was very low for all treatment groups, slightly but significantly higher values for posterior aortic elastin were again obtained with the copper treatments.

These data indicate, therefore, that not only are there production advantages for copper, but also the effects on carcass value brought about by this treatment may be worthwhile. Also, the low protein diets, although supporting somewhat less growth, can be used to produce acceptable market turkeys.

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Table 1. Palatability of Roasted Turkeys (Experiments 1 and 2)

| | Low protein | | Normal protein | |
|--|-------------|-------------------|----------------|-------------------|
| | Basal | Copper 120 ppm | Basal | Copper 120 ppm |
| Broilers | | | | |
| 15 wk. wt., kg | 4.6 | 5.0 | 5.1 | 5.5 |
| Dressing yield, % | 77.9 | 80.4 | 79.6 | 80.9 |
| Skin thickness, mm | 4.0 | 5.0 | 4.3 | 4.9 |
| Roasters | | | | |
| 24 wk. wt., kg | 9.5 | 10.7 | 10.4 | 11.1 |
| Dressing yield, % | 82.6 | 84.5 | 83.8 | 84.5 |
| Skin thickness, mm | 9.6 | 10.9 | 10.0 | 10.9 |
| Palatability scores^a | | | | |
| Roasted appearance | 6.6 | 6.6 | 6.5 | 6.6 |
| Mean preference | 2.7 | 2.4 | 2.4 | 2.6 |
| Flavor | 6.2 | 6.2 | 6.1 | 6.1 |
| Tenderness | 5.9 | 6.2 | 5.8 | 6.0 |
| Juiciness | 4.7 | 4.8 | 4.9 | 4.8 |
| Carver press | | | | |
| % loss | 32.5 | 34.3 | 33.3 | 33.3 |
| Liquid, ml | 5.4 | 5.8 | 5.7 | 5.7 |
| Fat, ml | 0.2 | 0.2 | 0.3 | 0.3 |
| Lee-Kramer shear ^b | 648 | 607 | 655 | 611 |
| Muscle fat, % | 13.6 | 14.5 | 14.1 | 14.5 |

^a Averaged scores of 8 taste panel judges, higher value preferred.

^b Maximum force per 100 gm, lower value preferred.

Table 2. Palatability of Roasted Turkeys (Experiment 3 - All Low Protein)

| | Basal | Copper 120 ppm | Copper 240 ppm |
|--|-------|-------------------|-------------------|
| Broilers | | | |
| 15 wk. wt., kg | 4.9 | 5.4 | 5.3 |
| Dressing yield, % | 80.2 | 82.6 | 82.7 |
| Skin thickness, mm | 4.8 | 6.5 | 6.2 |
| Roasters | | | |
| 24 wk. wt., kg | 12.2 | 12.6 | 12.7 |
| Dressing yield, % | 80.2 | 82.0 | 79.6 |
| Skin thickness, mm | 10.9 | 10.3 | 12.4 |
| Palatability scores^a | | | |
| Roasted appearance | 6.3 | 6.4 | 6.4 |
| Mean preference | 2.7 | 2.5 | 2.5 |
| Flavor | 6.0 | 5.9 | 6.0 |
| Tenderness | 5.8 | 5.6 | 5.7 |
| Juiciness | 4.2 | 4.3 | 4.3 |
| Carver Press | | | |
| % Loss | 31.9 | 31.9 | 31.6 |
| Liquid, ml | 5.6 | 6.0 | 5.9 |
| Fat, ml | 0.3 | 0.2 | 0.2 |
| Lee-Kramer shear ^b | 676 | 647 | 685 |
| Muscle fat, % | 19.0 | 19.8 | 16.8 |

^a Averaged scores of 8 taste panel judges, higher value preferred.

^b Maximum force per 100 gm sample, lower value preferred.