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A.S. Series 74-18

Effects of Copper on Turkey Lipids
and Palatability

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Large Broad White turkeys were fed from one day of age to market weight on low protein diets with and without two forms of copper (sulfate and oxide) to supply 120 ppm. As reported previously (A.S. Series 73-22 and A.S. Series 73-25), copper enhanced growth but had no consistent effect upon fatty acid composition.

The turkeys so obtained were processed and roasted to an internal temperature of 85° C and evaluated by a trained taste panel for flavor, tenderness, juiciness and overall rank. Four were roasted each day during a 12-day period for a 48-bird total. Hydraulic presses were used to physically ascertain juiciness (Carver Press) and tenderness (Lee-Kramer Shear). Muscle fat and liver copper contents were determined. The results are presented in Table 1 (broiler-type) and Table 2 (roaster-type).

Both types of turkeys showed copper sulfate to enhance dressing yield and produce the greatest amount of fat in the thigh muscle. The dietary treatment, however, had no consistent effect on cooking losses or the palatability scores. Breast meat of the broilers was less juicy than that of the roasters, whereas for thigh meat the broilers were most juicy. Tenderness and flavor scores were very similar for both types of turkeys irrespective of dietary copper. Liver copper was not materially altered by the dietary intake.
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These data indicate that copper treatment should not influence consumer acceptance of turkeys so fed. The improvement in dressing yield and the increase in muscle fat would be important advantages, which, together with the improved growth responses, make copper a valuable addition to turkey growing diets.

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Table 1. Effect of Copper Sources on Carcass Parameters and Palatability of Broiler Turkeys

Criteria	Basal	Cu ₂ O 120 ppm Cu	CuSO ₄ 120 ppm Cu
Dressing yield, %	82.1	82.9	83.4
Skin thickness, mm	6.2	5.9	6.2
Cooked thigh muscle fat, %	9.6	8.2	12.0
Liver copper, ppm	13.69	15.18	14.44
Cooking losses, %			
Drip	7.9	6.8	7.9
Total	20.9	20.2	20.2
Breast			
Appearance	6.5	6.5	6.4
Preference	2.5	2.4	2.7
Flavor	6.1	6.2	5.8
Tenderness	5.8	6.1	5.9
Juiciness	3.5	3.7	3.8
Carver Press loss, %	33.7	31.7	34.2
Liquid, ml	6.2	6.0	6.5
Lee Kramer shear	651	776	662
Thigh			
Appearance	6.3	6.4	6.3
Preference	2.5	2.8	2.3
Flavor	6.0	5.9	5.9
Tenderness	5.7	5.4	5.9
Juiciness	4.8	4.7	4.8
Carver Press loss, %	36.8	39.8	38.9
Liquid, ml	6.5	7.4	6.4
Fat, ml	0.6	0.5	0.7
Lee Kramer shear	733	679	702

Table 2. Effect of Copper Sources on Carcass Parameters and Palatability of Roaster Turkeys

Criteria	Basal	Cu ₂ O 120 ppm Cu	CuSO ₄ 120 ppm Cu
Dressing yield, %	83.1	84.5	85.6
Skin thickness, mm	11.3	10.9	12.2
Cooked thigh muscle fat, %	13.9	13.7	16.0
Liver copper, ppm	13.64	13.09	13.82
Cooking losses, %			
Drip	7.3	7.8	7.9
Total	23.4	24.3	24.2
Breast			
Appearance	6.6	6.4	6.5
Preference	2.4	2.8	2.5
Flavor	6.2	6.0	6.1
Tenderness	5.9	5.9	6.1
Juiciness	4.6	4.3	4.6
Carver Press loss, %	37.6	35.2	37.8
Liquid, ml	7.2	6.5	7.2
Lee Kramer shear	646	656	542
Thigh			
Appearance	6.1	6.1	6.2
Preference	2.2	2.5	2.8
Flavor	5.8	5.9	6.0
Tenderness	5.1	4.7	4.6
Juiciness	4.2	4.1	3.8
Carver Press loss, %	36.8	34.9	35.8
Liquid, ml	5.7	5.4	5.7
Fat, ml	0.9	0.9	0.9
Lee Kramer shear	759	788	744