

South Dakota State University

Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange

South Dakota Poultry Field Day Proceedings and
Research Reports, 1973

Animal Science Reports

1973

Dietary Energy Level and Copper Source and Their Effects on Fat Composition of Turkeys

R. A. Nelson

C. W. Carlson

Follow this and additional works at: http://openprairie.sdstate.edu/sd_poultry_1973

Recommended Citation

Nelson, R. A. and Carlson, C. W., "Dietary Energy Level and Copper Source and Their Effects on Fat Composition of Turkeys" (1973). *South Dakota Poultry Field Day Proceedings and Research Reports, 1973*. Paper 14.
http://openprairie.sdstate.edu/sd_poultry_1973/14

This Report is brought to you for free and open access by the Animal Science Reports at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in South Dakota Poultry Field Day Proceedings and Research Reports, 1973 by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

South Dakota State University
Brookings, South Dakota

Department of Animal Science
Poultry Section

A.S. Series 73-25

Dietary Energy Level and Copper Source and Their Effects
on Fat Composition of Turkeys

R. A. Nelson and C. W. Carlson¹

Research suggesting a relationship between diet and blood cholesterol levels has caused people to become more concerned about the type of fat in their diets. If the claims by the American Heart Association turn out to be right, the livestock and meat industries need to be ready to meet the change in consumer demand. Past experiments at this station have shown that fat type could be readily altered by diet. Other research with swine has shown copper additions increase the level of unsaturated fats.

Two experiments that considered the effect of copper or yellow grease additions on fatty acid composition have been conducted. Carcasses from the growth study reported here (A.S. Series 73-22) and the growth study reported last year (A.S. Series 72-15) were made available for this work.

Adipose tissue collections were taken at slaughter. Two methyl esters were made of each fat sample and these, in turn, were analyzed in replicate for fatty acid content by gas-liquid chromatography.

The addition of yellow grease to the diet (Table 1) caused highly significant increases in myristic, stearic and oleic acids and highly significant decreases in linoleic and linolenic acids. Advancing age caused a highly significant effect on myristic, stearic, palmitoleic and oleic acids. The decrease in saturated fatty acids and the increase in the monounsaturated fatty acids can be attributed to the increased level of corn, and therefore corn oil, in the diet of the older age birds. Copper supplementation (Table 2) did not increase the extent of total fat unsaturation as had been reported for swine. Neither was there a consistent alteration in individual fatty acid contents due to copper supplementation.

¹Superintendent, Poultry Research Center, and Professor and Leader, Poultry Research and Extension.

Table 1. Effect of Age and Yellow Grease (High Energy) Addition on Fatty Acid Composition of Adipose Tissue of Turkeys

	Energy level				Yellow grease effect		Age effect	
	Normal	Normal	High	High	Normal	High energy	Weeks	
	15	23	15	23			15	23
No. of turkeys	9	10	10	10	19	20	19	20
Saturated, %	33.3	30.0	35.2	33.0	31.6	34.1	34.3	31.5
Myristic, %	1.4	0.8	1.6	1.3	1.1	1.5	1.5	1.1
Palmitic, %	22.5	21.7	22.2	22.1	22.1	22.2	22.4	21.9
Stearic, %	9.5	7.4	11.4	9.5	8.4	10.5	10.4	8.5
Unsaturated, %	66.7	70.0	64.8	67.0	68.3	65.9	65.7	68.4
Palmitoleic, %	3.5	5.1	3.2	4.0	4.3	3.6	3.4	4.6
Oleic, %	32.1	34.2	36.8	38.4	33.1	37.6	34.5	36.3
Linoleic, %	29.4	29.0	23.3	23.1	29.2	23.2	26.3	26.0
Linolenic, %	1.7	1.8	1.5	1.5	1.8	1.5	1.6	1.7

Table 2. Effect of Copper Source on Fatty Acid
Composition of Adipose Tissue in Turkeys

Treatment	Control	120 ppm Copper oxide	120 ppm Copper sulfate
No. of turkeys	16	16	16
Saturated, %			
Myristic, %	0.8	0.9	0.9
Palmitic, %	25.2	24.2	25.0
Stearic, %	8.1	9.1	8.6
Unsaturated, %			
Palmitoleic, %	5.3	4.7	5.0
Oleic, %	35.9	35.0	34.8
Linoleic, %	24.7	26.1	25.8