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Cholesterol Content of Chicken Skin

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ABSTRACT

In order to resolve conflicting reports on the cholesterol concentration in chicken skin, we have assayed cholesterol in skin by gas-liquid chromatography. The mean content for six chickens was 71 mg/100g raw skin. Thus the suggestion that chicken skin is particularly high in cholesterol is probably not correct.

INTRODUCTION

WIDELY DIVERGENT FIGURES have been published for the cholesterol content of chicken skin (Sweeny and Weihrauch, 1976). Mickelberry et al. (1966) reported values of 106.7-111.4 mg/100g, similar to that in other chicken tissues and in beef or pork. From the data of Marion and Woodroof (1965), however, a value of 428 mg/100g can be deduced, which would put chicken skin on a par with high-cholesterol foodstuffs such as eggs and liver as far as cholesterol content is concerned. As this question is of importance to nutritionists, we have redetermined the cholesterol content of chicken skin by gas-liquid chromatography.

MATERIALS & METHODS

SIX CHICKENS (five deep-frozen and one fresh) were obtained locally from five different shops. Weights ranged from 1014-1248g. The total skin was separated from half of each carcass and homogenized. After homogenization, tissue samples of 10g were refluxed for 30 min with 100 ml 2M NaOH in 96% ethanol. The hydrolysate was first mixed with 100 ml benzene and then with 100 ml 2M aqueous KOH. The benzene layer was separated and washed free from alkali with water. One ml was combined with internal standard, dried down and silylated with 1.25M N,O-bis-silylacetamide in dimethylformamide (Trisyl-BSA, Pierce).

The silyl ethers were analysed on a Varian 2100 gas chromatograph with flame ionization detector. The 6 ft column was packed with 1.5% XE-60 on Varaport 30. Oven temperature was 230°C. Pure cholesterol (Merck 24622) and 5α-cholestane (Serva 17060) were used as calibration and internal standard, respectively.

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RESULTS AND DISCUSSION

AS THE VALUES for the cholesterol content in the fresh broiler tissues were very close to the average of the deep-frozen samples only the combined data are presented here.

The average cholesterol content of total skin was 71 mg/100g wet tissue (range, 58-95). If we take into account the many possible sources of biological variation, then our results appear to be in reasonable agreement with those of Mickelberry et al. (1966), who reported a value of 106.7-111.4 mg/100g. Marion and Woodroof (1965), however, reported a concentration per 100g of broiler skin tissue of 361 mg cholesterol and 111 mg cholesterol esters. As the lipids were quantitated by weighing, the latter figure should be corrected for the weight of fatty acids in the esters. According to the data of Marion and Woodroof these accounted for about 44 mg. This leaves a total content of 428 mg/100 g, expressed as unesterified cholesterol. It seems unlikely that such a high value could be due to biological variation alone. Marion and Woodroof already pointed out, that it was possible that materials other than cholesterol were included in the cholesterol fraction in their study: it was noted that yellow pigments were eluted at the interface of the triglyceride and cholesterol fractions, and these pigments were weighed with these fractions. In the light of the findings of Mickelberry et al. (1966) and the figures reported here it appears likely, that the high value reported by Marion and Woodroof was erroneous.

REFERENCES

Marion, J.E. and Woodroof, J.G. 1965. Lipid fractions of chicken broiler tissues and their fatty acid composition. J. Food. Sci. 30: 38.

Mickelberry, W.C., Rogler, J.C., and Stadelman, W.J. 1966. The influence of dietary fat and environmental temperature upon chick growth and carcass composition. Poult. Sci. 45: 313.

Sweeny, J.P. and Weihrauch, J.L., 1976. Summary of available data for cholesterol in foods and methods for its determination. Crit. Rev. Food. Sci. Nutr. 8: 131.

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