

INTRAMUSCULAR FAT AND CHOLESTEROL IN BEEF AND POULTRY MEATS

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SUMMARY

The quality and quantity of intramuscular fat, the fatty acid composition and the total cholesterol content were determined in 12 beef muscles from 50 grass fed steers and in chicken breasts, legs and thighs from 50 chickens respectively. The percentage range of intramuscular fat was from 1% in Semimembranosus beef muscle and in chicken breast without skin to 9.5% in chicken breast with skin. The cholesterol contents were from 42 mg/100 g in chicken breast without skin to 65 mg/100g in chicken thigh without skin. The percentages of saturated, monounsaturated and polyunsaturated fatty acid from the different meats are presented.

Introduction

The quality and quantity of meat lipids are a great concern for consumers and nutritionists. Due to the influence of production practices on the characteristics of meat lipids it is necessary to have precise local data on this subject. Beef, one of the major food in Argentina, contributes significantly to the total caloric intake as well as the to the total consumption of fat. Although there is much information on the lipids in various beef samples, most of it was collected for other purposes and can be used as compositional data only with difficulty, since there is often a lack of details about sample description, collection, preparation, and analysis. The intramuscular fat content, its fatty acid composition and cholesterol content were determined in 12 beef muscles from 50 steers and in 50 chickens of leading brands obtained in several retail shops at Buenos Aires and Gran Buenos Aires.

Materials and methods

Samples:

Twelve beef cuts from 50 Aberdeen Angus steers placed on full feed on a mixed pasture and slaughtered in standard conditions. The half carcass weight was 107 ± 10 and the fat degree was 1, according to National Meat Board official regulations. The muscles analyzed were Semimembranosus (SM), Biceps femoris (BF), Semitendinosus (ST), Tensor fascia latae (TFL), Gluteous superficialis et medius (G), Longissimus dorsi at 4-5th and 10-12th ribs, Rectus femoris (RF), Adductor superficialis (A), Infraspinatus (I), Psoas major (PM) and Supraspinatus (S). Breasts (B), legs (L) and thighs (T) without skin and breasts with skin (BWK) from 50 chickens from leading brands with an average carcass weight of 2.0 ± 0.21 kg. Aliquot samples from all of them were dried and extracted with boiling hexane during 16 hs to determine the percentage of chemical fat (IMF%) or extracted according to Folch et al. (1957). Aliquot samples from the final chloroform extract were used for cholesterol (CHO) and fatty acid analysis (García et al., 1992).

Results and discussion

The percentages of intramuscular fat (IMF%) are shown in Table 1. The lower values (1-1.1 %) were for SM and BF beef muscles and for the chicken B and the highest (9.5%) was for chicken BWS. The percentage of fat in the skin was very high (45.9 ± 5.4 in the leg and 40.1 ± 7.6 in the breast areas respectively). The coefficient of variation (CV%) in the beef muscles were between 23 for the S to 37 for ST. The relatively low values of IMF% and CV% in beef muscles are explained for the low energy and the similarity of the diet in a natural grass fed systems as occurs in Argentina. The IMF% contents in chicken meat are in general similar to the results of Kyung & Gandemer (1987). They found 1.1-1.2% in B, 4.5-4.6% in legs and 32-36.5% in

skin. Type of production system (genetic, carcass weight, age, diet, degree of fatness, etc.) could explain the differences.

The total cholesterol content (mg/100g of fresh muscle) in the different meats are shown in Table 2. The values were from 42 mg/100g in B to 65 mg/100g in L. The CV% were smaller compared to the ones from IMF% and show the relative independence of cholesterol content in meat with production variables. This results are similar to the ones of several authors that consider very difficult to alter cholesterol content in meats by production practices. These results and the previous data for IMF% showed that it is necessary for a correct diet preparation to have precise data for the specific muscle in each animal species and to avoid the use of generalized data.

The percentages of saturated (14:0+16:0), monounsaturated (16:1+18:1) and polyunsaturated (18:2+18:3+20:3+20:4) fatty acids in the studied meats are shown in Figure 1. and can be used for our nutritionists for diet preparation.

Important differences in P/S ratio between beef or chicken lipids were found and should be considered in diet formulations.

Conclusions

The percentages of intramuscular fat and the cholesterol content depend on the specific muscle in each meat specie and it is not correct to use generalized data. The consumer needs information for each specific type of meat.

References

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Table 1: Intramuscular fat (%) in the different meats

Table 2: Cholesterol content in the different meats (mg/100g)

Figure 1: Total saturated, mono and polyunsaturated fatty acids in beef cuts

Figure 2: Total saturated, mono, and polyunsaturated fatty acids in poultry meat