

STUDY OF THE FATTY ACID PROFILE FROM FILLETS OF BROILERS AFFECTED BY DEEP PECTORAL MYOPATHY

A. Giampietro Ganeco^{1*}, H. Borba², M. R. Pereira², E. A. Villegas-Cayllahua², É. N. F. Cavalcanti², F. B. Ferrari², R. F. Oliveira², and M. A. Trindade¹,

¹Department of Food Engineering, University of São Paulo–USP, Pirassununga, Brazil,

²Department of Technology, São Paulo State University–UNESP, Jaboticabal, Brazil,

*giampietroganeco@gmail.com

I. OBJECTIVES

Deep pectoral myopathy (DPM) is characterized by necrosis and atrophy of the *supracoracoideus* muscle, which exhibits variations in color ranging from a pinkish hemorrhage-like appearance to a grayish-green discoloration. This study aimed to evaluate the fatty acid profile in *Pectoralis major* (fillet) muscle from broiler affected by DPM.

II. MATERIALS AND METHODS

Breast samples were collected from broilers affected by DPM, Cobb 500 strain and slaughtered with 45 d of age. The classification was according to the methodology used by Bilgili and Hess (2008): DPM score 2—muscles with coagulative necrosis, fibrous tissue texture, and pink to plumb; DPM score 3—muscles with green necrotic area. The *Pectoralis major* muscle (fillet) was removed from the poultry carcasses, and the fatty acid profile was isolated by the method described by Bligh and Dyer (1959), which extracts the lipid phase from the sample; the esterification of fatty acids was performed according to the method proposed by Maia and Rodriguez-Amaya (1993) using a Shimadzu 14B gas chromatograph (Shimadzu Corporation, Kyoto, Japan) equipped with a flame ionization detector and a fused silica capillary column (Omegawax 250) with H₂ used as the carrier gas. The identification of peaks was made by comparison with retention times of standards with known composition. This study used a randomized design (Unaffected, DPM score 2, and DPM score 3) with 50 repetitions each; results were submitted to analysis of variance using the GLM procedure of SAS operating system (SAS Institute Inc., Cary, NC), and means were compared by a Tukey test at 5% significance.

III. RESULTS

There was no difference ($P < 0.05$) in fatty acid profile only for C10:0, C15:0, C17:0, C20:0, and C18:2c9,t11. The fatty acid profile of C20:5n3 and C22:6n3 are considered to be important for human health, and there was a difference ($P > 0.05$) between meats unaffected by myopathy (normal) and the affected group (DPM score 2 and 3). Polyunsaturated fatty acids are considered to be important nutrients and structural components in cell membranes to regulate human health. Diet as a way of controlling the risk of disease in humans is of considerable interest, and higher values were found in myopathy-unaffected meats too. However, C18:1n9c and C18:2n6c are considered to be important for human health too and are higher in meat from broilers with myopathy. For C14:0 and C16:0, there was a difference ($P > 0.05$), and normal meat had lower values. Meat from broiler fillets affected by DPM showed higher values for monounsaturated fatty acids in poultry unaffected meat by myopathy.

Table 1. Mean values and standard deviation of fatty acid profile of *Pectoralis major* muscle samples affected by deep pectoral myopathy (DPM).

Fatty acid	Unaffected	DPM score 2	DPM score 3	P-value
C10:0	0,000	0,000	0,000	0,0500
C12:0	0,000 ^B	0,013 ^A	0,003 ^{AB}	0,0202
C14:0	0,283 ^B	0,380 ^A	0,383 ^A	0,0003
C15:0	0,083	0,076	0,078	0,5801
C16:0	22,001 ^B	23,060 ^A	23,210 ^A	0,0083
C17:0	0,130	0,135	0,125	0,5229
C18:0	11,561 ^A	8,043 ^B	9,595 ^B	0,0069
C20:0	0,076	0,085	0,081	0,1144
Total SFA³	56,501^A	31,792^B	33,475^B	0,0005
C14:1	0,030 ^B	0,058 ^A	0,055 ^A	0,0050
C16:1	1,258 ^B	2,121 ^A	2,198 ^A	0,0094
C 17:1	0,125 ^A	0,050 ^B	0,038 ^B	0,0006
C18:1n9c	20,913 ^B	28,798 ^A	25,592 ^A	0,0005
C18:1n7	2,758 ^A	1,798 ^B	2,758 ^A	<0,001
C20:1n9	0,285 ^A	0,260 ^{AB}	0,238 ^B	0,0455
Total MUFA³	25,369^B	33,085^A	30,879^A	0,0006
C18:2n6c	19,535 ^B	27,758 ^A	25,422 ^A	0,0001
C18:2c9,11	0,015	0,011	0,013	0,8752
C20:2	1,245 ^A	0,540 ^B	0,668 ^B	0,0005
C18:3n6	0,118 ^B	0,176 ^A	0,195 ^A	0,0026
C18:3n3	0,5517 ^C	1,926 ^A	1,506 ^B	<0,001
C20:3n6	1,341 ^A	0,691 ^B	1,030 ^{AB}	0,0062
C20:3n3	0,158 ^A	0,065 ^B	0,086 ^B	0,0013
C20:4n6	9,328 ^A	2,960 ^B	4,545 ^B	<0,001
C22:4n6	3,048 ^A	0,991 ^B	1,386 ^B	<0,001
C20:5n3	0,430 ^A	0,125 ^B	0,201 ^B	<0,001
C22:5n3	1,905 ^A	0,556 ^B	0,823 ^B	0,0002
C22:6n3	1,016 ^A	0,316 ^B	0,481 ^B	<0,001
Total PUFA³	38,70^A	36,115^B	36,356^B	0,0399

¹ DPM score 2- muscles with coagulative necrosis, fibrous tissue texture and pink to plum; DPM score 3- muscles with green necrotic area. Means followed by distinct letters (in the columns) differ by Tukey's test (P<0.05%). ²SFA = saturated fatty acid; MUFA = monounsaturated fatty acid; PUFA = polyunsaturated fatty acid.

IV. CONCLUSION

DPM that occurs in the *supracoracoideus* muscle influences the composition of fatty acid profile of the *Pectoralis major* (fillet) muscle of broilers. This is a disadvantage for the consumer market in the search for healthier meat, and there is clear evidence of the nutritional benefits of consumption.

Acknowledgments: To the Foundation for Research Support of the State of São Paulo (FAPESP) for the support provided (case number 2019/09707-6).

Keywords: breast, *Pectoralis major* muscle, *supracoracoideus* muscle