

INFLUENCE OF WOODEN BREAST MYOPATHY ON THE COLOR OF BROILER BREAST MEAT

Pedro A. de Souza^{1*}, Mateus R. Pereira¹, Erick A. V. Cayllahua¹, Ana V. L. Dias¹, Rodrigo F. de Oliveira², Rodrigo A. de Souza¹, Aline G. Ganeco¹, Juliana L. M. de Mello¹, Hirasilva Borba¹

¹Department of Agricultural and Environmental Biotechnology, Faculty of Agricultural and Veterinary Sciences, São Paulo State University, Brazil

²Centre for Agricultural Sciences and Technologies, State University of North Fluminense Darcy Ribeiro. Brazil

*Corresponding author email: hrasilva.borba@unesp.br

I. INTRODUCTION

With the need to increase food production, the poultry industry has been constantly improving its production rates, this sector employs various tools, one of them being genetic improvement breeding, aiming to increase the weight of the noble parts of the chicken in a fixed time interval. However, this improvement for a fast growth caused the appearance of pectoral myopathies, being one of them, the wooden breast myopathy (WB), which can be divided into three degrees: the normal (when chicken breast fillets do not present the myopathy), the moderate (when chicken breast fillets present hardened consistency and pale colour in the cranial area of the fillet, and may contain few white streaks) and the severe (when chicken breast fillets present hardened and pale consistency throughout the muscle, and may present a large amount of white streaks) [1]. We can see this myopathy cause a change in the colour of the broiler breast, and this fact is very important because it is linked to the acceptability of the final consumer. Therefore, the present work aims to invest the influence of the wooden breast myopathy on the colour of the broiler breast meat.

II. MATERIALS AND METHODS

For the study, 30 male broilers of the Cobb 500 strain were used, slaughtered at 46 days of age; after slaughter, the samples were classified according to the appearance of WB in the breast of chickens through the characteristics recommended in the literature [1]. After classification, we separated the samples in a completely randomized design (CRD), with 10 broilers classified as Normal (absence of myopathy), 10 broilers classified as Moderate WB, and the other 10 broilers classified as Severe WB. The colour was determined using a Minolta Chrome Meter model CR-400 colorimeter, which uses the CIELAB system (L, a* and b*). Parameters such as luminosity (L*), red intensity (a*) and yellow intensity (b*) of the breast were evaluated. Coloration was determined at the time of boning, on the surface of the breast muscle (previously in contact with the skin) in three different regions (cranial, median and cauda), and then the average of the three measurements was taken to obtain the total colour of the muscle. Subsequently, the hue angle (h*) in degrees was calculated using the formula: $h^* = (\arctan(b^*/a^*) \times 57,3)$. Where arctan means tangent arc; and 57.3 is the factor that converts the result of h*, which was in radians to the unit degrees [2]. Data were analysed using the One-Way ANOVA procedure of the Statistical Analysis System program (SAS Institute Inc, Cary, NC) [3], the results submitted to analysis of variance and means compared using the Tukey test with significance set at $P < 0.05$.

III. RESULTS AND DISCUSSION

We can see in Table 1 the test of means and standard deviations of luminosity (L*), red intensity (a*), yellow intensity (b*) and hue angle (h*) of the breasts of broilers affected or not by WB.

Table 1. Means and standard deviations of luminosity (L*), red intensity (a*), yellow intensity (b*) and hue angle (h*) of the breasts of broilers affected or not by WB.

Myopathy	Luminosity (L*)	Red intensity (a*)	Yellow intensity (b*)	Hue angle (h*)
Normal	72,480 ^A	2,910 ^A	7,580 ^A	70,920 ^A
Moderate	70,690 ^A	3,080 ^A	5,890 ^B	57,480 ^B
Severe	72,540 ^A	3,980 ^A	4,640 ^B	54,890 ^B
P-value	0,3262	0,1989	0,0002	<0,0001
RSD/SE				
Normal	4,148	38,830	20,050	7,021
Moderate	4,128	50,003	33,151	11,519
Severe	4,521	36,231	24,784	7,928

^{A-B} Means followed by different capital letters in the same column differ by Tukey's test (P<0.05).

Through these results we can see that there is a drop in the intensity of yellow and a drop in the degree of tonality with the onset of myopathy, these results make the WB meat have a redder tone when compared with the meat from chicken breasts that were not affected by myopathy. This result is due to the appearance of haemorrhagic spots characteristic of this myopathy [4].

IV. CONCLUSION

Due to the appearance of haemorrhagic spots on the surface of broiler breasts, WB affects the coloration of broiler breasts, leaving them more reddish, a fact that may influence the acceptability of the final consumer.

ACKNOWLEDGEMENTS

This study was supported by Fundação de Amparo à Pesquisa do Estado de São Paulo (2021/05341-7).

REFERENCES

1. Maiorano, G. (2017). Meat defects and emergent muscle myopathies in broiler chickens: implications for the modern poultry industry. *Scientific Annals of Polish Society of Animal Production* 13: 43-51.
2. Ramos, E. M. & L. A. M. Gomide. (2007). *Avaliação de qualidade de carnes: Fundamentos e metodologias*. Viçosa: Editora da Universidade Federal de Viçosa.
3. SAS Institute. (2002-2003). *SAS user's guide: statistics*. North Carolina: SAS Institute Inc.
4. Cai, K., Shao, W., Chen, X., Campbell, Y. L., Nair, M. N., Suman, S. P., Beach, C. M., Guyton, M. C. & Schilling, M. W. (2018). Meat quality traits and proteome profile of woody broiler breast (pectoralis major) meat. *Poultry Science* 9: 337–346.