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Poultry Meat Affected by White Striping Anomaly and its Implications in Lipid Oxidation Levels (#281)

Natalia M. Leite, Jorge N. Inoue, Lilian W. Hasunuma, Mayka R. Pedrao, Fabio Coro, FC and MRP are CNPq research fellows

Federal Technological University of Parana, PPGTAL, Londrina, Brazil

Introduction

The poultry industry in recent years, considering the necessity to obtain carcasses with more quality, aiming most higher weight and yield, technological advances were improved regarding genetic selection and new handling and nutrition strategies, however, these purposes led to histological and biochemical changes, resulting from this new generation of broilers, impairing certain traits in the quality of the meat. Due to this alteration in muscle tissue, emergent pectoral myopathy called white striping (WS) was observed. Disorders in the chest muscle classified as WS are visible in raw cuts with appearance of white "scars" parallel to muscle fiber on the surface of the *Pectoralis major* muscles. They usually start at the cranial portion of the breast fillet, near the point of insertion of the wing and may present several levels of severity (Kuttapan et al., 2012). According to Petracci et al. (2014) and Soglia et al., (2015), WS poultry breasts have a higher lipid content, which increases accordingly with severity of the anomaly. It is known that there is higher lipid content in these kind of meats, but there is still little data on lipid oxidation rates. Facing this context, the present work has as main objective to evaluate the lipid oxidation and warmed over flavor (WOF) in poultry meat meat affected with WS.

Methods

A total of 20 carcasses were collected, 10 WS classified as moderate and severe and 10 breasts classified as normal. The samples were conditioned and kept under refrigeration until further analysis. Lipid oxidation (TBA) and Warmed Over Flavor (WOF) (Tarladgis et al. (1964)) and total lipid content (LP) (AOAC, 1995) were conducted in triplicate for each sample. Half portion of the breasts was ground *"in natura"* for TBA and LP analysis. The other half was vacuum packed and cooked in water bath at 80°C for 55 minutes, then triturated and stored under refrigeration for 24 hours, in order to the determine WOF.

Results

The results were submitted to T test statistical analysis using the Biostat 5.0 program. For LP, the values obtained were 2.3 times higher in WS than in normal meats. Similar results were found by Baldi et al (2017), in which the lipid content was also higher for meats with WS (Table 1). Soglia et al (2016) has observed that breast meat affected with WS showed an average of 1.25g% of lipids while those considered normal are 0.87g%. As reported by Kuttapan et al. (2012) and Petracci et al., (2014), the amount of intramuscular fat increases with the degree of WS. These authors also suggest that the damage to muscle tissue is intense and continuous, and attempts at self-regeneration in damaged areas of the muscle could face failure, leading to differentiation of pluripotent stem cells from muscle tissue into fibroblasts or adipocytes, which may lead to fibrosis and lipidosis. The obtained values for TBA, showed no significant difference between normal breasts and WS. A similar result to the study presented by Alnahhas et. al. (2016). However, when the samples were thermally treated, the lipid oxidation levels showed an substantial increase, indicating that WS breasts could produce lower oxidative stability, confirming that the combination of WS treated meats presents higher oxidation rates. Trindade et al. (2008), find out in their study that rancid odors can be detected by trained and untrained tasters in the range of 0.5-1.0 and 0.6-2.0 mg malonaldehyde/kg sample, respectively. The values obtained in this experiment are much higher compared to the levels found in Trindade et al. (2008), which justifies the characteristic warmed over aroma and flavor in poultry meats resulting, consequently a rejection by the consumer and greater losses for the industrial sector.

Table 1 – Mean values for Total Lipid contents, Lipid Oxidation (TBA) and Warmed-Over Flavor (WOF) in Normal and White Striping (WS) Poultry Breasts.

	Normal	WS
Total Lipid (LP) (%)	1.27 ± 0.76^{b}	$2,97 \pm 0,81^{a}$
TBA (mg/kg)	2.50 ± 0.21^{aA}	$3,12 \pm 0,56^{bB}$
WOF (mg/kg)	3.07 ± 0.69^{bA}	$3,84 \pm 0.8^{aB}$

* different letters in the same line (lowercase letters) and different letters ind the same collumn (uppercase letters) are differ statistically at 5% (P <0,05), T test.

Conclusion

Based on the results obtained, it can be concluded that poultry meat affected by the WS anomaly presents a lower oxidative stability after the heat treatment, and can be a quality factor perceived by the consumer, leading to depreciation of the product.

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