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Submission title: Nitrogen content in pectoralis major muscle from Ross 308 broilers with or without wooden breast.
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Abstract:
1. Introduction
Skinless chicken breast is the most used portion in the manufacture of chicken products and in catering. The amount of nitrogen in raw chicken meat is very important for the processing yield and is a usefulness factor to uncover misdescription and mislabelling in the chicken preparation market. Several studies – summarised in the review from Petracci M. et al., 2019 – have analysed both nitrogen (protein) and collagen in wooden and normal muscles. Mostly, the wooden breast muscles have less nitrogen compared with normal muscles for which the influence of wooden breast on the collagen content is more diffuse.
The aim of this work was to document the nitrogen level in pectoralis major in Danish produced Ross 308 broilers with or without wooden breast and to analyse the collagen share of the total protein.
2. Materials and Methods
64 samples were selected from two flocks, all Ross 308 broilers, age 34 or 38 days at slaughter. At the deboning line, pectoralis major was separated into two classes: normal (NB) or wooden (WB) by a trained expert using the methods from Dalgaard, L. et al., 2018. Every single muscle was blended and analysed for nitrogen (Kjeltec 8400/8420, SM 008, mod. according to AOAC 981.10: 1983, nitrogen/protein in meat), fat (Soxtec^{TM} 8000, FOSS, SM 004, mod. according to ISO 1443:1973) and water (SM 002, mod. according to NMKL nr. 23, 3rd ed.:1991) content. For collagen (SM 015, mod. according to NMKL No. 127, 2nd ed.:2002), the four samples with the highest nitrogen content and the four with the lowest nitrogen content within the flock were analysed, in total 16 samples.
The effect of wooden breast, age/flock and interaction was analysed with a linear model (PROC GLM (SAS system © SAS Institute Inc)).
3. Results
The average content of nitrogen was 3.5% (NB) and 3.0% (WB), with significant ($p<0.01$) effect from interaction age*breast type and breast type ($p<0.001$). The average content of fat was 1.6% (NB) and 2.2% (WB), with significant ($p<001$) influence of breast type. The water content was 76.5% (NB) and 78.8% (WB), breast type was significant ($p<0.001$).
Collagen is a part of the total protein content, and for the eight samples of NB, the collagen share was 2% of the total protein content. For the eight WB samples, the share was higher 3-9%. Soglia, F. et al. (2016) also found a greater share in WB. The best fit for the relationship between protein and collagen was a logarithmic curve, where samples with higher protein content has lower collagen.

4. Conclusion

For Danish Ross 308 chicken, the quality defect WB shows a lower content of nitrogen and a higher content of water and fat. The level of nitrogen in the normal meat was also low and lower than the level reported in AMC (2000). Cai et al. (2018) and Soglia et al. (2016) also found a lower nitrogen content in WB compared with NB in Ross 708 broilers. In this investigation, we found a clear correlation between protein and collagen, and WB had a higher collagen content compared with NB.

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Literature:
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