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Effect of spaghetti-meat abnormality on quality and histological traits of broiler breast fillets

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During the last few years, the increasing growth rate and meat yield of modern broiler hybrids caused the appearance of several breast muscle abnormalities, such as white striping and wooden breast. Recently, a new myopathy termed spaghetti-meat (SM) characterized by extremely soft and friable *pectoralis major* when palpated after chilling has emerged. Since the occurrence of SM is often associated with white striping (WS), this study aimed at evaluating the effects of SM and/or WS conditions on meat quality and histological traits in broilers. For this purpose, 96 *pectoralis major* muscles were selected from homogeneous flocks (47 d of age and 2.8 kg of live weight at slaughter) into two independent trials and classified as follows: 24 Normal (N), 24 WS, 24 SM and 24 WS/SM. Each fillet was cut in order to separate the superficial layer from the deep one and both used to assess proximate composition, histological features, colour, pH and protein profile. Data were analyses by two-way ANOVA using abnormality and sampling position as the main variables. Proximate composition was found to be significantly modified according the type of abnormality, especially in the superficial layer of the fillets. The SM and WS/SM groups had a remarkable decrease in total protein content coupled with an increased moisture level ($p<.001$), while WS group was associated with higher lipid content. Histological evaluations of abnormal samples evidenced several degenerative aspects that almost completely concern the superficial layer of the fillets. The SM samples showed poor fibres uniformity and a progressive rarefaction of the endo- and peri-mysial connective tissue. The WS fillets exhibited necrosis and lysis of fibres, fibrosis, lipidosis, loss of cross striation and vacuolar degeneration, while WS/SM fillets exhibited intermediate histological features. No relevant effect on meat colour has been detected, however abnormal fillets showed increased yellowness (b*) and ultimate pH values ($p<.001$). Moreover, both WS and SM abnormalities were associated with a more intense proteolytic degradation of muscle tissue ($p<.001$), which led to the formation of high molecular-weight protein fragments. In conclusion, both muscle myopathies mainly affect the superficial layer of *pectoralis major* muscle, while deep section is poorly involved. Furthermore, if compared with WS, SM abnormality is associated with a more remarkable alteration of the proximate composition and quality traits of the meat.

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Changes in structural properties and desmin degradation of broiler wooden breast fillets during refrigerated storage

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A novel myopathy termed "Wooden breast" (WB) appeared worldwide about 5 years ago especially in fast-growing broilers slaughtered at heavier weights. Since severe WB affects meat appearance and texture, the poultry plants tend to downgrade WB and divert the meat to further processing where the sensory implications are less important. This study aimed at investigating the effect of a 7-days refrigerated storage on textural properties, particle size distribution and desmin degradation in broiler breast meat affected by WB. For this purpose, 45 Normal (NB) and 45 WB *pectoralis major* muscles were selected at 3 hours *post-mortem* from a single flock (Ross 508, males, 38-days old) and used to assess compression force measured at 40 and 80% of its initial height, particle size distribution by using a Malvern Mastersizer 3000 (Malvern Instruments Ldt, UK) and desmin degradation quantified by Western Blot. To evaluate the intra-fillet sampling position effect, both the superficial and the deep layer were considered and all measurements were carried out at 10, 24, 72, 120 and 168 h *post-mortem* after refrigerated storage (2-4 °C). Data were analysed by factorial ANOVA using abnormality, sampling position and storage time as the main variables. If compared to NB, superficial layer of WB exhibited higher 40 and 80% compression values measured at the earliest sampling time. In addition, the 80% compression values suggested a progressive softening process taking place within the superficial layer of the WB samples from 10 to 72 h *post-mortem* ($p\leq.001$). As for particle size distribution, the increased deposition of extracellular matrix and fibrosis in WB might contribute in explaining the different fragmentation patterns observed between the superficial and the deep layer in the WB samples, with the superficial part exhibiting a higher amount of larger particles and an increase in particles with larger size during storage, in comparison with NB. The results for Western Blot against desmin revealed that at 10 h *post-mortem*, the WB cases exhibited larger ($p\leq.05$) amounts of desmin. A sharp decrease of the intact desmin