



## Characterization of Carcass Color Differences Between Hen (Small Birds) and Meat-Type (Large Birds) Pheasant Lines Associated with Freezing

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### Objectives

The aim of this study was to determine the cause of why hen carcasses turn red on freezing in contrast to meat-type male pheasants.

### Materials and Methods

Hen pheasant carcasses ( $n = 5$ ) that were visibly red on the outside and larger meat-type pheasants ( $n = 5$ , not red) from the same harvest day at a commercial plant were obtained. The frozen carcasses in their original, sealed plastic bag were brought to the University of Wisconsin Meat Science Laboratory and stored in a  $-25^{\circ}\text{C}$  freezer prior to being semi-thawed for about 24 h ( $4^{\circ}\text{C}$ ). Breast muscles (*M. pectoralis major*) were collected, cut into similar sections (approx.  $2.5\text{ cm} \times 2.5\text{ cm} \times 1.5\text{ cm}$ ), vacuum-packaged in a Nylon/PE vacuum bag, and stored in the  $-25^{\circ}\text{C}$  freezer. The frozen samples were ground (9.5 mm plate). Skins were trimmed of excessive fat prior to pulverization in liquid nitrogen. Instrumental color, pH, proximate composition, myoglobin content (myoglobin-based methodology, Mb), and muscle fiber type determination were conducted. All data were analyzed using the PROC MIXED procedure of the SAS statistical analysis software. Dependent variable means were separated ( $P < 0.05$ ) by pairwise comparisons using the PDIF option.

### Results

Hens exhibited greater redness (CIE  $a^*$ , 4.87) and were darker (CIE  $L^*$ , 53.33) than the meat-type pheasants (CIE  $a^*$ , 4.31 and CIE  $L^*$ , 55.74) on frozen/semi-

thawed breast muscles ( $P < 0.05$ ), whereas no difference was observed in the yellowness (CIE  $b^*$ ) between the different pheasant types ( $P > 0.05$ ). The highest pH (6.38) and Mb (1.89 mg/g) values were obtained from the skin of the hen carcasses compared to the skin of the meat-type pheasants (pH 6.21, Mb 1.22 mg/g). In addition, the breast muscle of the hens had a higher pH and Mb content. The hen skin exhibited the highest moisture and protein content as well as a lower fat content than the skin from meat-type pheasants. The intermediate fiber (IIA) type was the only type found in the pectoralis major muscles, regardless of the different pheasant types.

### Conclusion

The results of the current study reveal that hen carcasses had more red pigmentation and exhibited significantly higher pH values, redness, and Mb level than the meat-type pheasants. In this regard, a higher pH might suggest hens were more stress-susceptible which produced the darker red meat. Also, higher ultimate pH values could protect myoglobin and hemoglobin from denaturation. A major part of the darkening might be related to the lower amount of fat within the skin which may have facilitated transparency to the darker, more red breast muscle. Genetics or production practices differences did not appear to alter muscle fiber types. Our findings suggest that the more intense red appearance may be associated with the presence of hemoglobin rather than myoglobin. Future evaluation of the effects of soaking pheasant skin with various pH solutions and scalding variations on the physicochemical properties of collagen may merit investigation.