

Protein Solubility, Color and Water-Holding Capacity in Relation to Pork Quality

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It is well known that the extent of denaturation of the muscle proteins differs in normal and in pale, soft, exudative (PSE) meat. In order to investigate the relationship of sarcoplasmic and myofibrillar protein solubility to color and water-holding capacity (WHC) of pork, sixty loins were selected to represent the quality classes PSE, RSE (reddish-pink, soft, exudative), RFN (reddish-pink, firm, non-exudative) and DFD (dark, firm, dry). The loins were initially selected using a visual assessment of color and exudate, followed by objective measurements of ultimate pH (pHu), WHC (% drip loss), color (CIE L* a* b*) to establish one of four quality classes. A 10cm section of *longissimus thoracis et lumborum* cranial to the 10th costa was used for protein solubility, and a second 10cm section caudal to the 10th costa was used for physical measurements including pHu, color and WHC. Samples in each quality class were significantly ($p < 0.05$) different in lightness and % drip loss. However, there were no significant ($p > 0.05$) differences in redness, yellowness, chroma and hue between RSE and RFN groups. Also the solubilities of sarcoplasmic, myofibrillar and total protein were not significantly ($p > 0.05$) different between RSE and RFN samples. However, RSE sarcoplasmic protein solubility was significantly ($p < 0.05$) different from both PSE and DFD samples, whereas RSE versus DFD solubilities of myofibrillar and total protein were not significantly ($p > 0.05$) different. Only PSE samples showed the significant ($p < 0.05$) difference from RSE for all protein solubilities. The lightness, chroma and hue as indicator of objective color were decreased with increasing sarcoplasmic protein solubility. Also the % drip loss decreased with increasing sarcoplasmic protein solubility. Sarcoplasmic protein solubility explained 71% of the variation in lightness, with a linear decrease in L* value, and about half of the variation (52%) in % drip loss could be accounted for by sarcoplasmic protein solubility. This result implies that the pale color in PSE muscle is related to the soluble sarcoplasmic protein concentration and that the sarcoplasmic protein denaturation may affect the WHC to some degree.