

Precipitation of Sarcoplasmic Proteins onto Myofibrils

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It was suggested that the marked change in color of PSE (pale, soft, exudative) muscle resulted from precipitation of previously-soluble proteins of the sarcoplasm. The water-holding capacity (WHC) of pork also has been reported to be influenced by precipitation of sarcoplasmic proteins onto myofibrils. However, it is not clear what kind of sarcoplasmic proteins relate directly to color and WHC. The purpose of this experiment was to investigate which sarcoplasmic proteins precipitate onto myofibrils. The *longissimus thoracis et lumborum* of pork loins were selected at 24hr postmortem to represent the four quality conditions of PSE, RSE (reddish-pink, soft, exudative), RFN (reddish-pink, firm, non-exudative) and DFD (dark, firm, dry). To investigate the effects of sarcoplasmic protein denaturation on color and WHC, the selected four quality samples were subjected to SDS-gel electrophoresis. The gel pattern of sarcoplasmic protein fractions of samples was similar except in 5 specific regions. These differences were mirrored in the myofibrillar protein fractions where the bands below the alpha-actinin and actin position had reduced staining intensity in PSE muscle samples. With SDS-PAGE gel patterns in which the purified proteins were run in parallel with the PSE and RFN samples, it was clearly suggested that the precipitated sarcoplasmic proteins onto the myofibrils are phosphorylase, creatine kinase, triose phosphate isomerase and myokinase. A band below tropomyosin was not able to identify. Within PSE samples, extent of association of sarcoplasmic proteins with the myofibrils and reduction of staining intensity in the sarcoplasmic fraction were greater with increasing lightness and % drip loss. However, in the other quality classes, there was little or no changes in protein bands except changes in phosphorylase for RSE samples. This result suggests that pre-rigor conditions in PSE muscle caused precipitation of the sarcoplasmic proteins which are most sensitive to pH and temperature conditions existing immediately postmortem, and the early conditions after death play an important role in determining color and WHC.