

PORK QUALITY

Title: Impact of Proteolysis on pH Decline and Water Holding Capacity of Fresh Pork - **NPB #02-034**

Investigator: Elisabeth Huff-Lonergan Ph.D.¹

Co-Investigators: Steven Lonergan¹ and Ronald Klont Ph.D.²

Institution: Iowa State University¹ and PIC Inc.²

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Abstract: The objective of this study was to determine the relationship between pH decline, μ -calpain autolysis, and degradation of membrane proteins involved in calcium homeostasis. Commercial hybrid pigs ($n = 309$) from two different genetic lines (lines 1 and 2) were harvested. Longissimus dorsi (LD) pH measurements were taken at 45 min, 3, 6, and 24 h postmortem (PM). In order to obtain animals with variability in pH measurements, two groups (high and low pH at 3 h PM) were selected within each line. Percent drip loss after 24, 48, and 96 h storage was determined. Ten animals were selected within each group to determine autolysis of μ -calpain and extent of proteolysis of the ryanodine receptor (RyR1), and the sarcoplasmic reticulum Ca^{2+} -ATPase (SERCA2) at 1 d, 48, 72, and 120 h PM. The line 1/high pH group had a higher ($P < 0.05$) pH than all other groups at 24 h PM and the least ($P < 0.05$) drip after 96 h storage. The line 2/low pH group had the highest ($P < 0.05$) L^* value than all other groups. At 1 d postmortem, the high pH groups had increased ($P < 0.05$) μ -calpain autolysis compared to the low groups. Increased autolysis of μ -calpain was correlated ($P < 0.05$) to higher pH and decreased drip. Line 2 had more ($P < 0.05$) RyR1 degradation (band 2) than line 1 at 48 h PM. An increase in RyR1 degradation (band 2) was related to lower 6 h ($P < 0.05$) and 24 h ($P < 0.01$) pH and increased drip loss at all times measured ($P < 0.01$). Increased proteolysis of intact RyR1 at 1 d and 48 h was correlated ($P < 0.01$) to increased μ -calpain autolysis. Increased proteolysis of SERCA2 was correlated ($P < 0.05$) with lower pH and increased drip loss. Decreased degradation ($P < 0.05$) of vinculin was found in line 1/low pH compared to both line 2 groups. These results show that μ -calpain autolysis and proteolysis may be related to Ca^{2+} regulation and may affect pork quality attributes such as water-holding capacity.

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For more information contact:

National Pork Board, P.O. Box 9114, Des Moines, Iowa USA

800-456-7675, **Fax:** 515-223-2646, **E-Mail:** porkboard@porkboard.org, **Web:** <http://www.porkboard.org/>