82 The use of non-invasive measurements for predicting objective tenderness of muscles from the beef round. J.T. Sawyer*, J. K. Apple, J.-F. Meullenet, B. Cheatman, W. K. Chung, R. Xiong, and S. G. Bajwa, *University of Arkansas*, *Fayetteville*.

There is an unacceptable amount of variation in beef quality due to any number of genetic, environmental, and postmortem factors; thus, a non-destructive, objective method is required to predict meat quality. Moreover, regulatory limits set by the USDA Consumer and Marketing Service demand consistency in the final product and considering the slaughter rate of beef plants in the United States, a robust, on-line tool to classify carcasses or primal cuts is imperative. Therefore, the objectives of this study were to compare and analyze two spectroradiometers with two instrumental tenderness measures, and develop an empirical model that could accurately predict tenderness in the biceps femoris (BF), semimembranosus (SM), and semitendinosus (ST) muscles of the beef round. Beef top (inside) and bottom (gooseneck) rounds (IMPS # 168 & 170) were collected randomly from a large commercial slaughter facility. Muscles were selected from 4 quality grades (n = 10/quality grade; n = 120 total); U. S. Prime, upper 2/3 Choice (CAB), Choice, and Select. Steaks (2.5-cm-thick; n = 5) were cut from each muscle within each quality grade and allotted at random to be aged for 0, 7, 14, 21, 28 d at 2°C. Initially (d 0) and at the end of each aging period, steaks were first scanned from 400 to 2,400 nm with a NIRSystem (NIRS), then scanned from 350 to 1,050 nm with an ASD Field Spec Pro (ASD). After rescanning, steaks were vacuum-packaged and subsequently frozen at -20°C until shearforce could be completed. Steaks were thawed at 2°C for 12 h then cooked to an internal temperature of 71°C in a forced-air convection oven preheated to 190°C. After cooking steaks were allowed to cool to room temperature. The Meullenet-Owens razor shear (MORS) was used allowing a 1-cm-wide razor blade to travel 50% of the steak thickness, and four peak values were obtained from each steak. Then, six 1.3-cm-diameter cores, removed parallel to fiber orientation, were sheared with a Warner-Bratzler shear force (WBSF) device attached to a universal testing machine. Partial least squares (PLS) regression models on normalized spectra were able to explain the variability in WBSF at a rate of 41 (NIRS) to 19% (ASD) in the BF, 85 (NIRS) to 61% (ASD) in the SM, and 41 (NIRS) to 45% (ASD) in the ST. Additionally, PLS models generated for MORS values more accurately accounted for 68 (NIRS) to 67% (ASD) of the variation in the BF, 88 (NIRS) to 67% (ASD) of the variation in the SM, and 46 (NIRS) to 47% (ASD) of the variation in the ST. Differences in prediction capabilities were recorded between the spectroradiometers, but there were no correlations between the WBSF and MORS values; therefore, these instrumental tenderness methods could not be compared accurately. Nevertheless, the results indicate that there is potential for using non-destructive methods of tenderness predictions as a means for sorting beef subprimal cuts prior to fabrication.

Key Words: beef, tenderness, near-infrared spectroscopy