

**Project Title:** The Efficacy of Three Objective Measurements for Identifying Guaranteed Tender Beef Cuts  
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**Layman's Summary:**

This study compared three technologies, the MARC Slice Shear Force (MARC-SSF), CSU BeefCam (CSU\_BC), and SDSU Colorimeter (SDSU\_C), for their ability to sort beef carcasses at the time of grading. The MARC-SSF technology involves rapidly cooking a rib steak removed from the carcass, measuring its shear force and then analysis of a video image from the sample rib steak, which is then used for calculation of cutability, ribeye area, subprimal cut and tenderness. The CSU\_BC uses a Panasonic camera to acquire an image, which is then evaluated by HunterLab software to determine tenderness and palatability. The SDSU\_C scans a ribeye to get three readings measuring color to assess tenderness. The MARC-SSF is a direct, invasive technology, while the CSU\_BC and the SDSU\_C are both indirect and non-invasive.

In Phase I, 308 carcasses from two commercial plants representing Top Choice, Low Choice, and Select were tested. The strip loins, top sirloins, and top rounds were obtained, aged 14 d post-mortem, and then tested for Warner-Bratzler Shear Force, Trained Descriptive Attribute Sensory Panel Evaluation, and Consumer Evaluation. In Phase II, 400 carcasses, 200 rolled USDA Select and 200 rolled USDA Choice, from one commercial plant were tested. The strip loins were obtained, aged 14 d post-mortem, and WBS was measured. In Phase II, the CSU\_BC evaluation included both the prototype and a commercial instrument.

After completion of Phase I, it was determined the CSU\_BC had an equipment failure. Therefore, Phase II was conducted for a second chance for evaluation of CSU\_BC. Phase I showed the direct measure of tenderness provided by MARC-SSF results in more accurate identification of "tender" beef carcasses than the SDSU\_C, which is an indirect technology. It did not appear the SDSU\_C was sufficiently accurate to be useful, particularly in USDA Select and Low Choice. Thus, it was concluded in Phase I that direct measurement, such as that of the MARC-SSF is necessary to accurately sort USDA Select and Low Choice beef carcasses for tenderness. Phase II also found MARC-SSF results to be more accurate in the identification of "tender" beef carcasses than either of the indirect technologies. It was found that the SDSU\_C and the CSU\_BC were both not sufficiently accurate to be useful. It should be noted it was determined that evaluation of the commercial CSU\_BC is not available due to the need to develop new prediction equation/methodology for application to data collected in different plants. This evaluation should be available later in 2001.

