

Project Title: Process Upgrades for Beef Chuck Muscles Borderline in Palatability: Phase II Supplement

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Completion Date: November 2001

Layman's Summary:

This study was divided into two phases. Phase One was to determine the optimum brine pickup percentage (5, 10 or 15 percent) when formulated to achieve .5% salt and .4% phosphate in the muscle. The effect of cooking on meat palatability traits as evaluated by objective shear force measurements and trained sensory panel evaluation of meat attributes was used as selection criteria. The added moisture remained after thawing and cooking. Although not consistent, brine enhancement did increase sensory tenderness in the complexus and latissimus muscles approximately 16 percent, but shear values and overall tenderness of the splenius muscle was not affected. Juiciness was enhanced and sensory detectable connective tissue was reduced by enhancement for the complexus and latissimus muscles, but the effect was not always consistent. Regardless of percentage, brine enhancement had minimal effect on the splenius muscle. All brine enhancement treatment levels evaluated in Phase One produced from "slight" to "threshold" off-flavors, most often described as "salty". Ten percent added ingredients appeared to be the optimal level of brine enhancement.

Phase Two of this study was designed to evaluate various methods of brine enhancement application immediately after cooking and after a frozen storage period and reheating in a microwave oven. The injection pumping of muscles appeared to have a slight advantage over marination or vacuum tumbling, but the differences between treatment methods were not always consistent. The marination treatment did produce slightly more off-flavors, possible because they stayed in the brine solution longer in order to achieve the 10 percent pickup. Muscles higher in sensory detectable connective tissue appeared to be less affected by enhancement treatment. In general, the enhanced muscles, regardless of treatment, were considered tender and palatable by a trained sensory panel. The "salty" off-flavors identified by the sensory panelists may suggest a reduction in salt level may need to be explored, although, a trained panel may be more critical than a typical consumer. The decrease in palatability traits that occurred upon reheating appeared to be helped by enhancement, but if meat is to be stored for lengthy periods of time precooked, then the addition of antioxidants or spices that act as antioxidants may be needed.

