



## Texas Tech University

### Shear Force Analysis – Warner Bratzler Shear

#### Cooking Steaks

1. Thaw steaks in sausage room at 2-5°C. Steaks must be set out the day before as thawing takes 18 to 24hr. Thawing more rapidly at room temperature results in increased purge.
2. Take the internal temperature of each steak in geometric center of steak and record. Temps should be around 2-5°C. Don't allow steaks to set out and get warmer than 5°C as this will result in a higher degree of doneness.
3. Set a clean plate on the scale and zero the scale in grams.
4. Weigh each steak with its identification tag in grams and record.
5. Place each steak on the belt grill with its tag near it to maintain identification.
6. Using a new plate, again zero the scale in grams.
7. When steaks are finished cooking, weigh the steak and its tag and record.
8. Take the internal temperature of each steak in the geometric center and record. Temps should be 68-71°C.
9. Place all cooked steaks on a white tray and cover the tray with saran wrap. Store trays in cooler at 2-5°C for 24 hours until time to shear.

#### Shearing Steaks

1. Set up Warner Bratzler Shear machine or the United Testing Machine.
2. Square up steak and check fiber direction.
3. Take 6 cores from each steak parallel to the longitudinal orientation of the muscle fibers. Check each core to make sure they are devoid of connective tissue or fat.
4. Record degree of doneness. Use the NBCA color chart.
5. Shear each of the six cores and record values. Be sure to re-set shear machine to zero before each core is sheared. Clean shear knife between each sample.
6. Dispose of all meat once all shear values have been recorded in double bagged trash bags.
7. Clean shear machine by dis-assembling, washing, and re-assembling.

8. After entering data, check each point for accuracy.
9. Make copies of data and store in a properly labeled binder in the lab.

### **Purge**

1. Weigh the meat sample in the bag after 7, 14, 21d storage at 2°C and record the weight in grams as the before weight.
2. Remove the sample from the bag and place it on a table in a single layer and allow it to drip for at least 5 minutes.
3. Weigh the sample again and record it as the after weight.
4.  $\%Purge = \frac{\text{Before weight} - \text{after weight}}{\text{Before weight}} \times 100$

### **Drip Loss**

1. Remove a sample from the steak designated as the “proximate analysis” steak on the sirloin end using a 1” core. The sample should be free of connective tissue.
2. Weigh the sample and record it as initial weight. The sample should be no heavier than 100g.
3. Place the sample in clean drip loss tubes and store at 2°C for 24 hours.
4. Samples should be weighed at 24h and 48h and recorded as 24h and 48h weight.
5.  $\text{Drip Loss} = \frac{\text{Initial weight} - 24\text{h weight}}{\text{Initial Weight}} \times 100$

### **Magi-Grill Operation Instructions**

1. Turn the main power switch “ON”.
2. Turn the key switch to the menu position (horizontal) – Display should read [MENU?A].
3. Press the letter of the desired menu (F is the most common for cooking 1” cuts to a medium degree of doneness).
4. Press ENTER to choose the desired menu.
5. Press and hold the LIFT ENABLE button until the belts are fully lowered – BE SURE TO HOLD THE BUTTON DOWN UNTIL THE DISPLAY CHANGES FROM [SET Ht] to [TIME 15:00] --- **If the grill height does not change, the emergency knob may be engaged. Simply pull the knob out to undo the emergency hold.**
6. The grill will begin pre-heating for 15 minutes.

### **After Cooking Clean-Up**

After each cooking session the belt grill should be cleaned to prevent grease build up and aid in maintaining sanitary conditions.

1. After all steaks have been cooked, push the [CANCEL] button and the grill will count down for one cooking cycle.
2. Turn the power switch "OFF".
3. Remove the grease catching pans and clean thoroughly with soap.
4. Wipe down the area below the grease catching pans.
5. Wipe the belts clean with a wet cloth in bleach water (no soap) by turning the belts by hand.
6. **Empty the grease pail from the far left compartment in the trash can and rinse clean.**
7. Dry all pieces of equipment and re-assemble the grill.

### **References**

Hruska, Roman L., S.D. Shackelford, and M. Koohmaraie. 2005. Shear Force Procedures for Meat Tenderness Measurement. USMARC.