

# The Effects of Hot Boning and Vacuum Packaging on Yield of Cooked Corned Beef

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## Story in Brief

Twenty Semimembranosus and Semitendinosus muscles were either hot (90°F) or cold (34°F) boned and cured under vacuum or non-vacuum to determine the influence of these treatments on yield of cooked corned beef.

Results indicated that method of curing, vacuum *vs.* non-vacuum, has an insignificant effect on the yield of cooked (155°F) corned beef.

Results indicated the hot boning could result in a significant increase in the yield of cooked corned beef. This is important to the consumer since it would mean a larger percentage of edible cooked meat per pound of raw product.

## Introduction

In the past 10 years there has been extensive research on the acceptability of hot boned electrically stimulated beef (Will, 1976). There has been a large amount of research completed on the influence of vacuum packaging on beef (Schmidt and Keman, 1974). However, there is very little published work on the effect of hot boned beef when it is cured to produce a product such as corned beef. The effect of curing method, vacuum *vs.* non-vacuum, has not been investigated. The purpose of this research was to determine the effects of boning time (hot *vs.* cold) and method of curing (vacuum *vs.* non-vacuum) on yield of cooked corned beef.

## Materials and Methods

The Semimembranosus (SM) and Semitendinosus (ST) muscles of 10 ungraded 1,000-lb slaughter steers were used to determine yield changes between treatments. All animals were slaughtered according to procedures currently practiced at the Oklahoma State University Meat Laboratory. Within 45 minutes of death, each carcass was spilt longitudinally into two sides. The sides were removed to the electrical stimulation room where they were individually stimulated for 1 minute with a square wave pulse, 300 volts, 400 cycles per second for a duration of .5 milliseconds and a current of 1.9 amps. Electrical stimulation was accomplished by inserting multiple probes in the round and neck regions of each side.

Upon completion of electrical stimulation, one side was randomly designated as cold boned and removed to a holding cooler (34°F) for 24 hours. The procedure practiced on the cold boned side was the same as that for the hot boned side except it occurred after the side had cooled at 34°F for 24 hours.

From the side designated as hot boned, the SM and ST muscles were excised hot (90°F) by cutting along the natural muscle seams. Upon excision the muscles were trimmed of excess external fat and divided equally into two halves. Each muscle half was then weighed using an electronic digital scale. Each muscle half was pumped with a curing solution equal to 10 percent of its weight and placed in a Cryovac bag where a

covering brine of 30 ml per pound of muscle was added. One muscle half was then randomly selected and cured without vacuum. The remaining half was cured under a vacuum of 29.4 inches of Hg. The packaged beef samples were placed in a cooler (34°F) for 7 days to allow the curing reaction to equalize. After 7 days the muscle halves were removed from the Cryovac bags and weighed. A meat thermometer was then inserted into the center of each muscle half. The meat was then replaced in the Cryovac bag and resealed without vacuum. Each rebagged sample was then placed in a Browning Roasting bag, forming a double layered bag necessary for cooking. The muscle halves were then placed in a water cooker (160°F) and heated to an internal temperature of 155°F. As each muscle half reached an internal temperature of 155°F, it was removed from the water cooker to a cooler (34°F). When the halves had cooled for 24 hours, they were removed from the cooking bags, placed on a table and covered with a cloth to remove excess surface moisture. After 2 hours of blotting, each piece was weighed.

Differences in yield were calculated on the basis of the weight of raw cured muscle to the weight of cooked cured muscle.

The data was analyzed using the split plot design. The analysis of variance in conjunction with the F-test was used to determine statistical significance between treatments.

## Results and Discussion

Average yield values, derived from 20 observations per mean, for the semimembranosus and semitendinosus muscles are presented in Tables 1 and 2.

The effect of hot and cold boning on yield of cooked corn beef is seen in Table 1 by differences between treatment means of 4.61 percent for the SM and 7.45 percent for the ST. Statistical analysis of these data indicated significance (.05) for both means. Thus, these data indicate that by curing hot boned beef one can expect an increase in yield of cooked corned beef of 4 to 7 percent over the yield of cooked corned beef from cured cold boned beef.

Differences in the yield of cooked corned beef due to varying curing methods, vacuum *vs.* non-vacuum, are shown in Table 2. Yield differences of 1.2 percent and 1.0 percent ST are seen. Statistical analysis indicated that these differences are insignificant. Thus, either method of curing is acceptable with respect to yield of cooked corned beef.

**Table 1. Yield values for hot vs. cold boned corned beef.**

	Semimembranosus SM %	Semitendinosus ST %
Hot	75.25	77.75
Cold	70.65	70.35

**Table 2. Yield for vacuum vs. non-vacuum processed corned beef.**

	Semimembranosus SM %	Semitendinosus ST %
Vacuum	72.35	74.55
Non-Vacuum	73.55	73.55

Interaction between treatments (method of boning and method of curing) proved insignificant. Therefore, the insignificant effect observed on yield of corned beef due to curing method was not dependent on the boning treatment but was constant in both the hot and cold boning treatments.

### Literature Cited

Schmidt, G. R. and S. Keman. 1974. *J. Fd. Sci.* 39:140.  
Will, P.A. 1974. M.S. Thesis. Oklahoma State University, Stillwater.

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# Myofiber Width as Influenced by Breed Type in Baby and Weanling Beef Calves

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### Story in Brief

Myofiber widths were measured in three muscles of Angus and Charolais calves at approximately 25 and 240 days of age. Data showed that at 25 days of age, in all muscles, Angus calves had larger fiber diameters than Charolais. The increase in myofiber size at 240 days was not constant for all muscles examined. When the results were expressed as a percentage of initial myofiber widths, the 240-day fiber measurements suggested that radial growth rate in the ST and TBL muscles of Angus calves was greater than that of the Charolais. The increase in percent radial growth of the LD muscle, however, was approximately the same for both breeds.

Based on the percentage of myofiber width increase, it appeared that the ST and TBL muscles of Angus calves matured at a more rapid rate than those of Charolais calves, while the LD muscle seemed to mature at approximately the same rate in both breeds. These results would support the theory that Angus cattle mature more rapidly than Charolais cattle and could, in part, explain the muscling differences observed between these two breed types throughout development.

### Introduction

Of primary importance in beef production is the ability to promote muscle development in the live animal for its subsequent conversion to meat in the carcass. In an effort to determine causes of gross muscle size differences in different breed types of cattle, myofiber widths were measured in several muscles of Angus and Charolais calves at two stages of development. These two breed types mature at different rates, and thus expression of muscling at a constant age is affected. To follow the influence of