Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 1185

1980

Study I: economic feasibility of hot processing beef carcasses

J. McCoy

P. Nason

D. Chung

See next page for additional authors

Recommended Citation

McCoy, J.; Nason, P.; Chung, D.; Kastner, Curtis L.; Lawrence, A.; Dikeman, Michael E.; Hunt, Melvin C.; and Kropf, Donald H. (1980) "Study I: economic feasibility of hot processing beef carcasses," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 1. https://doi.org/10.4148/2378-5977.2588

Study I: economic feasibility of hot processing beef carcasses

Abstract

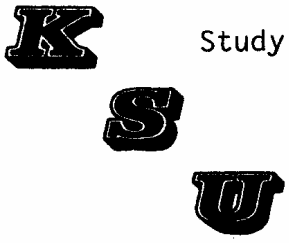
Nearly all steer and heifer beef carcasses processed in the United, States are chilled before cutting. However, recent meat science research has shown that carcasses can be processed, and quality of meat maintained, with little or no chilling. Processing as defined here involves cutting the carcasses into subprimal pieces, removing bones and excess fat, sealing the pieces in vacuum packages, and placing the packages in palletized boxes. It is already known that substantial economic saving can be obtained from reduced storage and transportation costs of boxed beef, but little work has been done on the economic feasibility of hot processing.

Keywords

Cattlemen's Day, 1980; Report of progress (Kansas State University. Agricultural Experiment Station); 377; Beef; Hot processing beef carcasses

Authors

J. McCoy, P. Nason, D. Chung, Curtis L. Kastner, A. Lawrence, Michael E. Dikeman, Melvin C. Hunt, and Donald H. Kropf



Study I: Economic Feasibility of Hot Processing Beef Carcasses

J. McCoy, P. Nason, D. Chung, C. Kastner,
A. Lawrence, M. Dikeman, M. Hunt, and D. Kropf

Nearly all steer and heifer beef carcasses processed in the United States are chilled before cutting. However, recent meat science research has shown that carcasses can be processed, and quality of meat maintained, with little or no chilling. Processing as defined here involves cutting the carcasses into subprimal pieces, removing bones and excess fat, sealing the pieces in vacuum packages, and placing the packages in palletized boxes. It is already known that substantial economic saving can be obtained from reduced storage and transportation costs of boxed beef, but little work has been done on the economic feasibility of hot processing.

This study compared two hot carcass processing techniques with conventional cold processing to determine comparative efficiency in use of energy, labor, and other resources. Hot processing option I includes an 8-hour conditioning period before cutting, which compares with 72 hours chilling in the conventional cold process. Hot processing option II eliminates the conditioning period, but includes electrical stimulation of the hot carcasses immediately before cutting.

Our analysis was based on a plant designed to slaughter 480 head of cattle a day during an 8-hour shift. No attempt was made to quantify, or evaluate, total resource use for each option. Instead, the objective was to determine differences in resources used.

Hot option I would require about 64 fewer Btu per pound of finished product than cold processing, a 42% reduction. The hot option II reduction would be 50 Btu per pound of finished product, a 32% reduction. Omitting the shroud load from both hot-processing options provided a major saving, as did not cooling the bones and fat trim. Additional energy savings were found in external building transmission, electrical equipment load, and lighting load. At 1979 electric rates, total energy savings amounted to 26 cents and 34 cents per carcass for hot options I and II, respectively.

Eliminating shrouds, shroud pins, and neck pins gave a 3 cent per carcass saving.

No attempt was made in our study to quantify labor time savings, but Armour Food Company and USDA showed reduced labor requirements for hot processing. The Armour study[1] indicated labor savings which at 1979 labor rates would convert to approximately $47.20 per hour for the entire slaugh-

[1]Armour and Co. 1977. Personal communications on 1967 test study.

tering and processing crew. A more recent USDA study[2] found labor savings of 13 minutes per carcass for the cutting operation only. At 1979 labor rates that would amount to $1.68 per carcass for hot option I, and $1.67 for hot option II--the difference due to maintaining an electrical stimulator in hot option II.

Since cooler capacity requirements are substantially less for hot processing--capital for cooler requirements, at 1979 costs, would be reduced by $325,000 for hot option I and by $677,000 for hot option II. No shrouding platform ($1,089) is needed for hot processing. The only additional capital cost would be an electrical stimulator ($21,000) for hot option II. At 10.5%, interest savings per carcass processed would be approximately 24 and 49 cents for hot options I and II, respectively.

In hot option II, the meat would move through the system in about 24 hours less time than in cold processing. That means reduced working capital requirement of the value of one day's output. The reduction in working capital for hot option I is approximately two-thirds that of hot option II. At 1979 wholesale beef values, the monetary savings in working capital at an interest rate of 10.5% would be 14 and 21 cents per carcass for hot options I and II, respectively.

The combined saving from all elements for hot option I is $2.36 per carcass, or $329,236 on an annual basis. For hot option II, the combined saving is $2.75 per carcass, or $383,253 annually.

Preliminary evidence indicates additional possible savings from reduced meat shrinkage, but more work is needed to quantify that item.

Warner-Bratzler Shear and Meat Tenderness

In 1932, K. F. Warner and L. J. Bratzler of the Animal Husbandry Department at Kansas State College developed a mechanical method for measuring meat tenderness. Cores from cooked steaks or roasts are placed in the apparatus and the pounds of force required to "shear" the core are recorded. Because Warner-Bratzler shear values correlate well with taste panel measurements of tenderness, this technique is used in many countries as an "unbiased" test of tenderness. The Warner-Bratzler apparatus is manufactured by G-R Electric Mfg. Co. of Manhattan.

[2]USDA. (Undated). Optional Methods for Hot Processing Beef Carcasses. Progress Report for Packerland International Inc. Meat Science Research Laboratory. S.E.A. Beltsville, Maryland.