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Study III: Hot Processed Beef--Microbiological Characteristics

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Introduction

To help insure that hot-processed beef has an acceptable shelf life and is microbiologically safe, the microbial characteristics of the product must be evaluated. This is particularly true for hot-processed cuts that are packaged and boxed prior to complete chilling--a practice that facilitates handling. An adequate chilling rate the first several hours postmortem is extremely important to the microbiological quality and shelf life of meat. Therefore, in order to insure an acceptable hot-processed beef product, this study was designed to establish chilling rates necessary to satisfactorily control microbial activity in hot-boned beef.

Procedure

Ten steers were slaughtered at hourly intervals in Experiment I, five in Experiment II, and three were slaughtered within one hour in Experiment III. One side of each carcass was hot processed within 2 hr postmortem, and the other side was conventionally chilled and cut at 48 hr postmortem. Samples from hot-processed and conventionally treated sides were vacuum packaged, boxed, stored, and chilling rates were monitored. Samples taken before and after 14 and 21 days of storage and 3 days of lighted display were examined for microbiological characteristics.

Results

As expected, conventionally treated samples chilled faster than hot-processed counterparts for the first 24 hr of chilling. Hot-processed cuts had higher total microbial counts than conventionally treated samples at each sampling period. However, hot-processed samples were within the generally accepted range, except for extended storage and display periods. Beef hot-processed 1 hr postmortem and vacuum packaged should be chilled to 21 C within 9 hr or less, then rapidly chilled to 2 C to be microbially acceptable. Therefore, this research established minimum chilling rates to produce an acceptable hot-processed beef product and help foster the economically attractive technique of hot-processing. Chilling rates faster than those necessary to achieve 21 C in 9 hr postmortem may be more desirable from a microbial standpoint but should be carefully evaluated, because they may result in a toughened product due to undesirable changes such as cold shortening.