Thawing of Frozen Whole Chickens and Ground Beef at Room Temperature

Category: Raw meat and poultry
USDA HACCP Category: Raw, not ground; Raw, ground
Processing: Thawing
CCP: Thawing
Validates: Critical Limits needed to ensure no growth of E. coli O157:H7, Salmonella, or Staphylococcus aureus on raw whole chicken and ground beef at room temperature.

CCP: Processors may find they need to rapidly thaw/temper meat or poultry for subsequent steps such as cutting, grinding, and mixing. In this situation, food regulatory agencies currently advise not to thaw frozen meat and poultry at room temperature. The rationale for prohibiting room-temperature thawing is that the surface of the thawing meat/poultry will reach temperatures suitable for rapid growth and/or toxin production by bacterial pathogens. Therefore, thawing raw meat or poultry may be a CCP and require validated Critical Limits to ensure adequate control of pathogen growth. This study examined thawing of frozen (-4°F) raw whole chickens (3.68 lb) and ground beef (1 lb and 3 lb) at 72°F and 86°F for 9 hours.

Study Design: Whole chickens (3.68 lb) and ground beef (1 lb and 3 lb) were inoculated with multiple strains of Salmonella spp., Escherichia coli O157:H7 and Staphylococcus aureus, frozen at -4°F for 1 day, and then held at 72°F or 86°F for 9 hours. Numbers of each pathogen were determined prior to freezing, after 4.5 h of thawing and after 9 h of thawing.

Results and Discussion: There was no significant growth of E. coli O157:H7, Salmonella spp., or S. aureus on 3.68-lb whole chickens or 3-lb portions of ground beef thawed at 86°F for 9 h. Pathogen numbers increased an average of 0.2 – 0.5 log on the surface of 1-lb ground beef portions thawed for 9 h at either 72°F or 86°F. Our results show that thawing whole chicken weighing at least 3.68 lb or ground beef portions weighing 3 lb or more for no more than 9 hours at a temperature not greater than 86°F is not a hazardous practice. Thawing ground beef portions weighing at least 1 lb for no more than 9 hours at temperatures not exceeding 72°F is also not hazardous. Thawing smaller portions at higher temperatures and/or for longer times cannot be recommended, however.

Validated Critical Limits based on study results:
- Intact chicken (frozen at -4°F or colder) weighing 3.68 lb or more can be thawed up to 9 hours at a temperature up to 86°F
- Ground beef (frozen at -4°F or colder) weighing 3 lb or more can be thawed up to 9 hours at a temperature up to 86°F
- Ground beef (frozen at -4°F or colder) weighing 1 lb or more can be thawed up to 9 hours at a temperature up to 72°F

A full copy of this research report is available on request.

For more information on this project or the work of the University of Wisconsin Center for Meat Process Validation contact: Steve Ingham, Extension Food Safety Specialist (608) 265-4801, scingham@wisc.edu or Dennis Buege, Extension Meat Scientist (608) 262-0555, drbuege@ansci.wisc.edu May, 2005.

The University of Wisconsin-Madison Center for Meat Process Validation provides science-based HACCP support to small meat processors in meeting state and federal mandates for safe food processing and handling.