E. coli O157
Research and Education Strategy Fact Sheet

Cooking of Beef Burgers

How Canadians Cook Burgers

A survey of Canadian consumers commissioned by the Canadian Cattlemen's Association showed that 51% of Canadian consumers prefer to cook their burgers by barbecue grill (51%) and to a degree of doneness of medium (71°C) or higher (90%). Most consumers (75%) turn their burgers twice or more frequently during cooking.[1]

Microbiology of Beef Burgers

Although muscle tissues from healthy animals are essentially bacteria free, bacteria may be transferred onto the meat during the production process from the hides of animals, equipment used in the production process and the meat plant environment. Those bacteria may include pathogens such as *Salmonella* and verotoxigenic *E. coli,* including the serotype O157:H7. The grinding process also spreads the bacteria on surfaces of meat and grinding equipment to interior portions of the meat. Due to the risks associated with consumption of undercooked burgers, Canadian regulatory authorities require that products containing ground beef to be cooked to a final internal temperature of 71°C. This standard has been established on the basis of the requirement to achieve a 5 log CFU reduction of *E. coli* O157:H7.

1. *National survey of 1,000 Canadian consumers commissioned by the Canadian Cattlemen's Association and conducted by an independent market research firm.*

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ALMA Alberta Livestock and Meat Agency Ltd.

CANADIAN BEEF CATTLE CHECK-OFF

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CCA CANADIAN CATTLEMEN'S ASSOCIATION
National Voice Of Cattle Producers

Research on Beef Burgers

Laboratory research was performed at the AAFC Lacombe Research and Development Centre. Approximately 10 million *E. coli* O157:H7 were injected at the centre and edges of burgers of approximately 120 grams in weight. Such high levels of *E. coli* bacteria would not be found in reality, however they are utilized to test cooking methods for burgers in the laboratory. Health Canada requires that cooking methods be demonstrated to be capable of eliminating large numbers of *E. coli* O157:H7 *e.g.* 100,000 bacteria reduced to zero.

Burgers were cooked from frozen or chilled state using an electric barbecue. Burgers were cooked to 67 or 71°C internal temperature with flipping of the burger one to three times. During cooking to 71°C, the burgers were flipped once at six minutes, or twice at three and six minutes for chilled or four and eight minutes for frozen.

When burgers were flipped once during cooking to 71°C, the elimination of *E. coli* O157:H7 was not complete, and higher levels remained in burgers cooked from frozen. However, when burgers were flipped twice during cooking to 71°C, *E. coli* O157:H7 was eliminated throughout the burgers irrespective of whether or not the burgers were frozen.

Given the effectiveness of flipping burgers twice, burgers were also cooked to 67°C to determine if lower burger end-point temperatures were safe. However, neither flipping once, twice or three times was sufficient to ensure product safety.

The average time it took to cook frozen burgers to the same final temperature with the same turning frequency was more than three minutes longer than that for chilled burgers.

Conclusions

The recommended method for cooking burgers is to achieve an internal temperature of 71°C with flipping at least twice during cooking. This recommendation is consistent with the current practices of the majority of Canadian consumers.

The CCA is a non-profit federation comprised of eight provincial member cattle associations that provide representation to a national, producer-led board of directors. The CCA's vision is to have a dynamic, profitable Canadian beef industry with high-quality beef products recognized as the most outstanding by customers at home and around the world.

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