

Recent Research in the Economics of Food Safety

by John A. (Sean) Fox, Michael A. Boland and Ping Zhang*

There have been several changes in the meat industry with respect to food safety in recent years. In this report we summarize recent studies conducted at Kansas State University that examine the economic impact of those changes.

One of the effects of new food safety regulations has been the development of safety enhancing technologies such as steam and hot-water pasteurization systems for carcasses. Kansas State University meat scientists have conducted several studies on the effectiveness of steam pasteurization for controlling bacteria on beef carcasses (Phebus et al.) while the effectiveness of hot-water pasteurization has been studied at other institutions (Castillo et al.). For a representative meat plant (100 head/hour, 8 hours/day, 280 days/year), Fox and Boland estimated fixed costs of \$0.25 and \$0.15 per head for the steam and hot-water systems, respectively. Higher throughput reduces the cost difference between the two systems. At 300 head/hour, fixed costs are \$0.08 and \$0.05, respectively. Operating cost for both systems was estimated at approximately \$0.19 per head. Relative operating costs were sensitive to utility prices because steam pasteurization uses more gas and the hot-water system uses more electricity.

The total cost of carcass pasteurization, which ranges from \$0.40 to \$0.45 per head, translates into an increase in meat price of less than one tenth of a cent per pound. However, apart from the costs of new technology, food safety regulations involve other costs associated with planning, training, and

record-keeping. In a survey of meat processing plants in Kansas, Nebraska, and Missouri, Peterson found that the postimplementation costs of HACCP and SSOP's were greater than the estimated baseline costs as reported by the USDA Food Safety Inspection Service (FSIS) prior to the regulation's implementation. In an earlier study, Klein had found that the cost of implementing the USDA FSIS zero tolerance directive was sensitive to a plant's size, and that without economic incentives from consumers, those costs would decrease plant output.

The additional costs associated with food safety will ultimately be borne by consumers. Overall welfare is increased if consumer willingness-to-pay for enhanced food safety exceeds the cost of attaining it. In a survey of Kansas consumers, McIlvain found that consumer willingness-to-pay for the reductions in food safety risk achieved with steam or hot water pasteurization were greater than the costs of either system. That study also identified cost savings of around \$40,000 per annum associated with the reduced probability of a product recall. Fingerhut et al. investigated consumer willingness-to-pay for beef treated with steam and hot-water pasteurization, beef treated with irradiation, and beef that had not been treated with any antimicrobial technology. Almost two-thirds of all respondents indicated a willingness to pay more for beef treated with any of the three technologies.

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Of those consumers surveyed, 64 and 75 percent reported that they preferred ground beef treated by irradiation to beef treated by steam pasteurization or hot-water pasteurization, respectively. The stronger consumer preference towards

*Sean Fox and Michael Boland are associate professors in the Department of Agricultural Economics, Kansas State University, Manhattan, Kansas 66506-4011. Ping Zhang is a former research associate and currently an economist with the Center for Disease Control.

the more effective technology, irradiation, suggests that consumers value marginal risk reductions, even in an already relatively safe product such as beef that had undergone carcass pasteurization. In another study, Fox et al. found that 75% of consumers preferred irradiated to nonirradiated pork.

Because Americans now spend approximately 52% of every food dollar away from home, acceptance of technologies such as irradiation depends as much on food-service providers as on consumers. Mullik surveyed 525 restaurants in Kansas and found that most had a positive attitude towards irradiation. A majority of restaurant managers were willing to buy irradiated ground-beef patties and median willingness-to pay for irradiation was estimated at \$0.04 per pound. It is important to provide information and education to the public and to food-service providers concerning irradiation. Our research found that several respondents

had misconceptions about the effects of irradiation. Schroeter found similar results in consumer focus groups, which suggests the need to get more information to consumers about irradiation.



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