

## **BEEF SAFETY RESEARCH PRIORITIES**

National Cattlemen's Beef Association

### **Recommendations from H. Russell Cross**

#### **Background.**

Food safety will continue to be top of mind with domestic and international consumers of U.S. beef. We are in the midst of a massive food safety reform in the U.S. that was triggered by the 1993 *E. coli* O157:H7 outbreak. In addition, the ongoing *E. coli* O157:H7 outbreak in Japan has seriously impacted U.S. beef sales in Japan (35-40%) at a cost approaching \$1 billion--even though no U.S. beef contributed to the Japanese outbreak. The current administration will have food safety as one of its major focus areas for the next four years. We expect President Clinton to make a significant announcement on food safety in his State of the Union address early next year. With the new HACCP and pathogen reduction regulations in place, we now have, for the first time, national bacterial performance standards on raw meat and poultry. It is expected that results of the USDA tests will be made available to the public on an individual plant basis (World Wide Web and 800 number). For these reasons, the awareness (and perhaps confusion) of the public regarding food safety will continue to increase. It is imperative that the U.S. beef industry become very aggressive to do all that they can do to make beef as safe as possible for their consumer and convince them that they have done so.

#### **Vision.**

The food safety program of the future will be based on risk reduction through prevention programs such as HACCP. These HACCP programs will contain effective hazard prevention or intervention strategies. HACCP will be implemented by the industry with third party oversight from the federal government. The command and control daily oversight will not be necessary nor will it be effective under a strong HACCP program. Finally, the HACCP/prevention system will be implemented from the ranch to the consumer. The final stage of the food safety chain will contain effective educational/awareness programs for the consumer.

#### **Goals.**

The goals of the U.S. beef industry in regard to food safety should include efforts to:

- Conduct research aimed at reducing hazards in beef that impact public health from the ranch to the consumer.
- Implement science-based technology to reduce hazards to public health.
- Aggressively tell their customer what they are doing to produce the safest beef product in the world.

#### **Potential Research Focus Areas (not listed in priority order)**

Pre-harvest.

- Conduct research to determine whether beef pathogen reduction focus should be prior to slaughter, after slaughter or both. Many in the beef industry feel that multiple post-slaughter pathogen interventions will effectively take care of pathogens. In recent articles, some consumer groups have stated that they feel that all *E. coli* O157:H7 is derived from the cow, regardless of

what food causes the illness. Research should be conducted to give the NCBA policy makers the information they need to take a position on pre- vs. post-harvest pathogen interventions.

- Conduct basic research to investigate bacterial attachment and detachment in the rumen prior to slaughter.
- Conduct a detailed public health risk analysis comparing dairy cows, beef cows, fed steers and fed heifers. Focus should be on pathogens and chemical hazards.
- Conduct research to evaluate risk factors and bacterial levels associated with the bovine during management prior to slaughter. There are potential risk factors associated with changes in the prevalence of human enteric pathogens in beef animals during the pre-slaughter time period. Research is needed to determine the change in bacterial load as influenced by pre-slaughter management, handling, etc.
- Conduct research to develop systems to effectively "trace-back" from the final product to the individual animal. The ability to "trace-back" will eventually be a requirement by the end-users of beef (food-service, retail, etc.) Many countries are well advanced in this area such as England, Ireland, France, Italy, and Australia. An initial step would be to access the current state of the knowledge in these countries and the U.S. Trace-back is coming, so we had better be prepared

#### Post-harvest.

- Investigate human beings as vectors/vehicles for transmission of *E. coli* O157:H7 and other microorganisms.
- Develop microbiological interventions following beef carcass fabrication--immediately prior to vacuum packaging and trim utilization.
- Investigate the inclusion of antibacterial agents in packaging film for retail case-ready cuts.
- Conduct research to identify all points between final washing of carcasses at which potential exists for microbiological contamination, growth and proliferation.
- Investigate the potential of pre-evisceration washing of beef carcasses to determine potential for preventing attachment of food-borne pathogens to the surfaces of the carcass.
- Develop pathogen interventions for variety meats. When the Japanese government began testing imported products for *E. coli* O157:7 they found two positives in U.S. beef variety meats. No other country had any positives. The U.S. beef industry generally does not practice HACCP for variety meats nor do they use pathogen kill steps. It is critical that this area be addressed as soon as possible. We need to be able to tell our Japanese customers that "we are researching the problem and that it is a very high priority."
- Conduct research to evaluate the effect of slaughter line speeds on the presence of pathogens post-slaughter.
- Conduct research to evaluate the impact of slicing open lymph nodes for inspection as this practice relates to the spreading of pathogens.
- Conduct research on the use of competitive inhibition of pathogens by non-pathogenic bacterial to

reduce pathogens on the carcass.

- Conduct research to evaluate the effect of beef carcass spray chilling on shifts of bacterial pathogen profiles on the beef carcass.
- Investigate various combinations of factors in processing, (i.e.. water activity, Ph, heat, chemicals, bacterial cultures, atmospheric pressure, packaging, etc.) to eliminate or damage pathogens.
- Conduct research to determine how pathogens are transmitted through slaughter and processing facilities. What physical controls are available to stop that transmission? What are the effects of condensation and aerosols on bacterial contamination?
- Conduct research to establish quantitative data on the impact of marginal temperature abuse on the growth of pathogens, especially during transportation.
- Conduct research to evaluate the human health risks of slaughtering diseased/suspect animals concurrently with healthy animals? Risk assessments could be performed to assess the risks related to cross contamination by carcass contact, dressing procedures, washing, equipment, aerosolization of pathogenic organisms, etc.
- Conduct research to evaluate the human health risks related to the consumption of products that are produced using different types of chilling systems. Risk assessments could be performed on air vs. water chilling (poultry).
- Conduct research to investigate the use of non-meat ingredients to limit growth of pathogens in processed beef products.
- Conduct research to evaluate the impact of condensation on pathogen levels and foodborne illness. Data is needed to determine the public health importance of condensation in beef fabrication and processing.
- Conduct research designed to improve the state and federal foodborne illness surveillance systems related to foodborne bacterial disease.
- Conduct research to evaluate the current state of pathogen intervention technology in regard to ready-to-eat beef items. There is a strong likelihood that effective kill steps are missing from these products and the potential exists for serious problems.
- Conduct research to develop an effective kill step for BSE prions in the rendering process.
- Conduct research to develop a rapid and low-cost test for BSE prions.