facsimile
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pages: 3

Please deliver to ERIC OLSEN who will be attending a meeting in your office later this afternoon.

Food Safety – farms – EW

From the desk of...

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- Jerry Larson
Copy for HY SG PG SD CE SS CW

Food Safety: Specific "On Farm" Thrusts

Pathogen Destruction Processes for Animal Waste ($4,000,000)

(2) Research will develop practical and economical processes to reduce the levels of pathogens in animal manure. Different processes will be developed for each type of animal production, and processes will be scaled to on-farm size and manure production levels, with well defined process parameters. Development of these methods will prevent transmission of pathogens to agricultural lands and crops used for human food, and prevent possible pathogen transmission to animals or other crops from surface runoff and irrigation waters.

Development of Predictive Models for Risk Assessment ($3,000,000)

(4) Risk assessment is crucial to evaluate the effects of production practices, processing and transportation systems on the contamination of food processing animals as they are presented for slaughter. Quantitative data is required to carry out the mathematical computations, and to develop and validate predictive models which are necessary components of risk assessment. Research will collect data on the incidence, number and type of pathogens on food producing animals at various critical stages of production and management. Predictive models will be developed for the transmission of zoonotic pathogens through farm management systems to the presentation of animals for slaughter.

Antibiotic Resistance ($4,000,000)

(1) Research will determine the amount and length of time antibiotics should be used, and other selective factors or conditions favoring the acquisition and dissemination of resistance genes among pathogens and non-pathogens in food producing animals. Research using chemostat model systems will determine the factors or conditions which favor the emergence of resistant organisms in the gastrointestinal tract of animals. Research will develop molecular characterization methods to facilitate the identification of resistant pathogens detected in food, and trace them back to their source. Research will seek to determine if morbidity and mortality sometimes associated with antibiotic resistant organisms are due to genetic factors for increased virulence which accompany resistance genes. New technologies including immunotherapy and competitive exclusion will be developed to reduce antibiotic use in the production of animals.

Transportation ($3,000,000)

(5) Transportation systems and practices increase the number of pathogens on all animals presented for slaughter. Research will determine the viability of feed withdrawl and the use of competitive exclusion cultures to reduce pathogens. Research will determine the role of stress and transportation time on pathogens transfer. Long transportation times increase animal stress, and stress may increase fecal shedding of pathogens. Culled diary cows are of particular concern, since meat processed from these animals is used for ground hamburger. Research will determine if increasing the holding time prior to slaughter assists in reducing pathogen levels. Research will examine if animal haulage technology and sanitation could be improved to effectively reduce pathogen contamination.

ARS proposals for additional food safety work in 2000.
Submitted to OBPA 8-24-98
JL

Ecology ($3,000,000)

Ecological research will be performed to determine which areas of the environment, range to feedlot, are of particular concern for pathogens. It is critical to identify specific sites since some reservoirs appear not be real. Prevalence of pathogen types within a particular niche, seasonality, pathogen life cycle, carrier status, and the role of wild animals will be examined. Research will also determine the influence of fecal shedding, herding, cattle type, and immune status. Research will develop molecular characterization methods to facilitate the identification of specific pathogens. Modeling studies will be performed to determine whether increased pathogen levels are predictable.

Pathogen Reduction Through Nutrition ($3,000,000)

Research will be directed towards the development of nutritional strategies for decreasing pathogens in cattle prior to slaughter. Fermentation acids help exclude foodborne pathogens from the gastrointestinal tract. Research will examine whether reduction in levels of starch through dietary modification, that is, reduced feeding of corn and increased feeding of hay prior to slaughter, effectively reduces pathogen levels, particularly E. Coli O157:H7.

Food Safety: Specific "In Plant" Thrusts

Irradiation ($2,000,000)

Research will be directed towards the increased use of irradiation for the control of pathogens in food. Consumer fears of irradiated foods are rapidly diminishing. Repeated endorsements by national food processing and health associations, and governmental regulatory agency approval for the process, offers an opportunity to increase the number of foods that could be treated by irradiation. Research will be directed to focus on fruits and fruit juices, vegetables particularly sprouts, ripening, ground meats, fish and shellfish.

Intervention Strategies ($3,000,000)

Increased attention must be directed towards the microbiological safety of fruits and vegetables, in particular, on interventions to remove or kill human pathogens from fresh produce. Research will determine profiles of native microbiological flora on product surfaces, and address the mechanisms of adhesion and biofilm formation to understand the relationship of pathogens to other species. Research will develop model biofilm systems to test physical and chemical strategies for minimizing pathogens by penetration, disruption or release of biofilms. Research will screen and attempt to identify both new compounds and synergistic combinations of existing compounds or methods to minimize pathogens in biofilms. Research will develop new treatments that can be applied to conventional washing technology or as part of the packaging technology. Research will also be directed towards using biological intervention strategies in "problem commodities" such as seeds used for production of sprouts and the sprouts themselves, which do not respond well to antimicrobial washes. Research will focus on the isolation and identification of competitive microorganisms from the natural microflora of these foods. Competitive exclusion, either alone or in combination with other hurdles such as seed sanitation will be evaluated to control or eliminate human pathogens.