A Discussion of an Epidemiologic and Economic Consideration in HACCP Evaluation: An Application of Salmonella

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This research focuses on conceptualizing the potential impact of good management practices and the associated economic costs and benefits of those practices aimed at reducing Salmonella. The aim is for feedback on ideas about systems identification, possible critical control points (CCPs), potential pathogen tests (serological vs. culture) and levels, identified test points, and potential benefits, etc. Analysis will focus on two levels, animal production (pre-harvest) and slaughter/processing (post-harvest). A primary objective will be identification of effective intervention strategies for reducing Salmonella.

Flowcharts have been developed for both animal production systems on farm and at the slaughter/processing plant. Test points and CCPs to detect presence of Salmonella have been tentatively identified for both levels. A Delphi technique was used to determine the initial critical control points and test points.

The systems flowcharts at the pre-harvest level depict pig movement within different farm management systems (one-site, two-site, and three-site swine production management systems with an all-in all-out practice) and include transportation of animals. Systems flowcharts at the post-harvest level show that the majority of CCPs and test points are at the front end of the slaughter/processing cycle, and include test points for Salmonella at the final stage of fabrication. The slaughter facility will include pigs from multiple sources which will be commingled at slaughter. This systems approach allows for evaluation of good management practices based on the prevalence levels of Salmonella at the beginning of the slaughter cycle as compared to the end of fabrication.

Culturing vs. rapid test (MIX ELISA) will be evaluated accordingly to determine: costs differences, labor requirements, turnaround time, ease of collection, impact on line speed, capital requirements, etc. Advantage and disadvantages of each method and, perhaps, identification of a balanced approach based on information and knowledge gained will be a focus.

Economic implications or costs of management interventions at identified CCPs for the animal production level and the slaughter plant level will be determined. These costs will be compared to the potential benefits for Salmonella reduction. For producers, potential comparisons will be intervention costs vs. performance changes such as: average daily gain or time to market, pounds produced per square foot, or potential changes in animal quality and value.

For producers/processors intervention costs at identified CCPs will be compared to benefits for products with reduced or low levels of Salmonella. Benefits may be a premium price for products with reduced Salmonella, reduced product losses due to extending the product shelf life, product appearance, etc. Packers/processors will be surveyed to obtain feedback on those potential benefits. Knowledge gained will be incorporated into good management practice recommendations. Information on costs and benefits can provide insight into potential premiums or discounts based on Salmonella levels in swine and pork products. It will allow determination of added value for reduced Salmonella levels.