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Food-Borne Pathogen Control – Relative Efficacy of On-Farm Control vs. Processing Plant Interventions

Introduction

North Americans enjoy some of the safest food in the world with the consumer expecting an unlimited supply of appealing, convenient, healthy, and reasonably-priced food. The microbiological safety of these foods is of the utmost importance to the poultry industry as well as the consuming public.

History and Background

The United States Department of Agriculture (USDA) formed the Food Safety and Inspection Service (FSIS) in 1906 in response to public concern about unsanitary conditions exposed in Upton Sinclair's book "The Jungle". At that time, the poultry industry was small and represented a second occupation for farmers who raised birds for personal consumption. As the poultry industry grew, the Federal Poultry Inspection Service was established in 1926. In 1957, Congress passed the Poultry Products Inspection Act which established regulatory standards for poultry products. At present, over 7500 FSIS employees work in about 6300 federally inspected meat, poultry, and egg production plants verifying compliance to those standards.

Even with regulations in place, on occasion, cases of human food poisoning still occur that can be attributed to pathogens on poultry products, particularly *Salmonella*. To reduce risk of human exposure to this and other pathogens, the poultry industry has implemented interventions aimed at controlling exposure in the field as well as reducing microbial levels in the plant. Field interventions include the use of bio-security and sanitation programs, vaccination, competitive exclusion products, and antimicrobial therapy.

Some groups have attempted to limit or even eliminate the use of antibiotics in poultry for fear that such use will increase bacterial resistance in humans. However, research has shown that limiting the treatment of disease has an adverse affect on flock health and may actually increase the level of microbial contamination, including *Salmonella.* It has been estimated that the withdrawal of certain antibiotics from use in chickens in the US will cause significantly more human illness days (and more cases of each type of illness, both resistant and susceptible) than it would prevent by withdrawing them. Antibiotics and other intestinal pharmaceuticals aid in maintaining intestinal health and if that is lost, an increase in *Salmonella* and other intestinal pathogens may occur.

Even with the incorporation of interventions in the field, *Salmonella* levels at many processing facilities appear to fluctuate independent of those interventions. This may be a result of the testing methodology in that only the presence or absence of Salmonella sp. is reported, not actual numbers. In other words, a carcass with a single *Salmonella* is weighted as heavily as one with 100,000. Thus, actual reductions (or increases) in number of *Salmonella* present on carcasses, is unknown. Further confounding the situation is that of over the 2400+ serotypes of *Salmonella*, there are only a few that cause are illness in humans. Reducing the level of one serotype may not affect the level of another.

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The objective of controlling food-borne pathogens should be to minimize and control those pathogens in poultry that are a concern to human health using as much science-based methodology as possible. The poultry industry should control these pathogens first through application of methods eliminating exposure at critical control points with emphasis on the most effective control points. These areas include: breeder facilities, feed-mills, hatcheries, broiler grow out facilities, and through monitoring for the absence of disease by laboratory testing. Bird (breeder and grow out) intestinal health should be improved and maintained with the proper use of approved pharmaceuticals and biologics – antibiotics, anticoccidials, feed additives, vaccines, etc. under the supervision of a licensed veterinarian. On-Farm Best Management Practices should also be employed.

Still, the processing plant probably affords the most effective means of reducing the passage of human pathogens, and interventions that show consistent reductions should be employed. The industry should also work with USDA towards implementing a risk-based inspection program based on scientific principles. Finally, education of the consumer on food safety issues including proper handling and cooking of food is of utmost importance in the prevention of food-borne illness. Our organization ~~should~~ supports the effort ~~of others~~ to educate consumers.