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SALMONELLA CONTROL

Every producer of human food, livestock feed and all ingredients that are used in food and feed is rightfully concerned about the control of Salmonella in his product or products. Because of the seriousness of the problem to the rendering, meat packing, and related industries a significant part of the total funds available to FPRF are being used for Salmonella research. A summary of this program is presented below.

Terminal Heater. Preliminary studies supported by FPRF on a terminal heater were reported in "The Director's Digest" No. 23, May, 1966. Although the equipment used did destroy Salmonella in meat and bone meal under the conditions tested, uniformity of heating was a problem and this type of unit has serious capacity limitations. After careful evaluation of all factors involved, Darling & Company's research and development laboratory, with support from FPRF, selected a Bartlet-Snow-Pacific Thermal Disc Processor for additional studies. To determine the conditions necessary to destroy Salmonella with this equipment solvent extracted meat and bone meal artificially inoculated with Salmonella senftenberg, a very heat resistant serotype, was used. Analysis of the data from an extensive series of pilot runs showed this equipment would destroy all Salmonella present under the following conditions:

1. A material discharge temperature of 210°F.
2. Operation of the unit in a vapor sealed configuration.
3. Adjustment of moisture content of the feed material to a uniform 9-10%.
4. Disc tip speed equivalent to 75-100 rpm on the pilot unit used.

5. Balanced supply of 100 psig steam to the disc shafts and individual condensate trap for each shaft.

6. A feed rate of 21 to 26 pounds per hour per square foot of heating surface.

A machine of the type used, designed to handle 10 to 12.5 tons per hour, will cost approximately $40,000 F.O.B. San Francisco. Full operating costs, including steam, electricity, water, depreciation, maintenance and labor would amount to approximately $0.60 per ton.

Studies are now under way to establish the equipment modifications and changes in operating procedures needed to use the machine for high fat expeller meal, poultry by-product meal, hydrolyzed feather meal and similar materials. Also, the possibility of using other types of commercially available equipment to attain the same processing conditions is under investigation.

Control of Salmonellosis of Chicks. In research supported by a grant from FPRF it has been found by Dr. G. H. Snoeyenbos, University of Massachusetts, that Salmonella contaminated feed very often fails to produce infection in chicks, and that transmission of salmonellosis does not readily occur between pens and houses on a farm. Precise thermal death time studies show that heat resistant serotypes of Salmonella can be destroyed by heating feed containing 15% moisture for 3.6 minutes at 197°F. (This confirms the results of the Darling & Company studies reported above). Current research by Dr. Snoeyenbos includes studies on pelleting to establish conditions necessary to destroy Salmonella by this process, and testing the feasibility of destroying Salmonella in hatching eggs by injection of antibacterial agents.

Antimicrobial Agents. Two new projects on Salmonella control have recently been activated: (1) A Study of Antimicrobial Agents as Salmonella Antagonists, supported jointly by NRA and FPRF, at Darling & Company, and (2) Studies on the Growth of Salmonella in Meat and Bone Meal, supported by grant from FPRF, at Fairleigh Dickinson University under the direction of Dr. Harold Yacowitz. Research under both of these projects will attempt to define clearly the conditions under which Salmonella will grow in animal and poultry by-product protein meals and to evaluate antimicrobial agents as potential growth inhibitors of Salmonella in these meals.

It should be emphasized that these projects are designed to furnish information that can be used to supplement, but not replace the strict plant sanitation procedures that are required to control Salmonella contamination of feed and feed ingredients. Proper plant sanitation and process control must remain "the first line of defense" against Salmonella contamination.