



# FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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## "THE DIRECTOR'S DIGEST"

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Technical Director

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### SALMONELLA RESEARCH

Because of the current critical nature of the Salmonella problem, the following up-to-date summary of FPRF sponsored research in this area is presented for your information.

Antimicrobial Agents as Salmonella Antagonists. This project, at the laboratories of Darling & Company is jointly supported by NRA and FPRF. Research findings to date are summarized below.

1. Salmonella counts of artificially inoculated meat meal were reduced somewhat by the addition of fats and fatty acids to the meal. This was particularly true if fatty acids were used with the higher grades of fat. However there was no reduction in count when meals containing high levels of fat and fatty acids were stored.
2. Salmonella organisms in artificially contaminated meat meal do not grow in the normal acidity range of pH 5.8 to 6.5 or in meal in which the moisture content has been adjusted from 7.7% to 25% even when samples were inoculated for several weeks at optimum temperatures.
3. Several chemical agents have been found that inhibit the growth of Salmonella under laboratory test conditions. The most promising agents, alone and in combination, are low molecular weight organic acids. Experiments are in progress to evaluate the effect of these materials when added to contaminated meat meal.

Studies on Growth of Salmonella in Meat and Bone Meal. Dr. Harold Yacowitz is conducting these studies in his laboratory and at the Health Research Institute, Fairleigh Dickinson University. The following results have been obtained.

1. Neither animal fat nor fish oils had any stimulatory or inhibitory effect on the growth of Salmonella senftenberg in artificially contaminated meat meal or when tested with laboratory nutrient media. However crude soybean lecithin stimulated growth of the organisms.
2. Salmonella in naturally contaminated meat meal containing 6.4% moisture did not grow but were not destroyed during storage for three months at room temperature. When the moisture content of the meal was increased to 12.4% all vegetative bacteria, including Salmonella, were destroyed in the three months storage period. When meat and bone meal, artificially contaminated with Salmonella senftenberg, was adjusted to 12% moisture content and stored at 37°C. there was a significant reduction in count after two weeks and no Salmonella were present after four weeks storage. Research is underway that should help to explain these unexpected results and perhaps lead to some practical techniques for control of Salmonella.

Detection and Control of Salmonella of Poultry. Dr. Snoeyenbos, University of Massachusetts, has worked extensively on the Salmonella problem for the past several years. Some of his findings are summarized below.

1. Although more than half of the meat and bone meal samples examined showed the presence of Salmonella, the level of contamination was usually quite low - less than 10 organisms per gram.
2. Although poultry flock infection from contaminated feed was demonstrated in a few instances, such infection was rare compared to the frequency of feed contamination. Most flock infections resulted from sources other than feed.
3. Precise laboratory studies have shown that heat resistant serotypes of Salmonella can be destroyed in meat and bone meal containing 10% moisture by heating for less than two minutes at temperatures of 185-190°F. These findings will be used in developing conditions necessary for Salmonella destruction in a feed conditioner and pellet mill.

Although these research findings are not applicable to the immediate solution of the Salmonella problem, they do contribute greatly to our understanding of the practical aspects of Salmonella control. Future results from this research and from research in other laboratories will undoubtedly develop facts that will aid in the elimination of Salmonella from foods and livestock feed.