FATS AND PROTEINS
RESEARCH FOUNDATION, INC.
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THE DIRECTOR'S DIGEST
D. M. DOTY
TECHNICAL DIRECTOR

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ACID ANTAGONISTS FOR SALMONELLA CONTROL

A number of research investigations have shown that high acidity (low pH) will inhibit growth of Salmonella organisms. In addition, research sponsored by the Fats and Proteins Research Foundation and Darling-Delaware Company has shown that some low molecular weight acids (acetic, propionic) have a definite bacteriocidal effect on Salmonella in animal by-product meals if used in conjunction with enough strong mineral acid to attain a pH of 4.5 to 5.0. For example, in one series of tests, a mixture of acetic acid and phosphoric acid added to meat and bone meal at a 4.5% level (1.5% acetic acid, 3.0% phosphoric acid) reduced the level of Salmonella by more than 95% (as compared to a control with no acid added) after 15 days storage at ambient temperature.

These data suggest that an acid mixture of this type might be effective as a sanitizing agent and could act as an antagonist to prevent Salmonella growth in meat and bone meal at even lower concentrations. This has been tested in a practical way in a number of rendering plants. In some plants the treatments have been effective in reducing the incidence of Salmonella contamination in finished meat and bone meal. In other plants the treatments have not been successful.

The following system of treatment has been developed and recommended by Darling-Delaware Company.

Acid Sanitizing Solution and Use. The acid sanitizing solution is made up as follows:

Phosphoric acid, 80% feed grade syrup	3-3/4 lbs.
Acetic acid, technical grade	1-1/2 lbs.
Water	94-3/4 lbs.

Mix the solution thoroughly and apply with either a tank type or airless pressure spray equipment to conveyors, presses, hoppers, mills, screens and storage silos to produce a thoroughly wet wall effect. Optionally the surrounding floor may be sprayed down also. This sanitizing treatment, with the exception of silos, should be followed on a weekly or even more frequent schedule. Silos should be sanitized on an "in turn" basis as they become empty.

Caution. The acids and the dilute acid solution are corrosive. Workers handling the materials must wear proper protective clothing including goggles and rubber gloves. Storage tanks, spray equipment, etc. must be acid resistant.

Acid Antagonist Solution and Use. The acid antagonist solution is made up as follows:

Phosphoric acid, 80% feed grade syrup	3-3/4 lbs.
Acetic acid, technical grade	1-1/2 lbs.
Water, as needed (see below)	5-10 lbs.

Mix the solution thoroughly. The solution strength should be such that the solution can be applied to attain an acid strength of 5-1/4 lbs. of acid per ton of product through an appropriate metering pump system.

The above solution is sprayed directly onto the cracklings at a point, where preferably, the following conditions can be achieved:

A. Cracklings are hot or warm.

B. Material can be mixed and dispersed immediately after the spraying operation.

C. Any chemical loss through vaporization or volatilization can be recovered back to the product.

The solution is added by a metering or proportionating system set to give an application of 5.25# chemical addition per ton of meat meal processed. Metering pumps should have all wetted parts 316 SS or other non-corrosive material. Tanks should be of 316 SS or Fiberglass reinforced plastic (FRP) and should be agitated. Lines, spray manifolds, and atomizing nozzles should be of 316SS. A typical system for chemical feeding is detailed below.

Vendor: Robert J. Fitzmeyer Co., Inc.
4716 North 2nd Street
Philadelphia, Pennsylvania 19120

Equipment Description: One (1) JAECO Proportioning pump Model 6211-S, w/¼ H.P. single phase, 115 volt T.E.F.C. motor, simplex unit, and 2 - 100 gallon chemical resistant Fiberglass tanks with agitators on mounting brackets, including mounting pump on one of the tanks with P.V.C. suction valves. Agitators having 1/3 H.P. T.E.F.C.motors.

Cost F.O.B. W. Conshohocken, Pa. $1,560.00

Caution. The same precautions apply to the acid antagonist solution as outlined above for the sanitizing solution.

Persons desiring additional details on the use of the acid mixtures as a sanitizing agent or Salmonella antagonist in meat and bone meal should contact Mr. Raymond H. Jones, Darling-Delaware Company, Inc., 4650 South Racine Avenue, Chicago, Illinois 60609, Telephone 312/927-3000.

It would be most helpful if the results of any plant tests using the acid mixtures are reported to the FPRF office. This will enable us to furnish sound advice to others requesting information on the acid mixtures and be valuable in our contacts with regulatory agencies concerned with Salmonella control.

NEW MARKETS FOR TALLOW THROUGH RESEARCH

A talk on this subject was presented, by invitation, at the 1971 Spring Meeting of the American Oil Chemists' Society. The paper was recently published in the JAOCS and a reprint is enclosed.