FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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Removal of Polyethylene from Tallow in the Rendering Plant

The increasing use of polymeric wrapping materials in the meat processing and retailing industries is reflected in a rising incidence of polyethylene in rendered animal fats. Not only is the presence of polyethylene objectionable from an esthetic point of view in edible fats but its accumulation in fatty acid processing equipment entails costly periodic shutdowns for its removal.

A two pronged attack to reduce the amount of polyethylene in tallow was initiated several years ago. The National Renderers Association launched with considerable success an intensive educational campaign directed at eliminating, insofar as possible, the entry of polyethylene film from drum liners, retail meat wrappers and such sources into the raw materials of the renderer. At the same time the Fats and Proteins Research Foundation sponsored an evaluation of various common fat refining procedures for the removal of polyethylene from rendered fat.[1]

Practical considerations ruled out all but bleaching with filtration, a technique that proved to be effective in reducing polyethylene levels on a plant scale. A preliminary report[2] summarized the experience of a number of rendering plants in reducing polyethylene levels by treatment with activated bleaching earth and filter aids.

Although industry practices varied widely from plant to plant, sufficient data were gathered to compute a rough regression equation from which some conclusions could be drawn. Polyethylene removal was favored by lowering filtration temperature and by increasing the amount of bleaching earth and filter aid. Filtration time varied inversely with filtration temperature and was increased by excessive M.I.U. levels.

Additional tests of the most effective procedure were then conducted under closely controlled conditions among a panel of collaborating renderers to confirm the general applicability of the method and to permit more specific recommendations to be made. The fact that one brand of bleaching earth and filter aid were specified in the confirmatory test reflects the intent to reproduce an effective plant procedure by standardizing as many variables as possible. Other brands have been used successfully for the removal of polyethylene under similar processing conditions.[3]

Raw tallow as obtained from the centrifuge of a continuous rendering operation, or the equivalent product from batch processing, is treated with 0.8% of Special Filtrol Grade 4 bleaching earth. Excess moisture is removed by passage through a vacuum dryer at 190-220°F. or by agitating in an open tank at 220°F. or higher. Total M.I.U. at this point should preferably not exceed 0.5% and unsaponifiables should be no higher than 0.30-0.35%. The tallow is then cooled to 180°F. and filtered through a pressure filter with the addition of 0.2% Celatom FW-12, either as a precoat on the filter or as a body feed in the tallow. Close control of the filtration temperature is essential to the successful removal of polyethylene.

This procedure usually lowered polyethylene levels from about 250-300 ppm to 0-20 ppm when analyzed by the tentative A.O.C.S. gravimetric method. Higher starting levels of polyethylene, i.e., about 600 ppm, were reduced to roughly 100 ppm. The use of proportionately larger amounts of bleaching earth and filter aid or a second treatment are suggested for more effective reduction of high levels of polyethylene.

Optimum effectiveness in removing polyethylene from tallow may require minor modifications by each renderer to adapt the procedure to his particular rendering and filtration equipment and to the nature of the raw materials he processes.

1) Director's Digest, No. 90, December 22, 1971
2) Director's Digest, No. 113, November, 1973
3) Activated bleaching earths:
   Super Filtrol Grades 1 and 4 (Filtrol Corp.);
   Tonsil Optimum FF (L. A. Salomon & Bros.,Inc.) and others
   Filter Aids:
   Celatom FW-12 (Eagle-Picher Industries, Inc.);
   Celite 545, Hyflo Super Cel (Johns Manville, Celite Division);
   Sil-Flow 443 (Sil-Flow, Inc.)