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ANALYTICAL METHODS FOR DETERMINING POLYETHYLENE AND OTHER POLYMERIC MATERIALS IN ANIMAL FAT

Research supported by FPRF at Michigan State University developed several techniques that effectively removed polyethylene from animal fats (Director's Digest No. 90, December, 1971). At least one of these techniques (treatment with bleaching earth at temperatures below 190°F.) has been effective in actual plant operation.

However, the level of polyethylene normally present and the effectiveness of removal techniques have been difficult to evaluate accurately because no standard method for determining polyethylene in fat has been universally accepted in the USA or in foreign countries. At least eight different quantitative methods have been proposed which, unfortunately, do not yield the same results on all samples. Furthermore, some of the proposed methods are very time-consuming and others require the use of very sophisticated equipment not normally found in control laboratories or in many commercial laboratories.

Therefore FPRF has asked IIT Research Institute to study some of the methods and, if necessary, to develop a reliable, simple method for determining polyethylene in animal fats. In the first phase of the study, researchers at IIT Research Institute compared results obtained using the procedure developed by the Japan Oil & Fat Processing Industry Association (a lengthy, exacting method), the modified Emery procedure described by Dr. Dugan of Michigan State University and recommended by NRA, and a procedure now under collaborative study by a committee of the American Oil Chemists Society.

Preliminary results (Table 1) show that these procedures do not give uniform results on some samples, particularly those that contain high levels of polyethylene. The IIT Research Institute investigators attribute the poor recovery on all of

the samples except Sample B to the method of sample preparation. The polyethylene was more finely dispersed in these samples than would normally be the case in commercial tallow. The effect of this was much more dramatic for the Dugan procedure than for the other procedures, especially for Sample D.

Considering all aspects of the methods, the proposed AOCS procedure appears to be the method of choice. It is expected that collaborative studies on this procedure will be completed by the end of December and that the method will be approved by AOCS next spring. In the meantime, investigations at IIT Research Institute will continue.

Table 1. Analytical Results for Polyethylene by Different Methods (Results are in ppm polyethylene)

Sample	Theoretical	Method		
		Japanese	Dugan	AOCS
A	200	139	140	154
B	600	634	584	645
C	681	557	525	343
		454	216	433
		495	283	366
D	604	424	24	370
		442	26	355

RESULTS OF COLLAGEN FERMENTATION STUDY PUBLISHED

The technical results of the collagen fermentation investigations performed under contract with FPRF have just been published. A reprint is enclosed. It is significant that Single Cell Protein of high nutritional quality can be produced from solubilized collagen just as effectively as it can be produced from petroleum fractions. Unfortunately the cost for the process is so high that the product cannot compete economically with oil seed protein (see The Director's Digest No. 92, February, 1972).