



FATS AND PROTEINS RESEARCH FOUNDATION, INCORPORATED

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This is the second issue of "The Director's Digest". I hope that you found the first issue informative; the program of FPRF can be meaningful only if you know what is going on and are able to apply at least some of the results from the research projects.

One of the major projects supported by FPRF has as its objective the development of new processes, uses and products based on inedible animal fats. Scientists at Battelle Memorial Institute have investigated a number of potentially useful reactions and compounds derived from fats. Some of the more promising results are summarized below.

Waterproofing of Concrete. Silicon derivatives of oleic acid and of inedible tallow were synthesized and tested for concrete waterproofing characteristics. High quality structural concrete slabs coated with solutions of the silicon derivatives were definitely more resistant to water penetration than were untreated slabs. These materials were even more effective for porous concrete, especially when applied from solution in mineral spirits to dry slabs. Under these conditions the tallow addition product was the most effective of the products tested. Concrete slabs treated with the various silicon derivatives of fats and fatty acids and similar slabs treated with commercial damp-proofing agents are now being exposed to water to determine the persistence of damp-proofing effects.

Air-Entraining Agent for Concrete. Air-entraining agents are used in concrete mortar to improve the freeze-thaw resistance of concrete. A compound prepared from animal fats, 9-carboxystearic

acid, has shown promise as an air-entraining agent. This compound is a more active air-entraining agent than a commonly used proprietary material. It appears to be more "fool-proof" than presently available materials. The fat derivative showed up particularly well when fly ash replaced part of the washed sand used in making the mortar. Under these conditions, 0.05% of the 9-carboxystearic acid in the mortar gave excellent air entrainment (4-12%, depending on the fly ash used) as compared to a proprietary product used in the same concentration (2-7% air entrainment).

Other Chemicals from Fats. Constituents of inedible animal fats, particularly unsaturated fatty acids such as oleic acid, are quite reactive and offer intriguing possibilities as starting materials for valuable commercial compounds. Organic chemists at Battelle are preparing and purifying some of these chemicals. They have been, or will be, evaluated for specific commercial or industrial uses. One group of derivatives from unsaturated animal fats now under investigation could be used as intermediates in the preparation of epoxy resin curing agents, scavengers for metal in petroleum products, or as ore flotation agents. Another group of inedible fat derivatives may be useful in treatment of textiles, paper, leather, etc. If all, or even some, of these compounds ultimately prove to be commercially useful, a new market for substantial amounts of inedible animal fat will be established.

Just a few notes on other FPRF sponsored projects should be of interest. North Carolina State College nutritionists are starting feeding tests with beef cattle to determine the value of sugar-tallow complex in the ration. There are some sound theoretical reasons to believe that this material will be more effective in cattle rations than unreacted tallow and these experiments should determine whether or not this is true. The University of Arizona scientists expect to publish the very promising results of their studies with sucrose tallow glycerides as surfactants in herbicide sprays. FPRF will help defray the cost of the publication of an Arizona Agricultural Experiment Station Bulletin on this subject. Publication of these results should stimulate other groups to undertake similar agricultural spray tests. If the Arizona tests are confirmed, and there is every reason to believe that they will be, a very substantial tonnage of inedible fats could undoubtedly be used in the preparation of sugar-tallow complex for use in agricultural sprays.