Suggests Thesis Topics in the Field of Fatty Acids

IN the belief that the scientific and industrial possibilities of fat chemistry and fatty acids specifically are being somewhat neglected at academic levels, the Fatty Acid Division of the Association of American Soap and Glycerine Producers Inc., New York, has prepared, in cooperation with other organizations, a list of suggestions for thesis topics, according to E. Scott Pattison, manager, Glycerine and Fatty Acid Divisions. The Division is considering an award program for outstanding college theses or papers. The list follows:

PHYSICAL CHARACTERISTICS

1. Solubility of various individual fatty acids in various organic solvents and in mixtures of water and organic solvents at different temperatures.
2. Solubilities of various pure fatty acid derivatives (alcohol, nitrile, amide, amine esters) in various solvents at various temperatures. Also solubilities of metal soaps. (*i.e.*, to fill in blank spaces that occur in the literature, such as in M. P. Doss' book "Properties of the Principle Fats, Fatty Oils, Waxes, Fatty Acids and Their Salts.")
3. Viscosity determinations on individual pure fatty acids.
4. The effect of oxidation of oleic, stearic, and animal fatty acids on the viscosity of soap solutions.
5. Binary melting point diagrams for fatty acid derivatives of different types: e.g. C_{18} acids/C_{18} nitrile; C_{18} nitrile/C_{18} amide; C_{18} alcohol/C_{18} acid; C_{18} amine/C_{18} nitrile; and others like these pairs.
6. A study of the formation of mixed crystals from various solvents. (This could include binary or ternary mixtures of acids and would involve the construction of phase diagrams, acid preparation, and purification techniques.)
7. Partition coefficients of various pure saturated and unsaturated fatty acids in various binary immiscible liquid-liquid systems.
8. A study of adsorption phenomena of fatty acids and derivatives on specific metallic surfaces, relating strength of adsorption to chain length and functional grouping.

ANALYSIS AND CHARACTERIZATION

9. A study of analytical techniques (potentiometric, colorimetric, micro, etc.) for certain fatty acid derivatives; *e.g.*, amines, zwitter-ions, aldehydes, etc.
10. The qualitative characterization of aliphatic amines. (In spite of the fact that long chain aliphatic amines have been marketed commercially for quite a number of years, to our knowledge no one has reported derivatives of these compounds which can serve for their identification.)

DERIVATIVES

11. Catalytic reaction of higher fatty acids with olefins to form esters.
12. Synthesis of hydroperoxide methyl oleate. (Up to the present time this interesting oxidized product of methyl oleate has been obtained only by the action of oxidizing agents on natural methyl oleate. The completely pure methyl oleate hydroperoxide has never been prepared from natural oleic acid. Recent research on hydroperoxides indicates that a synthesis may be possible.)
13. Preparation and characterization of various keto mono- and dibasic acids.
14. Tetrabromo derivatives of natural linoleic acid. (In the bromination of natural linoleic acid, both soluble and insoluble bromides result. Little, if anything, is known as to what differences contribute to the widely varied properties of these bromine compounds. In fact, the over-all chemistry of natural linoleic acid is in a poor state generally.)
15. Quaternary ammonium salts—kinetics of formation and decomposition with particular reference to steric effects.

REACTIONS

16. A study of the thermal decomposition of saturated fatty acids and the decomposition products formed.
17. The effect of oxidation of stearic acid on its reaction with anhydrous lime.