


# Fat and Oil Progress

OILS and fats are essential constituents of all forms of plant and animal life, and comprise a large portion of the caloric intake of most human beings. A better understanding of the chemical, physical, and nutritional properties of fatty materials is a part of our scientific and cultural progress. Recent developments in this field have produced important results that affect the lives of all of us.

Nutrition studies show that rats receiving fat in their diets grow more rapidly, reach a greater final weight, have greater capacity to do exhausting work, attain sexual maturity earlier, are more fertile, and raise larger young than do comparable animals on fat-free diets. These observations may help to explain the natural craving of the human organism for fatty foods. In cases of populations shut off from their normal sources of fat by the exigencies of war, it has been observed that the decreased fat intake leads to definite mass fat-hunger, to decreased general well-being and ability to do work.

Fats are composed of the glycerol esters of fatty acids. Studies with synthesized fats containing radioactive elements in the glycerol and fatty acid components are leading to a more thorough knowledge of digestion, absorption, transport, and metabolism of the fats. Also, compounds labeled with carbon 14 are being used to show paths of synthesis of fats in both plants and animals. For instance, it has been shown that bovine udders can utilize acetate labeled with $C^{14}$ as a substrate for the synthesis of milk fatty acids and cholesterol.

Another recent development is the experimental clinical use of fat emulsions in intravenous feeding under conditions where high caloric intake by parenteral nutrition is required.

Recent progress in the processing of fats and oils has been significant. Use of selective hydrogenation techniques has produced vegetable shortenings with greatly increased stability with respect to the development of rancidity. Similarly, deodorization and hydrogenation of lards have expanded their fields of application. Also, the general addition of synergistic combinations of antioxidants has improved the stability of lard. Emulsifying agents such as the monoglycerides and the polyoxyethylene esters of fatty acids have been developed for addition to many fats and general-purpose shortenings in order to increase their efficacy in baked products. Certain of these agents decrease the staling rate of bread. Controlled interesterification, or rearrangement of the fatty acid radicals, in the glycerides may eventually give us tailor-made fats for specific uses. In this way the plastic ranges of shortenings and margarine oils can be extended, confectioners' hard butters can be made from more readily available fats and oils, and the use-characteristics of cooking and salad oils can be improved.

Solvent fractionation and solvent crystallization techniques are additional means of modifying the characteristics of natural fats and oils by separation of the more unsaturated components from the saturated solid fractions.

This outstanding progress in the field of edible fats has been matched by contributions of equal importance in the areas of drying oils, protective coatings, soaps, synthetic detergents, and fatty acid derivatives, and in the improvement of oil seed crops. The future holds promise of even greater advances in our fundamental knowledge of these important materials—the fats and oils.

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