Support only basic food research of military significance in areas which might not otherwise be investigated;
Ascertain and delineate the military problems in food research;
Arrange for critical literature surveys and bibliographies;
Provide for the integration of the related sciences that comprise food research;
Encourage the early publication of papers and monographs to facilitate the development of areas in food research;
Insure the dissemination of scientific food information to interested agencies;
Serve as a clearing house for technical information;
Provide for the training of graduate students in food research;
Bring together the workers in scientific fields bearing on food research through conferences, meetings, seminars, and advisory boards.

To accomplish its missions and objectives, the Committee on Food Research undertakes the following functions:

To reflect the food problems of the Armed Forces into technical objectives;
To ascertain the nation's research and development facilities available for undertaking specific investigations;
To recommend the placing of contracts with research and development agencies;
To hold frequent meetings, conferences and seminars;
To channel technical information to the Quartermaster Food and Container Institute for the Armed Forces and other agencies of the Armed Forces for application to military problems.

In the order establishing the Committee on Food Research, the Office of the Quartermaster General defined its general functions:

The Committee will maintain technical liaison with government, quasi-government, and allied government agencies, research institutions, foundations, industrial associations and companies. It will initiate, channel, and exchange information with these institutions on subjects relating to fundamental food research and development activities and ascertain the Army's present and future technical food problems.

APPENDIX TWO

The Committee on Food Research is an integral part of the Quartermaster Food and Container Institute for the Armed Forces and is composed of the Committee proper and advisors.

Committee Members

Emil M. Mrak, chairman, associate professor in the Division of Food Technology, University of California.
M. L. Anson, director of chemical research, Continental Foods, Inc.
W. F. Geddes, chief of the Division of Agricultural Biochemistry, University of Minnesota.
Herbert E. Longenecker, dean of the Graduate school, University of Pittsburgh.
George F. Stewart, research professor in the Department of Poultry Husbandry, Iowa State College.
Major George Gelman, technical director, Quartermaster Food and Container Institute for the Armed Forces.

Advisors

Robert E. Johnson, director of research, Medical Nutrition Laboratory, U. S. Army.
S. M. Cantor, Corn Industries Research Foundation.
R. M. Conrad, director of the Bureau of Industrial Research, University of Denver.
S. T. Coulter, professor of dairy husbandry, University of Minnesota.
H. C. Diehl, director, The Refrigeration Research Foundation, Inc.
W. Franklin Dove, chief of the Food Acceptance Research Branch, Quartermaster Food and Container Institute for the Armed Forces.
Louis Howard, chief, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, United States Department of Agriculture.
C. G. King, director, The Nutrition Foundation, Inc.
H. R. Kraybill, director of research, American Meat Institute.
Samuel Lepkovsky, professor in the Division of Poultry Husbandry, University of California.
A. Frank Ross, associate professor, Department of Plant Pathology, Cornell University.
T. L. Swenson, director, Western Regional Research Laboratory, United States Department of Agriculture.
O. B. Williams, professor and chairman of the Department of Botany and Bacteriology, University of Texas.

Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

GRAIN STORAGE STUDIES. IV. BIOLOGICAL AND CHEMICAL FACTORS INVOLVED IN THE SPONTANEOUS HEATING OF SOYBEANS. M. Milner and W. F. Geddes (Univ. Minnesota, St. Paul). *Cereal Chem. 23,* 449-70 (1946). Surface sterilization of the seeds failed to eliminate mold infection, whereas inoculation of autoclave-sterilized soybeans with spores of *Aspergillus flavus* yielded heating and respiration curves virtually identical to those of normal seeds. Spontaneous heating of sterile seeds in which no microfloral activity had occurred was demonstrated. Chemical changes in the heating seeds assayed at intervals in the course of the trials indicated a disappearance of total sugars in the initial biological phase of heating and an increase in reducing substances in the initial spontaneous chemical heating phase. The petroleum ether-soluble fraction remained virtually unchanged in the biological heating stage but decreased markedly in the chemical heating phase, without a corresponding loss in dry matter content of the seeds. Respiratory quotients associated with the gas exchange during the spontaneous chemical heating phase suggest the occurrence of thermally induced oxidative cleavage of carbohydrates as well as oxidative polymerization of the seed oils.

REVIEW OF SHORTENING ACTION IN BAKERY PRODUCT PERFORMANCE. W. G. Epstein, S. W. Arenson, and E. G. Heyl (Doughnut Corp. Am., Ellicott City, Md.). *Trans. Am. Assoc. Cereal Chem. 4,* 117-19 (1946).

OIL CONCENTRATION BY THE FROTH FLOTATION OF PEBBLE-MILLED SEED. N. H. Grace and J. B. Palmer (Natl. Research Labs., Ottawa, Can.). *Can. J. Research 24F,* 338-47 (1946). Froth flotation of water-cooked pebble-milled milkweed seed or mustard screenings yielded 90% of the total oil in the concentrate, which was enriched to twice the oil content of the original seed. Protein and inorganic matter also tended to concentrate in the froth. The experiments are of interest in connection with the utilization of oil from large tonnages of waste material such as grain screenings.

DETERMINATION OF FREE FATTY ACIDS IN DRIED EGG POWDERS. C. M. Johnson and L. Kline (Western Regional Res. Lab., Albany, Calif.). *Ind. Eng. Chem.,*

Anal. Ed. 18, 617-9 (1946). A method for the determination of free fatty acids in dried egg powders is described. The egg powders are extracted with acetone and the traces of cephalin are removed with $MgCl_2$ before titration. The removal of the cephalin, previously shown to be responsible for as much as 70% of the total acidity of ether extracts of egg powders, facilitates accurate measurement of small amounts of free fatty acid acidity. Errors caused by the formation of a fatty acid-protein complex have been studied. Fatty acids are bound by basic proteins in a nonextractable form when the egg is in the liquid state or when dried egg powder is reconstituted. The fatty acids thus bound can be recovered completely only if the egg emulsion is adjusted to pH 4 before drying and extracting. Fatty acids which develop in the dry egg powder during storage are not bound and can be completely extracted by the proposed method.

X-RAY INVESTIGATION OF GLYCERIDES. IV. DIFFRACTION ANALYSIS OF 1-MONOARACHIDIN (1-MONOEICOSANOATE). S. S. Sidhu and B. F. Daubert (Univ. Pittsburgh). *J. Am. Chem. Soc. 68,* 1975-6 (1946). The long-spacing value is represented by the average weighted value obtained from a very strong first order line of 54.0 A., a weak second order of 27.3 A., a strong third order of 18.2 A., a medium fourth order of 13.6 A., and a medium sixth order of 9.03 A. The average increment in long-spacing value for the C_{10-20} series of saturated 1-monoglycerides is 4.36 A. The calculated long-spacing value for the 1-monoarachidin was based upon an empirical relation between long-spacing values and the effective number of C atoms in a double monoglyceride molecule, as derived in a previous paper.

THE SOLUBILITIES OF THE NORMAL SATURATED FATTY ACIDS. III. C. W. Hoerr, R. S. Sedgwick, and A. W. Ralston (Armour and Co.). *J. Org. Chem. 11,* 603-9 (1946). The solubilities of caprylic, capric, lauric, myristic, palmitic, and stearic acids have been determined in toluene, *o*-xylene, chlorobenzene, nitrobenzene, 1,4-dioxane, furfural, 1,2-dichlorethane, and nitromethane.

SUSCEPTIBILITY TO OXIDATION OF THE FAT OF THE BACON PIG. W. Tuck, P. B. D. De La Mare, F. B. Shorland, and R. N. Seelye (Dept. Agr.). *New Zealand J. Sci. Technol. 27A,* 212-20 (1945). Improved sampling methods showed that the susceptibility to oxidation, as measured by peroxide values of fatty tissue of pigs fed solely on buttermilk was greater in the flare fat and outer back fat than in the inner back fat. There was no correlation between rate of growth of fatty tissue and its susceptibility to oxidation. (*Nutr. Abs. & Revs. 16,* 17.

SOURCES OF OFF-FLAVORS DEVELOPED DURING STORAGE. H. L. Fevold, B. G. Edwards, A. L. Dimick, and M. M. Boggs (Western Reg. Res. Lab., Albany, Calif.). *Ind. Eng. Chem. 38,* 1079-82 (1946). Whole eggs were fractionated into egg white, egg yolk, lipovitellin, livetin, acetonesoluble lipides, and crude acetone-insoluble phospholipides. These dried fractions were stored separately at 36.5°, and each fraction was combined with the other unstored fractions to form whole egg powder for palatability evaluation. Egg white does not contribute materially to the loss of palatability during storage. Egg yolk does deteriorate and imparts the characteristic "stored" flavor to the reconstituted egg powder. Of the egg yolk components, the proteins, lipovitellin, and livetin do not develop stored flavor and odor. The phospholipide fraction of the lipides does undergo characteristic deteriorative changes and seems to be the source of substances imparting off-flavors and off-odors to stored egg powders. The phospholipide-free lipides develop marked rancidity changes when stored separately, which do not take place in the presence of the phospholipides. It thus appears that the phospholipides act as antioxidants, but in so doing undergo changes which impart characteristic off-flavors and off-odors to the egg powder.

RELATION OF LIPIDE AND SALT-WATER FLUORESCENCE VALUES TO PALATABILITY. M. M. Boggs (Western Reg. Res. Lab., Albany, Calif.), H. J. Dutton, B. G. Edwards, and H. L. Fevold. *Ind. Eng. Chem. 38,* 1082-4 (1946). Salt-water fluorescence values for stored egg powders were found to correlate well with palatability scores for high moisture (4-5%) egg powders, but the correlation was poor for egg powders below 2% moisture. Lipide fluorescence values, on the other hand, correlated well with palatability scores for high and low moisture powders during storage, and the correlation was also better for lipide fluorescence when all classes and grades of egg powders are considered. Because of these facts, and since the lipide-soluble fluorescing substance and the substance mainly responsible for loss of palatability both apparently originate in the phospholipide fraction of the egg powders, lipide fluorescence values are believed to be better criteria of palatability than salt-water fluorescence values.

THE GROWTH PROMOTING ACTION OF FAT SOLUBLE VITAMINS. B. V. Euler, H. V. Euler, and I. Saberg (Vitamin Inst., Univ. Stockholm). *Ark. Kemi Min. Geol. 17A,* No. 19, 15 pp. (1944). Boel and Jansen stated that summer butter and its unsaponifiable fraction contained a growth factor other than vitamins A and D, which was apparently not present in other fats. Exhaustive comparative tests with butter, vitaminized margarine and various other fats and oils with addition of vitamins A and D failed to confirm this claim. Vitaminized margarine and good summer butter supported the growth of rats equally well. No evidence of any extra growth factor was found. (*Nutr. Abs. & Revs. 16,* 49.)

BIOTIN AND AVIDIN INTAKE AND LIVER CHOLESTEROL. R. Okey (Univ. California, Berkeley). *J. Biol. Chem. 165,* 383-4 (1946). Biotin may be essential for deposition of excess dietary cholesterol in the liver. Avidin feeding, presumably by making biotin unavailable, prevents cholesterol accumulation and there is even some indication that it may help to remove cholesterol already deposited. Cholesterol-fed rats given avidin for a short time have consistently more liver cholesterol than those fed for longer periods.

LIPOTROPIC FACTORS AND THE FATTY LIVER PRODUCED BY FEEDING CHOLESTEROL. J. H. Ridout, C. C. Lucas, J. M. Patterson, and C. H. Best (Univ. Toronto, Can.). *Biochem. J. 40,* 494-9 (1946). No waning of the lipotropic effect of choline was observed in rats fed a diet containing 0.5% cholesterol for 16 weeks. Inositol, fed at the same level as choline, was never nearly as active in decreasing glycerides or cholesteryl esters and its effectiveness diminished as the experiment was prolonged. The synergistic lipotropic effect of choline plus inositol was clearly demonstrated in cholesterol-fed rats but inositol did not exert any

preferential effect on cholesteryl esters. In experiments, similar to those of McHenry and Patterson and of Handler in which the rats were given a preliminary period of deficiency of vitamin B_1, choline was uniformly more effective than inositol in decreasing liver glycerides and cholesteryl esters in cholesterol-fed rats receiving diets with or without fat. These results agree with those reported by Handler.

Abstracts

Drying Oils

Edited by
HOWARD M. TESTER

RELATION OF SURVIVAL PERIOD OF RATS IN AVITAMINOSIS B TO THE LIPIDE CONTENT OF THE DIET. L. De Caro (Carlo Erba Co., Milano, Italy). *Boll. soc. ital. biol. sper. 15,* 553 (1940). Young rats given a thiamine-free diet containing 1.8% of fat (olive oil or lard) lived 25-30 days. Increasing the fat in the diet to 26% at the expense of the carbohydrate increased the survival period to 40-60 days or even longer. (*Chem. Abs. 40,* 5475.)

THE OXIDATION OF HIGHER FATTY ACIDS IN HEART MUSCLE SUSPENSIONS. A. L. Lehninger (Univ. Chicago). *J. Biol. Chem. 165,* 131-45 (1946). Rat heart muscle suspensions are capable of the oxidation of higher saturated fatty acids, a reaction which requires the presence of adenine nucleotide and simultaneous furmarate oxidation. Extra succinic acid accumulates as the end-product of fatty acid oxidation in these preparations when succinic dehydrogenase is inhibited by malonate. Analytical data show that the extra succinate which accumulates accounts quantitatively for the fatty acid oxidized if it is assumed that 2-C fragments from the fatty acid combine with oxalacetate to form tricarboxylic acid and ultimately succinate. Citrate and acetoacetate do not accumulate during the oxidation of the fatty acid. Acetoacetate, however, is readily oxidized by the preparation with the formation of extra succinate. Acetate forms neither acetoacetate nor succinate. The results strongly suggest that both fatty acid oxidation and acetoacetate oxidation proceed through the Krebs tricarboxylic acid cycle in heart muscle suspensions.

PATENTS

LINSEED OIL. C. A. Tognoni (Tognoni, Buenos Aires, Argentina). *Industria y quím. 8,* 67-75 (1946). A general discussion of the linseed oil industry in Argentina. *Chem. Abs. 40,* 5935.

THE BLOWING OF OILS. M. Carrière (Faculté Sciences, Marseille). *Corps gras, savons 2,* 39-43 (1944). The drying of blown oils is described and in particular the formation of peroxides is discussed. A review is given on the manufacture and industrial applications of blown oils. 81 references.

NEW DRYING OILS. J. H. Greaves. *Chim. peintures. 9,* 38-42 (1946). Summary of recent progress in perfecting natural drying oils or obtaining new ones from plants not hitherto investigated. 26 references. *Ibid.* 71-2. Summary of recent progress in obtaining chemically modified drying oils by esterification of fat acids with pentaerythritol, mannitol and sorbitol. *Chem Abs. 40,* 5932.

TALL OIL. M. Hess. *Paint Tech. 11,* 299-304 (1946). A review of the origin of tall oil, its composition, processing and uses in the paint industry. 15 references.

FATTY ACID ESTERS OF LAC. B. S. Gidvani and N. R. Kamath. *Paint Tech. 11,* 271-2 (1946). Dewaxed shellac was esterified with stearic acid and with linseed fat acids by heating equivalent amounts at 250° in a beaker heated by a gas burner. Esterification proceeded only to the extent of 50-60%, and no further esterification occurred after heating for about one hour. Only 50% of the excess acids could be removed by distillation. Solvent extraction was efficient, but the product had no outstanding properties and its keeping qualities were poor. Esterification with pentaerythritol or glycerol gave materials (acid value 25-30) which had good film properties but which were inferior to other products prepared from shellac, fat acids and polyalcohol. Products obtained by adding lime, magnesia or ZnO could not be obtained with acid values less than 25. Their properties were not superior to those of the polyalcohol modified product. Esterification of shellac with 60% of the equivalent of fat acid in quinoline gave a product containing almost no fat acid. Removal of the quinoline was difficult.

IMPROVED LAC-OIL VARNISHES. B. S. Gidvani and N. R. Kamath. *Paint Manuf. 16,* 242-6 (1946). A progress report. The desired incorporation of lac in the manufacture of oil varnishes has been hindered by the incompatibility of lac with drying oils and its insolubility in hydrocarbon solvents. This is presumably due to the presence of free OH groups in the lac molecule. Some groups are more reactive than others and at high temperatures combine with each other to form ether-type cross-linkages which gel the resin. This is overcome by heating the drying oil in the presence of metallic oxides and (or) polyhydric alcohols to produce mono- and diglycerides. The former, a solvent for lac, prevents premature gelation and facilitates its incorporation in drying oils. Modifications by physical, chemical, and physicochemical methods and industrial applications are noted. *Chem. Abs. 40,* 5931.

PATENTS

SYNTHETIC GLYCERIDES. H. C. Black and C. A. Overley (Industrial Patents Corp.). *U. S. 2,408,905.* The method of preparing esters of polyhydroxy compounds and unsaturated higher fatty acids comprises saturating the unsaturated bonds of the acid by halogenation to form a saturated higher fatty acid, converting the acid so saturated into an acid chloride, reacting the acyl derivative with at least one hydroxyl group of polyhydroxy compound to form an ester and thereafter dehalogenating the acid radical portion of the ester to reestablish the unsaturated bonds.

POLYMERS OF UNSATURATED COMPOUNDS AND PROCESSES OF PRODUCING SAME. E. L. Kropa (American Cyanamid Co.). *U. S. 2,409,633.* The polymerizable compositions include (1) an unsaturated alkyd resin, (2) triallyl phosphate, and (3) a catalyst for accelerating the copolymerization of (1) and (2).