the recovery of the vitamin from the other baked goods.

TABLE III

Destruction of Vitamin A During Baking of Pie Shells

Baking Time	Color of Crust	Vitamin A in Fat Used	Vitamin A Recovered	Recovery
Minutes		*Units/Lb.*	*Units/Lb.*	*Per cent*
35	Light brown	9,760	6,790	70
40	Medium brown	Same	3,535	36
45	Dark brown	Same	1,365	14

In products of low fat content, such as bread, biscuits, and cake, which are baked under moderate conditions, vitamin A appears to survive the baking process to the extent of 80 to 100 per cent. In pie crust, which undergoes more severe baking conditions, there is appreciable destruction, the amount depending on the extent of the baking.

These data confirm preliminary results obtained by spectrophotometric assays of various original fortified fats and fats recovered from baked goods.

Summary

Various types of baked goods prepared from fats fortified with vitamin A have been assayed for the vitamin by the Carr-Price color reaction and by U.S.P. bio-assays.

In products such as bread, biscuits, and cake, which are baked under moderate conditions, it appears that 80 to 100 per cent of the vitamin survives the baking process.

In pie crust, which undergoes more severe baking conditions, considerable destruction, depending on the extent of the baking, is likely to occur.

Acknowledgment

The authors are indebted to Dr. W. M. Urbain of these laboratories for assistance in the colorimetric determinations.

BIBLIOGRAPHY

1. Harrelson, R. T., *et al.*, Iowa State College, Journal of Science, XII, 353 (1939).
2. Dyne, H. C., *ibid.*, XIV, 29 (1939).
3. Wilkie, J. B., Ind. Eng. Chem., Anal. Ed., *13*, 209 (1941).

Use of Ground Glass Covers in Glycerol Oxidation

B. S. VAN ZILE, E. W. BLANK and J. C. MOORE

Research and Development Department, Colgate-Palmolive-Peet Company, Jersey City, New Jersey

The standard methods of analysis of glycerol of the American Oil Chemists' Society require that the bichromate oxidation of glycerol be continued for two hours in a boiling water bath (1). It is further specified that the oxidation mixture be kept from dust and organic vapors, such as alcohol and ether, until the titration is completed.

In this laboratory considerable difficulty has been experienced with vibration from the boiling water causing the cover glasses to chatter and creep off the top of the beakers thus exposing the contents to danger of evaporation and objectionable fumes of ether, alcohol, etc., which are usually present in the atmosphere of a laboratory devoted to work on fats and oils.

To avoid this source of error use has been made for some time of 500-ml. beakers without lip and provided with a ground glass rim. The underside (convex surface) of the watch glass used to cover the beaker is ground in a circular segment so that when placed over the beaker the ground surface of the beaker rim and the ground surface of the cover glass is in contact. Steam from the solution in the beaker wets the two contacting ground surfaces causing them to adhere and effectually preventing the watch glass from "riding" off the beaker.

Before introducing this modification in the glycerol procedure it was necessary to ascertain whether sufficient CO_2 is trapped in the beaker to influence the course of oxidation.

Assuming 0.2 grams of 100 per cent glycerol is oxidized, a volume of approximately 145 ml. of CO_2 at 0° and 760 mm. is liberated. The volume of the beaker above the surface of the contents is approximately 440 ml. It is apparent that at no time is a very great concentration of CO_2 present, and it is highly probable that it is quantitatively dissipated during the two-hour oxidation period.

Experiments run in this laboratory several years ago showed that a continually renewed atmosphere of pure CO_2 at 760 mm. pressure above the surface of the oxidation mixture for a period of 2 hours reduced the value for a known glycerol content (97.82 per cent) by only 0.62 per cent. Since 1938 several thousand glycerol determinations have been run with complete satisfaction as to accuracy using the above described procedure.

LITERATURE CITED

(1) Official and tentative methods of the American Oil Chemists' Society, p. D-6 (1941).

Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

VEGETABLE OILS THAT U. S. NEEDS FROM AMERICAN TROPICS. K. S. Markley. *Oil, Paint & Drug 7*, 45 (1942).

THE PROBLEM OF RELIEVING THE FAT DEFICIENCY IN ITALY. F. Wittka. *Allgem. Oel- u. Fett-Ztg. 38*, 7-10 (1941). About one-third of the fat consumed in Italy was imported in the form of seeds. This deficiency can be overcome by planting better quality seeds, improving cultivation and increasing the amt. of peanuts planted. The climate is unsuitable for production of soybeans.

COMPLETE NEUTRALIZATION OF FATS AND OIL. Ludvik Spirk. *Chem. Listy 35*, 45 (1941). For the production of neutral fats and oils rapid removal of the water formed by the reaction of neutralization is recommended (heating, evacuation, or removal with a current of neutral gas). E. G., 50.8 kg. coconut oil and 10.2 kg. free fat acid in an earthenware crucible are heated slightly (with steam coils) and mixed with 3 kg. monoglycerides (from coconut fat acids). The mixt. is then heated to 250°. This temp. should be maintained for 3 hrs. during which air and water vapor are removed by a stream of CO_2. In this way the amt. of fat acids is reduced to about 2% and the oil obtained is suitable for working up further. The oil so obtained has a pleasant odor and is suitable for use in the prepn. of foods. *(Chem. Abs.)*

A NOTE ON REGENERATING BLEACHING EARTH. Eduard Erdheim. *Allgem. Oel- u. Fett-Ztg. 38*, 162-4 (1941). The methods for regeneration and the efficiency of the product on soybean oil and mineral oil, resp., were: (1) extn. with benzene and drying at 110°, 45.2 and 77.2; (2) drying at 110°, extn. with benzine and drying at 110° 37.7 and 74.2; (3) autoclaving in 10% salt soln. at 2-2.5 atm., washing and drying 43.7 and 38.2; (4) autoclaving at 2-2.5 atm. with 10% Na_2SO_4, washing and drying 41.6 and 32.6; and (5) the original earth was considered as 100 and 100%.

THE KEEPING QUALITIES OF BEEF SUET PACKED IN CANS. A. Clarenburg. *Tijdschr. Diergeneeskunde 68*, 192-7 (1941) Chem. Zentr. 1941, II, 681. Cans were either partially or completely filled with beef suet after which some were sterilized and some were not. The enclosed air had an undesirable effect and sterilization was useless or even injurious. The suet in the cans which had been completely filled was still in perfectly good condition after 18 months, while that in those only partly filled became rancid in 7.5 months, and after sterilization in only 2 months. The aldehyde reaction was found to be superior to detn. of the degree of acidity in judging the condition of the fat. *(Chem. Abs.)*

FURTHER STUDIES ON THE USE OF BASIC DYES FOR MEASURING THE HYDROLYSIS OF FAT. Georges Knaysi. *J. Dairy Sci. 25*, 585-8 (1942). A study is made of the free bases of Nile blue, methylene blue, spirit blue, and neutral red, especially with respect to prepn. solubility, stability, and contrast. The base of Nile blue is found to be highly unstable and unsuitable for use in fat analysis. Of the four dyes studied, the base of neutral red is recommended for general use. When excessive contrast is desirable, as in the microscopic study of very minute fat droplets, the use of neutral red base may be supplemented with some other dye base. Adaptation of the use of dye bases for detg. the quality of edible fats has yielded promising results and is under further investigation.

THE COMPONENT ACIDS OF SOME WILD ANIMAL AND BIRD FATS. *T. P. Hilditch et al. Biochem. J. 36*, 98-109 (1942). Four of the fats—those of the lion, cat, kangaroo, and Somali sheep — closely resembled in quant. compn. the "stearic-rich" depot fats of domestic herbivorous mammals, in spite of great differences in the various species. The 3 remaining animal fats—from the Ceylon bear, giant panda, and sacred baboon—differed materially in one respect or another from the usual depot fatty acid compn. Those of the Ceylon bear and giant panda had the typically high land animal content of palmitic acid, but bear fatty acids included 11% of haxadecenoic acid, while the panda fat contd. about the same proportion of ordinary or "seed fat" linoleic acid. The baboon fat also contd. a similar amt. of linoleic acid, while its palmitic acid content was unusually low. Of the 2 bird fats, that of the emu resembles the fats of land mammalia in many respects, but is much richer in oleic acid and somewhat poorer in palmitic acid; the fat of the grey goose was characterized by comparatively large amts. of lauric and myristic acids, but how far this is due to species or possibly to dietary conditions is at the moment uncertain.

THE RHEOLOGY OF BUTTER. 1. METHODS OF MEASURING THE HARDNESS OF BUTTER. R. M. Colby. *J. Dairy Res. 12*, 329-36 (1942). Trials with the Scott Blair app. for measuring hardness of butter by compression of a cylindrical sample showed a lack of reproducibility due to splitting or crumbling of the sample. Investigation of alternative methods led to the development of an app. in which the resistance of butter to cutting by a wire is measured. The method-given results which are in general agreement with those obtained with the Scott Blair app. but are much more reproducible. The effect of wire diameter and thickness of block of butter have been detd. and conditions for temp. control of the sample before and during the detn. have been investigated. 2. THE RELATION BETWEEN RATE OF SHEAR AND SHEARING STRESS. THE EFFECT OF TEMP. AND OF REWORKING ON HARDNESS AND ON STRUCTURAL VISCOSITY. *Ibid.* 337-42. The viscosity of butter decreases rapidly as rate of shear is increased, but the rate of decrease varies from one sample to another. Measurements of spreading capacity should be made at rates of shear comparable with those which occur when butter is spread with a knife. The effect of temp. over the range 6-18° C. on the hardness and structural viscosity of a number of butter samples has been investigated. The effect of reworking has also been studied. 3. THE EFFECT OF VARIATION IN BUTTERMAKING CONDITIONS ON THE HARDNESS OF THE BUTTER. *Ibid.* 344-9. An investigation of the effect of type of pasteurizer, rate of cooling after pasteurization, temp. during holding and during churning, temp. of wash water and amt. of working showed that of these factors the only one which had any marked and consistent effect on the hardness of the butter was the rate of cooling of cream after pasteurization, rapidly cooled cream yielding harder butter. The use of low temp. wash water tended to reduce the hardness of the butter but the effect was small. The other factors had no consistent effect on the hardness of the butter.

A STUDY OF THE NITROGENOUS CONSTITUENTS OF TISSUE PHOSPHATIDES. E. Chargaff *et al. J. Biol. Chem. 144*, 343-52 (1942). In a prepn. of pig liver phosphatides 35.6 per cent of the amino nitrogen could not be characterized either as ethanolamine or amino acid. All of the non-amino nitrogen in a hydrolysate of this phosphatide was found to be present as choline. In a prepn. of beef brain phosphatides all the amino nitrogen could be identified as ethanolamine and amino acid, whereas only 50% of the non-amino nitrogen was accounted for as choline. In a prepn. of pig heart phosphatides 86.8% of the amino nitrogen was accounted for as ethanolamine and amino acid; only 49.3% of the non-amino nitrogen could be characterized as choline. The phosphatides from brain and lung were found to have the highest amino acid content. The egg yolk phosphatides were free of amino acid. Data on the effect of storage on phospholipid compn. and a discussion of some of the implications of the exptl. results are included.

The effect of variations of diet fat on dietary fatty livers in rats. H. J. Channon *et al. Biochem. J. 36,* 214-20 (1942). In continuation of the work of Channon & Wilkinson the influence of dietary fat on the extent of fat infiltration of the liver of the rat has been further investigated with a view to assessing whether choline was concerned with the desatn. of fatty acids in the liver. It has been shown that on high diets in fat and low in choline, the extent of fatty infiltration is related to the proptn. of C_{14}-C_{18} saturated fatty acids. Solid unsatd. acids exert no effect. Elaidic acid is treated normally in the body, appearing in liver, carcass, and faecal fats in proportions dependent on its amt. in the diet.

The relation of B-vitamins and dietary fat to the lipotropic action of choline. R. W. Engel. *J. Nutr. 24,* 175-85 (1942). When thiamine, riboflavin, pantothenic acid, pyridoxine, corn oil, and choline were fed to rats receiving a purified diet contg. 18% of casein for a 3-wk. exptl. period, an abnormal accumulation of liver-fat resulted. Under these conditions 2 mg. of choline chloride per rat daily failed to prevent the kidney hemorrhages of choline deficiency; at least 10 mg. of choline chloride was necessary for this factor to exert its max. lipotropic action but normal liver-fat levels were still not obtained. The addn. of 3 mg. of inositol per rat daily to the diet adequate in choline and contg. the above B-vitamins reduced the liver fat to the normal level found in rats receiving an adequate stock diet. Prolonged feeding of a diet deficient in pyridoxine or essential fatty acids resulted in fatty livers, even though the diet contd. adequate choline. It is concluded that pyridoxine and a source of essential fatty acids are necessary in the diet for choline to function properly as a lipotropic agent. Inositol, in addn. to choline, is a necessary dietary constituent for the rat receiving purified diets supplemented with the other B-vitamins known to be required by this species.

PATENTS

Method of dehydrating castor oil. Oscar A. Cherry (Glidden Co.). *U. S. 2,290,165.*

Process for breaking petroleum emulsions. Charles M. Blair (Petrolite Corp. Ltd.). *U. S. 2,290,154.*

Process for breaking petroleum emulsions. Melvin DeGroote and Bernhard Keiser (Petrolite Corp.). *U. S. 2,290,411-7.* Various fat acid derivatives are used as deemulsifiers for mineral oils.

Procedure for preparing fish oils. Kenneth C. D. Hickman (Distillation Products, Inc.). *U. S. 2,289,780-1.* Sodium sulfite or other absorbent is added to animal or fish tissue to preserve the vitamin contg. oil until extn.

Process for producing fatty acid polyhydric esters from glycerides. W. H. Goss and H. F. Johnstone (Secretary of Agriculture). *U. S. 2,290,-609.* A method of selectively sepg. fatty acid monoesters into fractions, one of which contains a high concn. of relatively unsatd. valence bonds and another which contains a lesser concn. of unsatd. valence bonds consists of treating the monoesters with a solvent system wherein the monoesters are distributed between incompletely miscible liquid phases, sepg. the phases, and removing the solvent system.

Mercurated aliphatic nitrile. A. W. Ralston and Miles R. McCorkle (Armour & Co.). *U. S. 2,-289,590.* The products are germicides and weed killers.

Abstracts

Soaps

Edited by
ARMOUR AUXILIARIES LIBRARY

Dangers in the perfuming of soaps and their elimination. A. Foulon. *Fette u. Seifen 48,* 148 (1941). Perfumes added to soaps are decompd. by free alkali, fatty acids, and unsapond. fats. This is avoided by addn. of ZnO (I). I makes it unnecessary to have some free alkali in soaps. The chem. action of I is the formation of zinc soaps of the lower fatty acids. These soaps are harmless and emulsify well. The phys. action of I depends upon its fine particle size and surface activity. Impurities are absorbed in the surface as are the added perfumes and the acids of low mol. wt. I converts the colored oxidation products of perfumes, e.g., acids from aldehydes, to colorless salts. *(Chem. Abs.).*

Standard methods for the sampling and analysis of commercial soaps and soap products revised. F. W. Smither, R. E. Divine, J. E. Doherty, C. P. Long, E. B. Millard, M. L. Sheely, and H. P. Trevithick. *Ind. Eng. Chem. Anal. Ed. 20,* 558-67 (1942). A revision of the 1937 methods, covering cake, powd., and liquid soaps and soap pastes. Methods are given for: moisture; alc.-insol. material; free acid or alkali; water-insol. material; anhyd. soap; chloride; unsap.; unsaponified matter; rosin; titer tests, acid no., I no. of the fatty acids; borax; silica present as alk. silicates; carbonates; phosphates; sulfates; glycerol, sugar and starch; volatile hydrocarbons; combined Na and K oxides. 21 refs.

Estimation of ortho-, pyro-, meta-, and polyphosphates in presence of one another. Loren T. Jones. *Ind. Eng. Chem. Anal. Ed. 20,* 536-42 (1942). The method is intended primarily for analysis of soaps and detergents. Abrasives are removed by filtration; fatty acids are removed by addn. of acid and filtration. (1) Total phosphate is detd. on an aliquot portion of the soln. as follows: convert all phosphates to ortho form by boiling with excess nitric acid; then ppt. as phosphomolybdate and det. P_2O_5 in phosphomolybdate volumetrically. (2) Ppt. hexametaphosphate from a second aliquot by addn. of $BaCl_2$ to the acid soln., and det. P_2O_5 on the ppt. as in (1); det. trimetaphosphate in the filtrate as in