ABSTRACTS

R.A. REINERS, Editor. Abstractors: N.E. Bednarcyk, J.E. Covey, J.C. Harris, S.F. Herb, F.A. Kummerow, Biserka Matijasevic, E.G. Perkins, and R.W. Walker

• Fats and Oils

MASS CHROMATOGRAPHIC ANALYSIS OF VOLATILES. A.C. Lanser, J.O. Ernst, W.F. Kwolek and H.J. Dutton (Northern Regional Res. Lab., Peoria, Ill. 61604). *Anal. Chem.* 45, 2344–8 (1973). A gas chromatographic method for determining molecular weights called mass chromatography has particular interest for the lipid chemist. The equipment differs from the familar dual compensating gas chromatograph in using different carrier gases in each column and in employing the "forgotten ideal" gas density balances as detectors in independent mode. Molecular weights are calculated from detector responses for the same component eluted from identical columns with different carrier gases. An analysis of errors, precision and accuracy of the method is given.

CHICKEN LIPID CHANGES DURING COOKING IN FRESH AND REUSED COOKING OIL. W.T. Lee and L.E. Dawson (Dept. of Food Sci. and Human Nutr., Mich. State Univ., East Lansing, MI 48823). *J. Food Sci.* 38, 1232–7 (1973). This study was conducted to evaluate changes in the fatty acid composition of the cooking oil and in chicken lipids during cooking in fresh and reused corn oil and to evaluate changes during storage of raw and cooked chicken.

PHOSPHOLIPID CHANGES AND LIPID OXIDATION DURING COOKING AND FROZEN STORAGE OF RAW GROUND BEEF. J.D. Keller and J.E. Kinsella (Dept. of Food Sci., Cornell Univ., Ithaca, N.Y. 14850). *J. Food Sci.* 38, 1200–4 (1973). In the present investigation the phospholipid composition of three grades of hamburger meat was determined and the changes occurring in total lipids, phospholipids, TBA values and lipid soluble carbonyls during cooking and frozen storage were quantified. The results are discussed in relation to quality changes that may occur during domestic cooking and frozen storage of raw hamburger meats.

TOCOPHEROLS IN THE UNSAPONIFIABLE FRACTION OF COCOA LIPIDS. J.A. Erickson, W. Weissberger and P.G. Keeney (Div. of Food Sci. & Industry, Borland Lab., The Penn. State Univ., University Park, PA 16802). *J. Food Sci.* 38, 1158–61 (1973). Although chocolate flavor is of nonlipid origin primarily, cocoa fat, because of its unique crystallization behavior in confectionery products, is of great economic importance. Fatty acid composition of cocoa fat is 26% palmitate, 34% stearate, 35% oleate, 3% linoleate, 1% arachadic and trace amounts of several other acids. Phospholipids vary between 0.1% and 0.9% depending on recovery method, and free fatty acid content is usually less than 1%. The unsaponifiable fraction, approximately 0.3%, is dominated by sterols. Many constituents of cocoa fat have been studied extensively, but little attention has been given to the tocopherols. In a survey of fats and oils, by colorimetric analysis, Herting and Drury reported 136 μg to 173 μg tocopherol/g lipid in three cocoa butter samples. They indicated that α-tocopherol is not the major tocopherol in cocoa fat. The limited amount of available data on the tocopherols of cocoa fat prompted the investigation reported herein.

ANALYSIS OF N-PARAFFIN OXIDATION PRODUCTS IN THE PRESENCE OF HYDROPEROXIDES. B.D. Boss, R.N. Hazlett and R.L. Shepard (Chem. Div., Code 6180, Naval Res. Lab., Washington, D.C. 20375). *Anal. Chem.* 45, 2388-92 (1973). The analysis of *n*-dodecane oxidation products is presented in a plan which determines hydroperoxides at low levels and accounts for or avoids the interference of hydroperoxides in the analyses of other oxidation products. In ester analysis by ethanolic KOH saponification, accurate results are obtained when no reflux solvent is added, provided sufficient H_2O is present and hydroperoxides are first reduced by triphenylphosphine. Fully activated silica gel, which is very effective in quantitatively concentrating polar products by column chromatography, does not cause decomposition of the sec-hydroperoxides. High speed liquid-liquid chromatography is used to separate and collect alcohols, ketones and hydroperoxides for further analyses.

CHROMATOGRAPHIC SEPARATION OF COSMETIC PRODUCTS AND RAW MATERIALS WITH THE AID OF UREA. J. Pokorny, M.K. Kundu and G. Janicek (Inst. for Food Materials Chem. of the Chem-Technol. Highschool of Praha, 16628 Praha 6, CSSR). *J. Soc. Cosmet. Chem.* 24, 753–62 (1973). The samples were prefractionated with paper or thin-layer plates impregnated with urea or thiourea. Urea was preferable in most cases. Mixtures of diethyl ether and methanol saturated with urea or thiourea, were used as eluents. Generally, two or three fractions were obtained, and the separation depended on differences in molecular size. The fractions were further subfractioned by thin-layer chromatography on silica gel which separated them according to their polarities. This combination chromatography based on different principles facilitates resolution of complicated mixtures into simpler mixtures which can be analyzed more readily by instrumental methods.

MELTING CHARACTERISTICS OF OINTMENTS AND CREAMS. C. Führer and W. Parmentier (Inst. of Pharmaceutical Technol. of the Technical U. Braunschweig, D-33 Braunschweig, Pockelstrasse 4). *J. Soc. Cosmet. Chem.* 24, 737–45 (1973). Easy-to-spread preparations, whether they be ointments or creams, are complicated colloid-chemical systems. They generally comprise liquid and solid components, and the latter are responsible for building up a more or less distinctive structure. The structure of this solid component generally consists of connected fringed micelles or spherulites. In a good formula the crystallites should be as small as possible, and they are expected to form a tight network. Since the energy levels of the solid network are broadly distributed, continuous dissolution of the micelles occurs during melting. Melting diagrams, which can be obtained readily with a simple laboratory-developed calorimeter, show a linear increase in temperature under constant heating. With continued heating, the curve flattens (becomes nonlinear) and then ultimately continues in a linear fashion. The nonlinear portion of the diagram stops when the melt is completely clear and gives insight into the magnitude of the heat of melting of the solids mixture. Good formulations are distinguished by the

fact that this nonlinear portion covers a wide temperature range and by the fact that the melting diagram of the sample shows no significant changes upon repeated melting and slow cooling. Details of the experimental set-up as well as pertinent melting diagrams are described.

INFLUENCE OF DRYING AND SUBSEQUENT STORAGE OF SUNFLOWER SEEDS HARVESTED AT DIFFERENT PERIODS ON THE QUALITY OF THE OIL. L.A. Mhitar'janc et al. *Maslozir. Prom.* 1973(10), 5–8. If mature sunflower seeds are dried at elevated temperature before storage or treatment, the oil contains 1.2-1.5 times more phosphatides than oil from completely mature seeds. Intensive drying of wet seeds increases the hydrophilicity of the oil-phosphatides system. (Rev. Franc. Corps Gras)

ABOUT THE USE OF THE METHOD OF ELECTROFLOTATION IN THE OIL INDUSTRY. V.I. Polstjanoj et al. (Inst. of Public Nutr., Kharkov). *Maslozir. Prom.* 1973(8), 6–7. Electroflotation equipment is widely used in the oil industry. The authors used this equipment for studying different processes for the reduction of losses in production. The experiments have been done in the laboratory of a soap factory in Kharkov. The electroflotation method was used for increasing the concentration of a soapstock which contains 28–45% of fatty material. Good results were obtained; the concentration reached about 96% of fatty material. Kinetics of the electroflotation process for the separation of water by decantation from inedible animal fats was also studied. Much data about all studied processes are given in the paper. (Rev. Franc. Corps Gras)

INFLUENCE OF REDUCED ATMOSPHORIC PRESSURE ON FAT HEATED AT ELEVATED TEMPERATURE. M.I. Beljaev et al. *Maslozir Prom.* 1973(8), 15. Fats were heated at various atmospheric pressures for 30 hours at 175–180C. Samples were taken every 5 hours and the acidity, total quantity of oxidative polymerization products and dicarbonyl compounds were determined. The results of the analysis show that the accumulation of secondary oxidation products and copolymerization are slowed down as the pressure is reduced, but that the acid value did not change much. (Rev. Franc. Corps Gras)

EASE OF HYDRATION OF PHOSPHATIDES IN SUNFLOWER SEED. E.D. Litvinova et al. *Maslozir. Prom.* 1973(9), 15–17. Phosphatides extracted with acetone from crushed kernels as well as those extracted from deoiled sunflower seed with chloroform have good solubility in oil and are easily hydrated. Non-hydratable phosphatides are extracted from the deoiled residue with acetone. (Rev. Franc. Corps Gras)

EXPERIMENTS WITH SEPARATORS FOR FIRST PURIFYING OF SUNFLOWER OIL FROM MECHANICAL IMPURITIES. V.R. Zerebjat'ev et al. *Maslozir. Prom.* 1973(10), 38–41. Centrifuges and separators used for purifying crude pressed oil from insoluble impurities are described (centrifuge NOGS-325 and separator AI-MSI or AI-MSP were used). If oil of low quality is treated, it is necessary, before entering the centrifuge or the separator, to add 1% of water or of a 10–15% solution of sodium chloride. If separator AI-MSP is used, centrifugation can be eliminated. (Rev. Franc. Corps Gras)

LINE FOR CLEANING SUNFLOWER SEED FOR THE OIL INDUSTRY. A.B. Demskij et al. *Maslozir. Prom.* 1973(10), 34–8. A line at complex KLOM for cleaning of the seed is described. On the line, the impurities are separated in different way depending on their properties. The seeds going to the machine are fractioned to avoid overloading and to obtain the best results for the complete impurities separation. (Rev. Franc. Corps Gras)

GENERAL CLASSIFICATION OF EDIBLE FATS AND OILS. A.M. Goldovskij. *Maslozir. Prom.* 1973(10), 8–10. The author has elaborated the classification of edible fats and oils in three groups. Non-modified fats are in the first group. This group is further divided in two subgroups: A- crude (non-refined) fats and B- refined fats. In the second group are modified

fats and this group is divided in the following four subgroups: C- lipid fractions obtained without chemical modification of their triglycerides, D- interesterified fats before they are eventually fractioned, E-hydrogenated fats and F- hydrogenated fats interesterified and eventually fractioned. The third group includes complex fats and this group is subdivided in three subgroups: G- nonemulsified systems, H- emulsified systems, and I- pulverized fats. (Rev. Franc. Corps Gras)

DETERMINATION OF SOME VALUES CHARACTERISTIC OF THE PHYSICAL PROPERTIES OF NATURAL FATTY ACIDS. L.V. Porolo et al. *Maslozir. Prom.* 1973(10), 17–21. The physical properties examined by the authors were: density, specific heat, thermal conductivity, viscosity and surface tension. The average coefficient of volume dilatation of natural liquid fatty acids is 0.00097/°C. In the solid state, the saturated fatty acids C_8, C_{10}, C_{12}, C_{14}, C_{16} and C_{18} have coefficients of volume dilatation of 0.00035, 0.00039, 0.00019, 0.000191, 0.00028, and 0.000266/°C, respectively. (Rev. Franc. Corps Gras)

REFINING OF MINK OIL. S.N. Volotovskaja et al. *Maslozir. Prom.* 1973(10), 13–4. The authors studied the refining of the sample of mink oil with an acid number of 3.9, peroxide number 0.03%, iodine number 80.4, melting point 23.1C, unsaponifiable matter 0.24% and moisture 0.68%. The refining included the following operations: filtration for elimination of impurities, neutralization with the 20% excess of sodium hydroxide (90g/l conc.), filtration through the layer of bleaching earth to eliminate traces of soap and deodorization. Addition of 0.02% of BHT decreased the rate of the oxidation of crude oil two times and the oxidation of refined and deodorized oil 2.5 times. (Rev. Franc. Corps Gras)

USING OF SUNFLOWER HULLS. V.P. Gladkaja et al. *Maslozir. Prom.* 1973(9), 35-6. Sunflower hulls can be used as raw material for the production of fodder. The process consists of the grinding of the hulls to obtain particles not larger than 3mm and then mixing these with gums heated to 70–80C until a homogeneous product is obtained. The hulls, which will be used for this purpose, must have a water content not higher than 10%. The gums cannot have an oil content higher than 50%. (Rev. Franc. Corps Gras)

UTILIZATION OF KIESELGUR K-700 FOR THE FILTRATION OF SUNFLOWERSEED OIL. S.N. Volotovskaja et al. *Maslozir. Prom.* 1973(9), 17–19. With kieselgur (porous diatomite), it is possible to obtain a transparent sunflower oil which will not cloud when held at 0C or 5C for 24 hours. With the pressure $4.9\ 10^4$ to $19.6\ 10^4$ Pa, the speed of the filtration with kieselgur is about 40 kg/m²h for the crude oil and 60 kg/m²h for the hydrated oil. The filtration decreases appreciably the quantity of phosphatides in the oil. (Rev. Franc. Corps Gras)

DETERMINATION OF THE CONTENT OF CARBONYL COMPOUNDS OF LIQUID AND HYDROGENATED SUNFLOWER OIL. M.E. Koncalovskaja et al. *Maslozir. Prom.* 1973(9), 12–14. In the determination of carbonyl compounds in liquid and hydrogenated sunflower oil, the yield of 2,4-dinitrophenyl hydrazones depends on the excess of dinitrophenylhydrazine in the reaction. The excess of hydrazine should be about 700–1,000%. The time of reaction for liquid oils should be 3 hours and for hydrogenated oils 2 hours. The analyses reported in the paper were done with a reaction time of 1 hour. (Rev. Franc. Corps Gras)

ADSORPTION OF PIGMENTS AND PHOSPHATIDES AS A FUNCTION OF TEMPERATURE DURING THE REFINING WITH THE ADSORBENT OF SOYBEAN OIL MISCELLA. V.V. Kljuckin et al. *Maslozir. Prom.* 1973(8), 13–15. The adsorption of pigments increases with temperature from 20 to 45C during the refining with an adsorbent in soybean oil miscella. Above this temperature, the adsorbent power of the bleaching earth, regarding carotenoids and chlorophyll, does not change. The elimination of phosphatides increases with the temperature from 20 to 70C. Especially intensive adsorption is observed at temperatures above 40C. (Rev. Franc. Corps Gras)

STRONG ELECTRICAL FIELDS IN THE TECHNOLOGICAL PROCESSING IN THE OIL INDUSTRY. T.V. Mgebrisvili. *Maslozir. Prom.* 1973(7), 5–7. At the Institute of Scientific Research for Food Industry of Krasnodar, work has been in progress since 1967 on the utilization of strong electrical fields in the oil industry. This technique is applied for the electroseparation of a mixture of almonds and sunflower hulls, for the separation of substances in the suspension in hexane miscella, for the separation of impurities in cloudy oils, and for the separation of catalysts from hydrogenated oils. Physico-chemical and biological studies showed that the quality of the lipids treated with electrical field is not changed if the tension is not higher than 30 kV—cm and if the time of the field action is not more than 20 minutes. (Rev. Franc. Corps Gras)

ABOUT THE CAUSES OF THE DIFFICULT HYDROGENATION OF RAPESEED OIL. B.N. Tjutjunnikov et al. (Polytech. Inst. of Kharkov). *Maslozir. Prom.* 1973(7), 15–17. One of the causes for difficulties in the hydrogenation of rapeseed oil is the relatively low rate of hydrogenation of erucic acid. Another one of the causes is also the presence of the essence of mustard oil. The rate of the hydrogenation of rapeseed oil is directly correlated with the sulphur content in the oil. However, after refining the oil with acid, hydrogenation is faster than with oil treated with ammonia and alcohol, even if the sulphur contents of the latter are lower. The explanation for this is that the oils refined by different methods contain different sulphur compounds and these have different actions on the catalyst. It has been shown in practice that rapeseed oil stored for a long time in the tank is hydrogenated easier than fresh oil. Elimination of complex gums by sedimentation is the probable explanation. Hydrogenation of rapeseed oil, fresh and stored for different periods, is described in the paper. Some theories are elaborated by the authors to explain the reason for the results obtained. (Rev. Franc. Corps Gras)

STATISTICAL STUDY OF THE PROPERTIES OF SUNFLOWER SEED. V.D. Dratva et al. (Ministry of the Construction of Agricultural Machines of USSR). *Maslozir. Prom.* 1973(7), 7–8. In this work, the authors established a statistical correlation between the following values for the properties of sunflower seeds: size (D, mm), mass of 1000 seeds (A, g on the dry matter), specific weight (p, g/cm³), the content of hulls (L, %), and the apparent density (N, g/l). From the data, it can be seen that the size of sunflower seeds varied between 3 and 7.2 mm; the fractions of width between 4 and 5.6 mm predominated. The relationship between the hull content,

Smalley Committee to offer Aflatoxin Check Meal Series

The AOCS Smalley Committee will offer an Aflatoxin Check Meal Series for worldwide distribution beginning with the 1974-75 season. Tentatively, the first series will consist of 4 cottonseed meal samples and 1 peanut meal sample which will be provided to participants over a period of ca. 5 months for assay by AOCS Official Methods Aa8-71T and Ab6-68, respectively. The subscription fee for this Check Meal Series will be $35.00.

Due to the inconveniently large oilseed samples of 10-25 kg that would be required to provided a representative sample and the inherent instability of the aflatoxins in ground oilseed meats, it is imperative that the series be provided in the form of an oilseed meal for the present time. By this means, uniform samples with stable aflatoxin content can be provided.

The current U.S. Department of Agriculture, AOCS Smalley Committee, and National Cottonseed Products Association collaborative Aflatoxin Check Meal Series has well illustrated the need for a continuing Smalley Aflatoxin Check Meal Series to help bring about a greater degree of accuracy in aflatoxin asssay to laboratories serving the oilseed industry and commodity markets throughout the world.

Those analysts interested in participating in the Smalley Aflatoxin Check Meal Series should write for information or subscription to: Smalley Committee, AOCS, 508 S. Sixth St., Champaign, Ill. 61820.

Any suggestions readers have to aid the Committee in offering an improved program will be appreciated. ■