sumption that all of the GS_3 is tripalmitin and all other triglyceride molecules are triolein gives values for GS_3 found/GS_3 calculated $\times$ 100 which are much lower than those recorded. For instance, in Table II this value for the fat from rats fed the basal diet is 107%. When recalculated in terms of mol percentage the value is reduced to 93%. Although the actual difference may be less than this, it is very likely significant.

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For A. R. S. KARTHA
by R. J. VANDER WAL

Letter to the Editor

Dr. Kartha has been kind enough to send me his response to Dr. Dieckert's and my paper on "The Influence of Dietary Fat on the Glyceride Structure of Animal Fats" and requested my comments.

We believe that the early part of his letter, with citations, confirms our statements, which he quotes, outlining his position on the lack of specificity of lipases. (The exceptional behavior of the lower fatty acids is not a factor since we were discussing animal depot fat.) Perhaps he meant to present these citations as further defense and elucidation of his position, rather than to correct our misrepresentation of it. His letter is not quite clear on this point.

One can find supporting evidence for almost any point of view by quotations from the literature, especially in this field. It was for that reason we felt that more experimental evidence, under controlled conditions, was required.

Kartha's criticism of our procedure can only be valid if it can be shown that the procedure is enough in error to affect the conclusions. He raises two objections.

a) Our isotope dilution procedure is faulty since we added tripalmitin as a carrier while natural saturated triglycerides contain some stearic acid.

Theoretically a carrier should be exactly the same substance as that being isolated. At the time we decided on the use of labeled tripalmitin as a carrier for total saturated triglycerides, the probable influence of the small amounts of tristearin and palmitostearins present was considered. We considered it a good risk that, under the conditions of precipitation we used and because of the very small amounts of stearins present, the method of determination was probably much better than any other available. Certainly it is below the limits of the other errors inherent in the experiment.

The values themselves refute Kartha's argument. As he points out, if the tripalmitin were more soluble than the tissue-saturated triglycerides, all the values would be slightly high. Yet the values for endogenous rat fat conform well with Kartha's random theory. and after fat ingestion the values are below those expected by the random theory. It is only the chick fat values that are high, and these are much too high to be accounted for by any possible solubility difference.

b) We were in error in presenting the data in weight percentage instead of mol percentage.

The use of weight instead of mol percentage was made advisedly. To use the mol percentage basis many assumptions and guesses would have to be made as to the fatty acid composition of the various glycerides. The figures would thus be only estimates. The weight percentages could, at least, be given with confidence. More important, the error involved would not be great enough to change any conclusions. The figure of 93% calculated by Kartha in his letter, on assumptions of glyceride fatty acid composition, as compared to our figure of 107%, still leads to the same conclusion that endogenous rat triglycerides are of the random type.

The same is true for the rest of the figures. By whatever method calculated the addition of any fat to a rat diet lowers the percentage of saturated triglycerides below that expected by random distribution.

In the case of chickens the percentage of saturated triglycerides is much greater than expected by random distribution, regardless if calculated on weight or mol percentage basis.

In summary, therefore, while Kartha is technically quite correct in his criticisms of our procedure, these procedures were used advisedly; they are within the limits of error of the experiment; and they are, in our opinion, too small to affect the final conclusions.

RAYMOND REISER
Department of Biochemistry and Nutrition
Texas Agricultural Experiment Station
College Station, Tex.

J. W. DIECKERT
Southern Regional Research Laboratory
New Orleans, La.

Letter to the Editor

May 12, 1956.

In a recent study of the component acids of salmon egg fat (from *Oncorhynchus gorbuscha*) by R. M. Kyte (1) the author employed fractional distillation of groups of esters segregated by crystallization from acetone. He remarks that the method employed resulted in low values for unsaturation and chain length of the constituent unsaturated fatty acids.

It is true that, unless due precautions are observed, loss of unsaturation in polyethenoid esters is liable

to take place during prolonged exposure to heat but when all the precautions which have been recommended are employed, the resultant loss of unsaturation is very small. Thus an analysis of a whole oil may be quoted (2), from which the calculated iodine value of the original oil was 113.0, as compared with the observed figure of 115.2.

From the details in Table II (p. 148) of Kyte's paper (1) the calculated iodine value of the fatty acids of the salmon egg fat is 218, corresponding to an iodine value of about 209 on the original fat. Unfortunately no iodine value for the original fat is recorded, nor are those of the segregated groups of methyl esters; but the statement is made (p. 146) that "fat from salmon eggs has the very high iodine value of 220" (3). The loss of unsaturation (apparently about 5%), although possibly greater than necessary, is not so marked as might be inferred from the rather vague statements of the author referred to above.

As mentioned, some data relevant to the understanding of the author's results are missing from the paper, and no comparison has been made of the iodine value of the oil as calculated from the detailed fractionation analysis with its observed value, a matter which should always be looked into as a check on the general accuracy of ester-fractionation analyses.

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T. P. HILDITCH
Birkenhead
England

ABSTRACTS . . . . . R. A. Reiners, Editor

• Oils and Fats

S. S. Chang, Abstractor
Sini'tiro Kawamura, Abstractor
Dorothy M. Rathmann, Abstractor

Antioxidants and synergist inhibition of Hermatin-catalyzed oxidative fat rancidity. Y. T. Lew and A. L. Tappel(Dept. of Food Tech., Univ. of Calif., Davis, Calif.). *Food Tech.* 10, 285–9(1956). Manometric measurement of the oxidation of lard in aqueous emulsions and catalyzed by hemoglobin allows rapid evaluation of antioxidants and synergists. On the basis of the results of this research it is doubtful if there can be found nitrogenous inhibitors which inhibit by direct combination with hermatin compounds and which are suitable for use in meats. Of greater practical consideration for inhibiting oxidative rancidity in meats are synergistic mixtures of some of the approved food antioxidants. One such mixture evaluated in this study is that of NDGA, BHA and ascorbic acid.

Color changes of fats involved in the frying of a fritter-type batter. Marion Bennion and Flora Hanning(University of Wis., Madison, Wis.). *Food Tech.* 10, 290–2(1956). Color changes in lards and combination shortenings used for the deep fat frying of a fritter-type batter, measured with the Hunter Color Difference Meter, were similar. The general trend of changes involved a marked decrease in L values, or color lightness, and increase in the a and b scales, showing the development of reds and yellows. Color changes in lards varied according to the composition of the flour mixture fried. Batters without baking powder maintained higher L values but showed greater increase in yellow than other batter modifications. All color darkening was quite easily observed by sight but the values on the Hunter Color Difference Meter gave quantitative measurement for the components of the color, some of which could not be discerned visually.

The polymorphism of glycerides—an application of x-ray diffraction. E. S. Lutton(Procter and Gamble Co., Cincinnati, O.). *J. Soc. Cosmetic Chemists* 6, 26–34(1955). Methods used in the study of the modes of crystallization of a number of mono-, di-, and triglycerides are reviewed. (*C. A.* 50, 7481)

Obtaining easily refinable extracted cottonseed oil. I. V. Gavrilenko and I. E. Bezuglov. *Masloboino-Zhirovaya Prom.* 21, 8, 5–9(1955). Method of processing and characteristics of products are reported from operations at some Russian plants. In prepressing with an "FP prepress," oil in cake is reduced to 12% on 1–4 grade seed and to 15% for 5- and 6-grade seed. The gossypol content was 0.05–0.11% in the cake and 0.11–0.17% in the prepress oil. The cakes were extracted with benzene to yield miscella passed through 4 compartments of increasing temp. of 57–92° where it was concentrated from 9.35 to 81.42%, and final concentration was done in a 2nd single-step stage at 115°. Another factory uses a 3-stage distillation, the 1st 2 stages being each 4-compartment units as the 1st stage of the above. Characteristics of the crude oil and the oil after refining are given. (*C. A.* 50, 7481)

Mineral constituents of peanut oil. K. S. Srinivasa Varadan. *Indian Pharmacist* 10, 263–4, 271(1955). The peanut-oil sample was filtered in a hot funnel to remove suspended impurities. The minerals found (in terms of their oxides) were: P_2O_5 55.82, Fe_2O_3 8.76, CaO 6.5, CuO 5.18, MgO 2.85, and SiO_2 1.10%. The other minerals present were thought to be Na_2O and K_2O, but no data are given. Chlorides were found but only traces of sulfates were detected. The methods used are described in detail. (*C. A.* 50, 7481)

Continuous refining of rapeseed oil. A. M. Zharskii and T. E. Romanova(Fat Combine, Kharkov). *Masloboino-Zhirovaya Prom.* 21, 8, 12–13(1955). Rapeseed oils of acid no. 3.5–4.5 were refined by the continuous process of A. A. Schmidt. The oils were hydrated with steam, held 2 hrs., and centrifuged. Refining was with 100% excess lye solution of 130 g. per 1. concentration. Tests on 10 oils yielded refined oils containing 0.36–1.25% soap and 0.24–0.38% free fatty acids. The foots contained 9–12% soap and a saponified fatty acid:neutral oil ratio of 1:0.49 to 1:0.3. The refined oil was efficiently decolorized with 2% active earth when the moisture present was 0.5–1.5%. Above 1.5% moisture in the oil, efficiency of decolorization decreased. (*C. A.* 50, 7481)

The influence of aging on the physical properties of tung oil. P. Guimarães da Fonseca and B. Schneiderman(Escola politécn., São Paulo). *Bol. dept. quim. escola politéc.* (São Paulo) 1, 1–6(1955). During the process of aging both the density and the viscosity of tung oil increase, more probably due to an intramolecular rearrangement than to a large-scale polymerization. The constant *b* of Andrade's viscosity of formula might prove more valuable in characterizing a certain sample of oil than the viscosity itself. (*C. A.* 50, 6816)

Determination of glyceride composition in vegetable fats. M. Filajdic(Univ. Zagreb). *Kemija u Industriji*(Zagreb) 4, 235–48(1955). Methods for determining the glyceride composition of vegetable fats are reviewed, and the calculation of glyceride composition on the basis of analytical data is illustrated in detail in a number of examples. 21 references. (*C. A.* 50, 6813)

Turtle oil. Nadja Avalle. *Inds. parfum.* 10, 463–4(1955). The oil extracted from the muscles and genital organs of the Mexican giant sea turtle *(Chelonia athecae)* and purified, has the constants: $d^{25} = 0.911–0.919$, $n_D^{20} = 1.4599–1.4715$, saponification number 197–210, I number 89–97, acetylation number 3.5, Reichert-Meissl number 0.20, unsaponifiable matter 0.6%, slight animal odor, unsaturated fatty acids 65%. The oil gives excellent results in creams, or pure as a vehicle for vitamins. It is useful in cosmetic emulsions. (*C. A.* 50, 6815)