1962 Margarine Production Sets Record

Margarine production in 1962 maintained a 7-year record of annual increases with a total production of 1,726 million lb—a 2.2 million gain over the previous year. Americans consumed an average of 9.3 lb of margarine in 1962 compared to 6.4 lb of commercially sold butter.

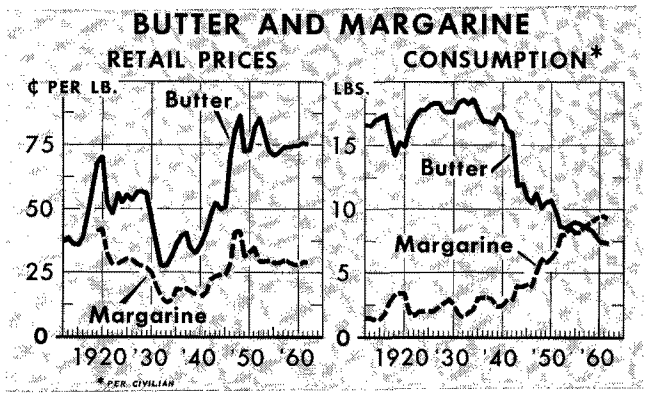
Margarine provided a major market for the large and new supplies of edible fats and oils that the nation's farms produced last year. In 1962 margarine producers used 1,352 lb of these fats and oils, including 1,057 million lb of refined soybean oil, 107 million lb of cottonseed oil, and 9.7 million lb of corn oil. Margarine also provided a major outlet for the expanding safflower crop and absorbed approximately 26 million lb of nonfat dry milk.

Margarine's retail price, as reported by the U.S.D.A., for leading cities averaged 28.3 cents per lb in 1962 compared with 28.6 cents in 1961.

MARGARINE PRODUCTION AND STOCKS—1962
(Millions of pounds)

Month	Total production	One-pound units [b c]	Pats or chips [c]	Other [c]	Stocks [a] Start of month	Stocks [a] End of month
January	159.8	148.0	2.8	9.2	32.8	38.3
February	140.6	130.0	2.6	8.0	38.3	37.7
March	142.9	130.7	2.9	9.3	37.7	38.3
April	135.9	124.4	2.7	8.8	38.3	37.3
May	136.1	124.0	2.7	9.4	37.3	39.9
June	129.6	117.2	2.4	10.0	39.9	42.7
July	125.9	113.3	2.5	10.1	42.7	39.9
August	140.1	127.7	2.8	9.6	39.9	38.0
September	137.0	125.3	3.0	9.0	38.0	38.5
October	165.1	150.9	3.6	10.6	38.5	37.8
November	155.9	142.2	3.4	10.3	37.8	40.3
December	157.0	144.6	3.0	9.3	40.3	39.3
TOTAL	1,725.9	1,578.3	34.4	113.6		

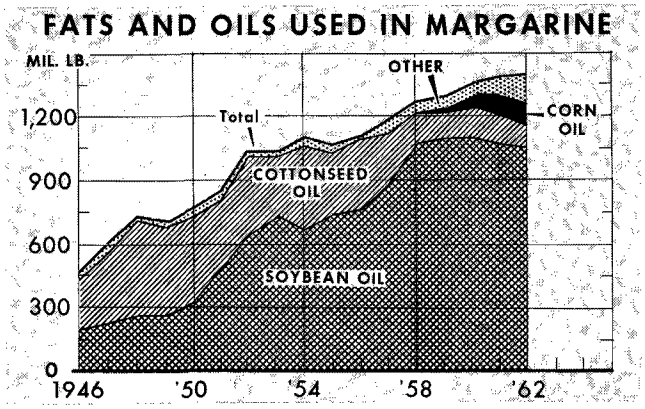
[a] Producers' and warehouse stocks; [b] includes small quantity of less-than-one-pound packages; plastic-bag margarine not reported separately; [c] the sum of these items may not agree with the production total shown above because some margarine is not packaged during the same month in which it is produced.



FATS AND OILS USED IN MARGARINE—1962
(Millions of pounds)

Month	Total oils	Soybean	Cottonseed	Corn	Peanut	Lard	Edible tallow	Safflower Seed Oil
January	127.0	97.2	9.9	7.6	(D)	(D)	(D)	(NA)
February	112.9	85.6	8.8	6.4	(D)	(D)	(D)	(NA)
March	115.1	85.1	8.8	8.1	(D)	(D)	(D)	(1)
April	109.9	82.5	8.5	6.8	(D)	(D)	(D)	(1)
May	108.7	79.0	9.4	8.1	(D)	(D)	(D)	(1)
June	104.6	78.7	8.2	7.3	(D)	(D)	0.4	(1)
July	102.3	78.8	7.6	6.6	(D)	(D)	(D)	(1)
August	112.6	85.0	8.0	9.0	(D)	(D)	(D)	(D)
September	111.4	86.7	8.4	8.6	(D)	(D)	(D)	(D)
October	133.6	106.1	9.7	9.1	(D)	(D)	(D)	(D)
November	126.8	97.0	9.2	9.3	(D)	(D)	(D)	(D)
December	127.1	96.2	10.0	9.5	(D)	(D)	(D)	1.8
Total	1,392.0	1,057.9	106.5	96.9	(NA)	(NA)	(NA)	(NA)

(D) Withheld to avoid disclosing figures for individual companies. (NA) Not available. (1) Figures withheld pending further investigation.



Gordon Research Offers Lipid Metabolism Conference

The Gordon Research Conferences on Lipid Metabolism will be held at Kimball Union Academy, Meriden, N. H., June 10-14, 1963. The following program has been released.

June 10

Fatty Acids and Sialic Acids

Newer Developments in the Biosynthesis of Fatty Acids, by S. Wakil.

Enzymatic Synthesis and Comparative Biochemistry of Unsaturated Fatty Acids, by K. E. Bloch.

Carnitine and Its Role in Fatty Acid Metabolism, by I. Fritz.

Studies on the Metabolism of the Sialic Acids, by S. Roseman.

June 11

Phosphatides and Other Complex Lipids (A)

Positional Specificities in Phosphatide Synthesis, by W. Lands.

Inositol Phosphatides, by C. Ballou.

Structural and Biosynthetic Studies on Mycobacterial Lipids, I, by E. Lederer.

Complex Glycolipids, by H. E. Carter.

June 12

Functions of Complex Lipids

Phospholipid Metabolism Associated with the Active Transport of β-Thiogalactosides in E. Coli, by H. Nikaido.

Role of Lipids in Mitochondrial Function, by S. Fleischer.

Immunological Activity of Sphingolipids, by M. Rapport.

Phosphates and Other Complex Lipids (B)

Chemistry and Metabolism of the Prostaglandins, by S. Bergstrom.

Structural and Biosynthetic Studies of Mycobacterial Lipids, II, by E. Lederer.

June 13

Lipid Absorption, Storage, Mobilization, and Transport

Role of Lipolysis in the Absorption of Glycerides, by F. Mattson.

Fatty Acid Mobilization and Utilization, by D. Steinberg.

Studies on the Biosynthesis of Plasma Lipoproteins, by J. Marsh.

Tangier Diseases—One of the Newer Genetically Determined Lipid Storage Diseases, by D. Fredrickson.

June 14

Lipids of Insects

Fat Transport in the Locust, by A. Devir.

Utilization of Sterols in Insects, by R. Clayton.

The Obese Mosquito, by E. Van Handel.

(Continued from page 31)

DISAPPEARANCE OF THE CHOLESTEROL MOIETY OF AN INJECTED CHYLOMICRON-CONTAINING FRACTION OF CHYLE FROM THE CIRCULATION OF THE RAT. S. S. Naidoo, W. J. Lossow, and I. L. Chaikoff (Dept. of Physiology, Univ. of Calif., Berkeley). *J. Lipid Res.* 3, 309–13 (1962). A chylomicron-containing, low-density lipoprotein fraction of thoracic duct chyle (S_f classes 20 and higher) obtained from rats fed either cholesterol-4-C^{14} or palmitic acid-1-C^{14} was injected intravenously into rats. Blood samples were obtained every 5 to 10 min for the first 1.5 hr, and thereafter at intervals of 30 min or longer up to 2.5 or 6.5 hr. The disappearance curves for the labeled cholesterol differed strikingly from those for the labeled triglyceride. The latter first declined rapidly and then more slowly. The former consisted of three phases: (1) rapid decline, (2) rising, and (3) leveling off. The first phase of the curves for the cholesterol-labeled, chylomicron-containing chyle fraction results from an initial rapid removal of cholesterol-C^{14} of chylomicrons accompanied by a slow removal of cholesterol-C^{14} that has been transferred intravascularly to higher-density lipoproteins. This phase, during which most of the chylomicron-cholesterol-C^{14} is removed from the circulation, is followed by a period during which labeled free sterol is rapidly recirculated from the liver as higher-density lipoproteins. The greater proportion of the labeled sterol in the plasma lipoproteins during the terminal phase is derived from the sterol that has been recirculated.

THE INCORPORATION OF ACETATE-1-C^{14} INTO THE LIPIDS OF VACUOLATED RAT LIVER CELLS. G. Gaja and A. Bernelli-Zazzera (Inst. of Gen. Pathology, Univ. of Milan, Italy). *Experientia* 18, 122–123 (1962). The results reported indicate that the incorporation of acetate-1-C^{14} into lipids occurs at a normal rate in vacuolated rat liver cells.

NOMENCLATURE OF STEROIDAL SAPOGENINS. G. P. Mueller and G. R. Pettit (Dept. of Chem., Univ. of Maine, Orono). *Experientia* 18, 404–405 (1962). A summary of the personal views of the authors is presented. Errors have been found in the nomenclature rules of 1960. The authors offer a plan to extricate sapogenin nomenclature from the confusion of the past.

IN VITRO RELEASE OF FREE FATTY ACIDS BY ADIPOSE TISSUE IN YOUNG AND OLD NEPHROTIC RATS. H. Altschubr, M. Lieberson, and J. J. Spitzer (Gerontological Res. Inst. and Hahnemann Med. Coll., Philadelphia, Pa.). *Experientia* 18, 418–419 (1962). There is a difference between old and young nephrotic rats in the amount of free fatty acid released by epidielymal adipose tissue. Adipose tissue triglyceride content of nephrotic rats was significantly higher than in normal rats. It was concluded that the primary change in causing nephrotic hyperlipemia is an increased lipid output by the liver and not by adipose tissue.

R_{Mg} VALUES IN THE GAS CHROMATOGRAPHY OF STEROIDS. B. A. Knights and G. H. Thomas (University of Birmingham). *Chem. & Ind. (London)* 1963, 43–4. The relative retention time of a steroid on gas chromatography may be expressed by the equation: Log $r = \Sigma\Delta R_{Mg} + \log r_N$ where r_N is the relative retention time of the steroid nucleus and R_{Mg} is the change in Log r brought about by the introduction of the group (g) into the nucleus.

THE SIGNIFICANCE OF SERUM TRIGLYCERIDES. Margaret J. Albrink (West Virginia University). *J. Am. Dietet. Assoc.* 42, 29–31 (1963). If a man is found to have a high level of triglycerides in his serum, the odds are good that he is a middle-aged, weight-gaining, coronary-prone male with a family history of coronary artery disease or diabetes. He may respond to a low-fat, high-carbohydrate diet by a further increase in triglyceride concentration. These findings indicate the fallacy of the determination to lower serum cholesterol by rigid fat restriction. The author states that the interrelated effects of dietary fat and carbohydrate on total metabolism require further study to evaluate the impact of modern diet on vascular disease.

TOCOPHEROLS IN NUTS. G. Lambertsen, H. Myklestad, and O. R. Braekkan (Norwegian Fisheries Res. Inst.). *J. Sci. Food Agr.* 13, 617–20 (1962). The α- and γ-tocopherol contents of different nuts have been determined spectrophotometrically on chromatographic fractions. Thin-layer chromatography was applied to study the tocopherol pattern. Values for α-tocopherol and γ-tocopherol, respectively, were as follows: filberts 210 and ~15 μg/g nuts; walnuts ~15 and 205; brazil nuts 65 and 110; pecans ~15 and 170; almonds 150 and 5; groundnuts 65 and 110; coconuts 7 and 2.5; chestnuts ~5 and 70.

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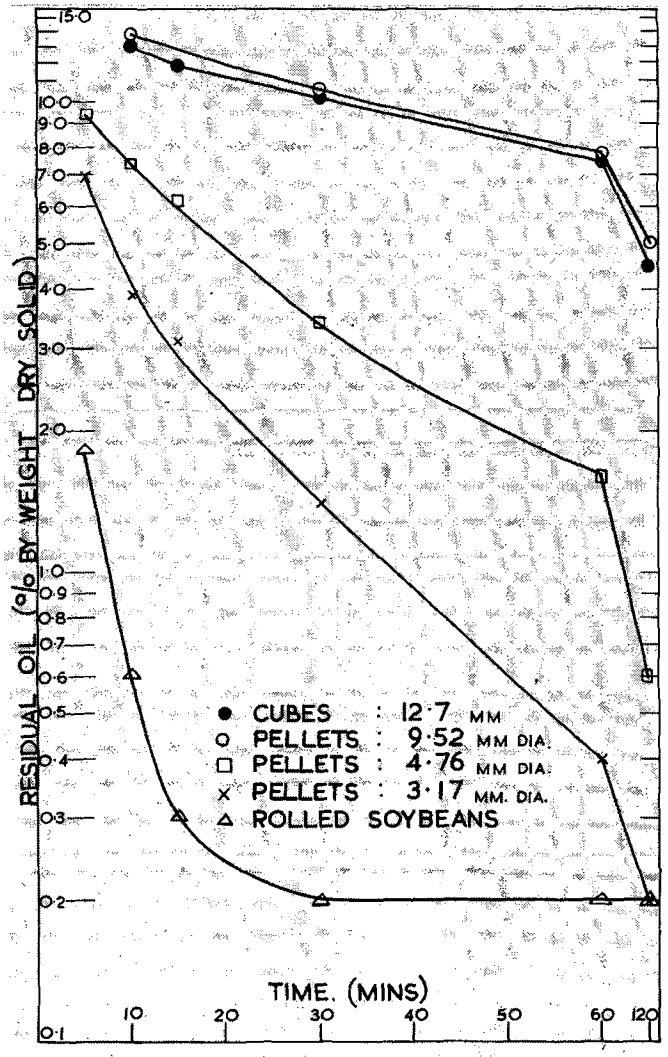

FIG. 1. Effect of pellet size on the comparative extraction rates of rolled and pelleted soybeans with trichloroethylene at 55C.

Solvent Extraction . . .

(Continued from page 22)

to merit further experiments with soybeans on a larger scale.

(b) *Plant scale.* A Simons' Century feed pelleting machine driven at 260 r.p.m. by a 100 H.P. motor was installed to take rolled soybeans routed to the machine via a conditioning kettle and feed worm. The machine output was directed along 36 m of Redler conveyors to a Bibby basket extractor (8) where the oil was extracted with trichloroethylene. Two types of desolventizing equipment were used: a conventional toaster of the type described by Sipos et al. (9) in which 90% of the heat requirements are supplied by live steam and a Bibby steamer relying mostly on jacket heat with live steam to strip the final 2% of solvent.

Rolled soybeans were fed cold to the machine, passing through the kettle where the bulk density was increased from 0.45 g/cc to 0.65 g/cc by agitation. A maximum load of 6½–7 long tons/hr soybeans was attained with a 4.76 mm diam hole die ring at a power consumption of 6 kW. per ton soybeans. The fines content of the pellets from the machine (classified on a 5/20 S.W.G. screen) was 19.0% increasing to 29.0% at the extractor hopper.

From Table II it is seen that the retention value of the fines is higher and bulk density and drainage lower than the corresponding pellets so it would be preferable to screen out fines and recirculate to the kettle. However,

TABLE II

Effect of Fines on Bulk Density, Drainage Rate, and Solvent Retention of 4.76 mm diam Soybean Pellets

	Bulk density	Drainage rate	Solvent retained
	g/cc	*cc sq cm /sec*	*g/g oil free meal*
Feed to pelleting M/c	0.65	0.047	1.26
Pellets/fines mixture	0.65	>2.44	0.54
Pellets	0.65	>2.44	0.53
Fines	0.58	0.232	0.72

the extraction rate is faster than pellets, therefore as we were limited with this extractor as regards miscella recirculation the retarding effect of solvent drainage through the pellets was useful in prolonging the contact time.

Residual oil results of 1.0–1.5% were achieved with an extraction time of 64 min; the actual level varied slightly with the pellet length but corresponded to the forecast values from rate determinations. Desolventizing proceeded satisfactorily by both processes, i.e. through the D.T. and the Bibby steamer. The meal was slightly overtoasted based on the analyses (protein (46.8%, water soluble protein 3.78%, urease activity 29.2 mg urea destroyed by 1 g meal, residual trichloroethylene (0.02%), and contained approximately 40% of pellets of modified shape. Maximum plant throughput was increased by 50–60% without adjusting the steam consumption. This capacity increase was greater than predicted and was attributed to a more even feed, better distribution and depth tolerance in the buckets.

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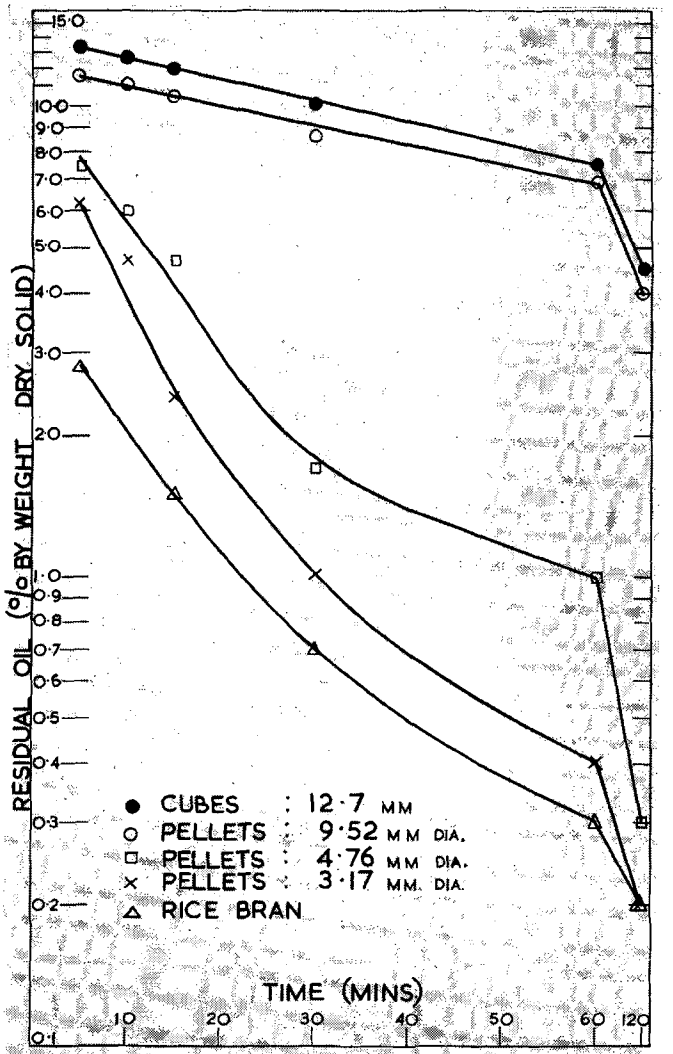

FIG. 2. Effect of pellet size on the comparative extraction rates of rice bran and pelleted rice bran with trichloroethylene at 55C.

Crude Glycerine Production Rises

According to the U.S. Department of Commerce, production of crude glycerine (including synthetic) for the month of January 1963 was 22.5 million lb, up 0.4 million lb from December, but down 0.1 million lb from crude production reported for January 1962.

The crude glycerine stocks figure for December 1962, originally stated at 29.0 million lb, has been revised downwards to 24.7 million lb, now placing the total December stocks level at 53.2 million lb. Crude and refined stocks in the producers' hands totalled 55.8 million lb at the end of January, up 2.6 million lb from the revised December figure, but down 11.5 million lb from January last year.

JANUARY
(Million lb)
Preliminary

Factory Production			Factory & Warehouse Stocks (Producers *)	
Glycerine 100% Basis	Jan. 1963	% Change from Dec. 1962	End of Jan. 1963	% Change from Dec. 1962
Crude	22.5 *	+ 1.8	22.9	— 7.3
Refined, all grades	23.1	+ 8.5	32.9	+ 15.4
			55.8	+ 4.9

* Includes synthetic glycerine.

PRODUCTION OF ETHYLENE GLYCOL, PROPYLENE GLYCOL & PENTAERYTHRITOL
(Millions of lb)

	Ethylene Glycol	Propylene Glycol	Pentaerythritol	Total **
Year				
1957	1,199.9	98.4	56.5	1,354.9
1958	1,145.5	42.0 [b]	53.3	1,240.8
1959	1,214.6 [a]	151.5 [a]	64.1 [a]	1,430.2
1960	1,297.3 [c]	152.0 [c]	64.3 [c]	1,513.5
1961	1,183.3	160.3	62.4	1,406.0
1962 [d]	1,211.0	177.1	62.1	1,450.1
1960				
November	104.9	8.7	5.2	118.8
December	108.8	.....	5.1	113.8
1961				
January	119.5	12.0	5.5	137.0
February	101.0	12.7	4.4	118.1
March	101.3	14.0	5.3	120.7
April	95.7	14.1	5.4	115.3
May	98.4	15.4	5.3	119.1
June	97.0	15.1	5.1	117.2
July	94.4	16.0	4.6	115.1
August	99.3	15.3	5.0	119.7
September	87.7	10.7	5.2	103.6
October	97.5	12.3	5.9	115.6
November	95.2	10.8	4.9	110.9
December	97.3	11.9	5.1	114.3
1962				
January	91.3	19.1	5.8	116.1
February	80.8	15.4	4.5	100.7
March	87.9	16.0	4.7	108.5
April	88.8	12.2	5.0	106.0
May	98.4	17.2	4.8	120.4
June	103.7	13.6	4.5	121.7
July	119.1	13.2	4.9	137.2
August	122.0	12.7	5.4	140.0
September	106.4	13.0	5.5	124.9
October	112.9	9.9	6.6	129.4
November	114.4	23.4	5.5	143.3
December	117.9	16.8	4.9	139.6

** Totals may not agree exactly because of independent rounding of figures.

[a] Revised, but does not agree with total of monthly figures.

[b] Incomplete—sum of five monthly figures only. Tariff Commission did not publish an official 1959 annual figure for propylene glycol.

[c] Official figure, but does not agree with total of the months.

[d] Official, preliminary totals. Figures shown for ethyene glycol and propylene glycol do not agree with the total of individual monthly figures.

• *Obituaries*

C. N. Andersen (1946-60), Ossining, N. Y., passed away December 22, 1961. He maintained a consulting research laboratory for ten years immediately perceding his death. One of the best known chemists in the East, Dr. Andersen held more than 175 U. S. and foreign patents.

E. B. Kester (1940-60), Berkeley, Calif., died February 16, 1963. He has served as a research chemist with the U. S. Department of Agriculture's regional laboratory in

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FATTY ACID COMPOSITION OF THE MILK FAT OF THE ELAND ANTELOPE (TAUROTRAGUS ORYX). S. H. W. Cmelik (Liebig's [Rhodesia] Ltd.). *J. Sci. Food Agr.* 13, 662–5 (1962). The acetone-soluble milk fat of the eland has been analyzed. Myristic, palmitic, and stearic acids are the most prominent among the saturated acids. No lauric acid was detected. The presence of C_{12}–C_{18} monoenic acids was confirmed. Polyunsaturated acids, both conjugated and non-conjugated, were also present in small quantities. A glyceride identical with palmito-distearin has been isolated.

SEED FATS OF THE NEW ZEALAND AGAVACEAE. Isobel M. Morice (Dept. of Scientific & Industrial Research, Wellington). *J. Sci. Food Agr.* 13, 666–9 (1962). The seed fats of 5 species of *Cordyline* and 2 species of *Phormium*, the only New Zealand genera of the family *Agavaceae*, have been shown to be similar in fatty acid composition, containing the following ranges of fatty acids: linoleic acid 75–89%, oleic acid 5–16%, palmitic acid 3–11%, and stearic acid 1–3%.

HYDROGENATED TALLOWPERHYDROSQUALENE DERMATOLOGICAL EXCIPIENT. P. L. V. Monot. *U. S. 3,069,324.* An excipient of dermatological use comprises a mixture of 15–40% by weight hydrogenated tallow and 85–60% by weight perhydrosqualene.

WATER-DISPERSIBLE LECITHIN. G. W. Cogswell (A. E. Staley Mfg. Co.). *U. S. 3,069,361.* An aqueous dispersible lecithin composition comprises from 90 to 99 parts by weight lecithin and from 10 to 1 parts of a vegetable oil-soluble nonionic alkylated phenoxy compound in which the alkyl group contains from 6 to 18 carbon atoms.

PARENTERAL AQUEOUS SOLUTIONS OF FAT-SOLUBLE VITAMINS. J. D. Mullins and T. J. Macek (Merck & Co.). *U. S. 3,070,499.* The described solution comprises a fat-soluble vitamin active substance and, as a solubilizing agent, a condensation product of castor oil and ethylene oxide (20–40 moles ethylene oxide per mole of castor oil). The condensation product is present in the solution in an amount of from 5 to 25 milligrams of fat-soluble vitamin active substance.

PROCESS FOR PREPARING STABLE ALCOHOLIC EMULSION OF GRAPE SUGAR. C. H. Buer. *U. S. 3,070,500.* A process for preparing stable alcoholic emulsions of therapeutically useful glycerine difatty acid phosphoric acid amino alcohol esters comprises adding a glycerine difatty acid phosphoric acid amino alcohol ester to a boiling aqueous alcoholic solution containing at least 10% grape sugar and stirring the mixture at a temperature of 82–87C until an emulsion has been formed. The ratio of ester and sugar is so adjusted that the obtained emulsion contains at least 10% of the ester and at least 6% sugar.

EFFECTS OF STARVATION ON THE CARDIOVASCULAR SYSTEM OF THE CHICKEN. J. A. Vogel and P. D. Sturkie (Rutgers Univ., New Brunswick, N, J.). *Proc. Soc. Exp. Biol. Med.* 112, 111–113 (1963). Acute starvation of chickens produces a drop in heart rate, blood pressure and cardiac output. The decline in heart rate, which is influenced by excitement and handling of the bird may be due to enhanced vagal tone.

EFFECT OF AGE AND RESTRAINT ON POSTPRANDIAL LIPEMIA CLEARANCE IN DOGS. H. Sobel and H. V. Thomas (Veterans Admin. Hosp., Sepulveda, and St. Joseph Hosp., Burbank, Calif.). *Proc. Soc. Exp. Biol. Med.* 112, 206–209 (1963). A meal containing 1 g of lard per pound body weight in a meat patty was given to male mongrel dogs after a 16-hour fast. Lipemia clearance was observed in dogs of 4 age groups as follows: Group 1, less than 1 year; Group 2, 1 to 3 years; Group 3, 4 to 8 years and Group 4, over 9 years. Peak lipemia was apparent after 4 hours in Group 1–3 and was greater in Group 2 than in Group 1 and in Group 3 than in Group 2. In Group 4 dogs peak lipemia occurred later than in the others but was not as great as that observed in Group 3.

ACCELERATED INCREASE IN EGG WEIGHT OF YOUNG PULLETS FED PRACTICAL DIETS SUPPLEMENTED WITH CORN OIL. J. V. Shutze, L. S. Jensen and J. McGinnis (Dept. of Poultry Sci., Washington State Univ., Pullman). *Poultry Sci.* 41, 1846–1851 (1962). Four experiments were conducted with S. C. White Leghorn pullets fed practical diets containing different cereal grains with and without corn oil. During the first 6 to 8 weeks of production, supplementation with corn oil consistently improved average egg weight, regardless of the cereal grain used. Differences among cereal grains were generally correlated with energy concentration, except for milo and oats. Corn oil did not stimulate egg weight significantly when compared to an isocaloric diet containing tallow.

THE EFFECTS OF COTTONSEED OIL AND COTTONSEED OIL DERIVATIVES ON THE QUALITY OF EGGS STORED AT 30 AND 60F FOR VARYING PERIODS OF TIME. W. F. Pepper, E. S. Snyder, I. R. Sibbald and S. J. Slinger (Dept. of Poultry Sci. and Nutr., Ontario Agricul. College, Guelph, Ontario, Can.). *Poultry Sci.* 41, 1943–1946 (1962). An experiment was conducted to study the effects of the dietary inclusion of cottonseed oil, acidulated cottonseed soap-stocks and cottonseed still bottoms on the interior quality of eggs stored at either 30 or 60F. Eight diets were formulated, each of which was fed to 4 replicated pens of 10 pullets for a period of 20 days. During the latter 10 days, eggs were collected, marked according to treatment and replicate, and placed in storage. Eggs were broken out after 1, 8, 15, 29, 57 and 113 days of storage. A number of criteria of egg quality deterioration were observed. On the basis of the data collected it would seem unwise, at the present time, to incorporate any of the three products into diets for laying hens.

THE RESPONSE OF FAT DEFICIENT LAYING HENS TO CORN OIL SUPPLEMENTATION. J. E. Marion and H. M. Edwards, Jr. (Dept. of Poultry, Univ. of Georgia, Athens). *Poultry Sci.* 41, 1785–1792 (1962). Two trials, each of 70 days duration, have been conducted with fat deficient laying hens to determine the influence of isocalorically adding corn oil to a low fat diet on various measures of lipid metabolism. A higher rate of egg production was maintained when hens received dietary corn oil but the treatment differences were not statistically significant. Egg weights were significantly increased by corn oil feeding but no differences in the dry matter, total lipid content or major lipid components in the egg were attributable to diet treatment. The total weight, dry matter and lipid content of the liver, in addition to plasma lipids into glycerides, phospholipids, cholesterol and cholesterol esters showed that corn oil feeding resulted in a lower glyceride content in the plasma and liver. Adding dietary fat appeared to widen the ratio of esterified to free cholesterol in the plasma while having little influence on the total content of cholesterol. Total liver cholesterol was reduced by dietary corn oil. Hatchability of fertile eggs and progeny growth were each found to be significantly increased when supplementary fat was added to the low fat diet.

EFFECTS OF LONG-TERM FEEDING OF VEGETABLE FATS ON ATHEROSCLEROSIS. H. B. Lofland, Jr. and T. B. Clarkson (Dept. of Biochem., and the Vivarium, Bowman Gray School of Med., Wake Forest College, Winston-Salem, N. C.). *Proc. Soc. Exp. Biol. Med.* 112, 108–111 (1963). White Carneau pigeons were maintained for 26.5 months on cholesterol-free diets (pigeon pellets). When such diets were supplemented with 10% hydrogenated shortening aortic atherosclerosis and the level of aorta cholesterol were less than in birds receiving no supplement, or 10% safflower oil. Serum cholesterol levels were not different in these 3 groups. When other groups were maintained on diets containing 1% cholesterol for 6 months, the severity of atherosclerosis was increased, and inclusion of 10% safflower oil in the diets exerted no prophylactic effect. When cholesterol was removed from the diets, and the birds were maintained for an additional 12 months on either pellets alone, or pellets plus 10% safflower oil, there was no decrease in the level of aorta cholesterol and a slight decrease in aortic atherosclerosis.

CHOLESTEROL CONTENT OF HUMAN SERUM LIPOPROTEINS OBTAINED BY DEXTRAN SULFATE PRECIPITATION AND BY PREPARATIVE ULTRACENTRIFUGATION. D. Kritchevsky, S. A. Tepper, P. Alaupovic and R. H. Furman (Wistar Inst. of Anatomy and Biology, Philadelphia, Pa., and Oklahoma Med. Res. Inst., Oklahoma City). *Proc. Soc. Exp. Biol. Med.* 112, 259-262 (1963). A comparison of cholesterol levels of α- and β-lipoprotein of human serum obtained by dextran sulfate precipitation compares well with analysis of lipoproteins obtained by ultracentrifugation. Comparison of dextran sulfate from 2 different sources gave identical results. The presence of oxalate may interfere with the analysis of β-lipoprotein cholesterol, but this can be avoided by using analytical methods which entail digitonide precipitation.

ACTIVITY OF VITAMIN K_1 AND MENADIONE SODIUM BISULFITE COMPLEX WHEN MEASURED BY MORTALITY OF CHICKS WITH CECAL COCCIDIOSIS. R. H. Harms, P. W. Waldroup and D. D. Cox (Florida Agricultural Exper. Stations, Gainesville, Fla.). *Poultry Sci.* 41, 1836–1839 (1962). Four experiments conducted with day old Vantress X White Plymouth Rock chicks indicated the relative activity of vitamin K_1 on a weight basis, to be three times that of menadione sodium bisulfite complex when measured by mortality from cecal coccidiosis. Although an inverse relationship existed between vitamin K activity in the diet and mortality from coccidiosis, this did not appear

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Local Section News. . .

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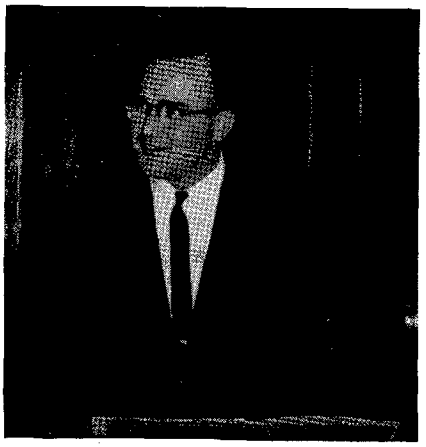
Mr. Marshack advised that "Doc" MacGee and C. H. Hauber, AOCS Executive Secretary, will be present at the April 2, 1963—Second Symposium of the Northeast Section. The Symposium affords an interesting subject matter to compliment the variety presented in the first Symposium. We all thank Oscar Ackelsberg and his Committee for the wonderful job in soliciting such a formidable group of speakers. We hope to top the attendance at the First Symposium, and look forward to a successful meeting.

Next, the Chairman for the evening, E. A. Lawrence, was presented. We all wish him the best in his new position with Union Carbide. Mr. Lawrence introduced the speaker, L. R. Driscoll of Blaw Knox, who spoke on "Trends in Instrumentation." Mr. Driscoll discussed the specific tools of the trade presently used in measuring flow, analyzing and pneumatics. He also discussed the future relative to instrumentation and predicted more activity in process control.

The evening was enjoyed by all, and the entire Section looks forward to the all-day Symposium on April 2, 1963.



D. B. Lake, Du Pont Co., seen delivering his talk entitled "Recent Developments in Amine Oxide Chemistry," at the December Meeting of the AOCS Northeast Section December 4.

D. S. Bolley (left), candidate for AOCS Board Member at Large, enjoys dinner at the February 5 Northeast Section Meeting with Meeting Chairman E. A. Lawrence and L. R. Driscoll, speaker for the evening. Mr. Lawrence (right) spoke on "Trends in Instrumentation."

• *New Products*

FISHER SCIENTIFIC, Pittsburgh, Pa., has introduced the C-H-N/Analyzer, which performs simultaneous determination of carbon, hydrogen and nitrogen at milligram levels. The Analyzer has been designed for maximum stability and combines a Pregl combustion train furnace, a gas chromatograph, and a solid-state frequency-converter.

PERKIN-ELMER CORP., Norwalk, Conn., has announced the development of a new Atomic Absorption Spectrophotometer. The new Spectrophotometer will bring simplicity and speed to routine analyses, and is expected to offer advantages in the analyses required by many different fields.

ANALYTICAL MEASUREMENTS, INC., Summit, N. J., recently announced the development of the Titra-Kit, a simplified and compact instrument package

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to be a satisfactory assay of the vitamin K activity of the diet. Coccidiosis did not appear to increase the chicks' requirement for vitamin K.

THE RAPID INCORPORATION OF PHOSPHATE INTO MITOCHONDRIAL LIPIDS. J. Garbus, H. F. DeLuca, M. E. Loomans, and F. M. Strong (Dept. of Biochem., Univ. of Wisconsin, Madison). *J. Biol. Chem.* **238**, 59–63 (1963). Liver and kidney mitochondria catalyze a rapid incorporation of radioactive phosphate into their lipid fraction. This process requires magnesium ion but not substrate, and is inhibited by dinitrophenol, azide, cyanide, antimycin A, Dicumarol, gramicidin, anaerobiosis, and storage of the mitochondria at 4C, but not by oligomycin. An unidentified mitochondrial lipid is labeled more rapidly than is phosphatidic acid. The unknown lipid has some of the properties of a phosphorylated analogue of phosphoinositide. Present evidence makes it unlikely that this material functions as an intermediate in oxidative phosphorylation.

COENZYME Q. XXXVI. ISOLATION AND CHARACTERIZATION OF COENZYME Q_{10} (H-10). P. H. Gale, B. H. Arison, N. R. Trenner, A. C. Page, Jr., and K. Folkers (Merck Sharp & Dohme Research Lab., Division of Merck & Co., Inc., Rahway, N. J.). *Biochemistry* **2**, 196–200 (1963). A new naturally occurring member of the coenzyme Q group has been isolated and crystallized from cells of *Gibberella fujikuroi*. Comparison of ultraviolet, infrared, and nuclear magnetic resonance spectra of this compound with spectra of coenzyme Q_{10} and related known compounds has revealed a structure differing from coenzyme Q_{10} in that the terminal unit in the ten-unit side-chain is isopentanyl, rather than isopentenyl. This new compound is designated coenzyme Q_{10} (H-10).

CHARACTERIZATION OF VITAMIN K_9(H) FROM MYCOBACTERIUM PHLEI. P. H. Gale, B. H. Arison, N. R. Trenner, A. C. Page, Jr., and K. Folkers (Merck Sharp & Dohme Research Lab., Merck & Co., Inc., Rahway, N. J.) and A. F. Brodie (Dept. of Bacteriology and Immunology, Harvard Med. School, Boston, Mass.). *Biochemistry* **2**, 200–203 (1963). A newly characterized naphthoquinone has been isolated from *Mycobacterium phlei*. Spectral data and analytical and papergram results revealed that it is closely related structurally to vitamin $K_{2(45)}$, but differs in that one of the side-chain isoprenoid units is reduced. Nuclear magnetic resonance data also show that the saturated isoprenoid unit is not located at either end of the side-chain. This compound is designated vitamin K_9(H) by the same nomenclature used for the new coenzyme Q_{10}(H-10).

FATTY ACID COMPOSITION OF EMBRYONIC FAT ORGAN LIPIDS. G. L. Feldman, H. T. Jonsson, T. W. Culp and R. H. Gowan (Biochem. Section, Div. of Ophthalmology, Baylor Univ. College of Med., Houston, Texas, and Metabolic Endocrine Research Dept., The Methodist Hospital, Houston, Texas). *Poultry Sci.* **41**, 1851–1857 (1962). The fatty acid composition of embryonic adipose tissue bears a striking resemblance to that of egg fat and not to the fat of the adult chicken. The triglyceride fatty acids are relatively constant and do not reflect the changes associated with embryonic development. However, the phospholipid fatty acids fluctuate widely and appear to be related to the onset of triglyceride synthesis and pipping of the shell. An unidentified fatty acid occurs in all of the phospholipids, in which it comprises a major component.

EFFECTS OF GLUCOCORTICOIDS ON METABOLISM OF ADIPOSE TISSUE IN VITRO. J. N. Fain, R. O. Scow, and S. S. Chernick (Lab. of Nutrition and Endocrinology, National Institute of Arthritis and Metabolic Diseases, NIH, Bethesda 14, Md.). *J. Biol. Chem.* **238**, 54–58 (1963). Dexamethasone at very low concentrations, 10^{-8} to 10^{-7} *M*, increased the release of fatty acid by incubated parametrial and mesenteric adipose tissue. Corticosterone at 10 times the above concentrations produced similar effects. 2α-Methylcortisol was as potent as corticosterone, whereas 2α-methylcortisone was ineffective. Deoxycorticosterone had little effect on fatty acid release. Glucose uptake and its conversion to carbon dioxide, total lipid, and fatty acid was decreased by glucocorticoids. Addition of small amounts of insulin (4 milliunits per ml) to the media reversed the effects of dexamethasone on fatty acid release and glucose uptake in parametrial adipose tissue. The onset of action of glucocorticoids was slow; at least 2 hours of incubation were required before dexamethasone had any effect on adipose tissue.

INULIN AND SUCROSE DISTRIBUTION IN TISSUES OF VITAMIN E-DEFICIENT AND CONTROL RABBITS. J. F. Diehl and J. K. Bissett (Dept. of Biochem., Univ. of Arkansas Med. Center, Little Rock). *Proc. Soc. Exp. Biol. Med.* **112**, 173–176 (1963). Inulin and sucrose space were determined under *in vivo* conditions in 4 tissues of vitamin E-deficient and vitamin E-supplemented rabbits, and inulin space was determined in the same tissues of starved rabbits. In vitamin E-deficient, but not in starved animals, a significant increase in inulin and sucrose space of skeletal muscle was found. Whether this increase reflected an actual increase of the extracellular fluid compartment or was caused by increased permeability to the saccharides, could not be established. It was concluded that if there was an actual increase of extra-cellular space in the dystrophic muscle, this increase was not greater than by a factor of 2. Inulin space in livers of all 3 experimental groups was very variable and in most cases much higher than average sucrose space.

THE OCCURRENCE OF CYTOCHROME AND COENZYME Q IN THIOBACILLUS THIOOXIDANS. T. M. Cook and W. W. Umbreit (Dept. of Bacteriology, Rutgers—The State Univ., New Brunswick, N. J.). *Biochemistry* **2**, 194–196 (1963). The existence of a cytochrome system and coenzyme Qs has been demonstrated in *Thiobacillus thiooxidans* and *Thiobacillus thioparus*. Cytochrome 550 of *T. thiooxidans* has an absorption spectrum resembling that of cytochrome c. The coenzyme Qs content of *T. thiooxidans* was estimated to be 4.3 μmoles (3.2 mg) per gram of dry weight.

EFFECT OF DIETARY FAT ON THE DISPOSITION OF CHOLESTEROL-4-C^{14} IN RATS. J. G. Coniglio, F. R. Blood, W. Youmans, L. Gibson and N. Warnock (Dept. of Biochem., Vanderbilt Univ. School of Med., Nashville, Tenn.). *Proc. Soc. Exp. Biol. Med.* **112**, 140–144 (1963). Rats were maintained for 30 to 76 days on a purified diet containing 20% fat as hydrogenated cottonseed oil, corn oil, or coconut oil and then injected intravenously with a tracer dose of cholesterol-4-C^{14}. In the 6 days following injection higher excretion of C^{14} was observed in animals maintained on hydrogenated cottonseed oil. Of the activity extracted by petroleum ether after saponification, a lower percentage was present in the digitonin-precipitable fraction in animals fed coconut oil. Smaller amounts of cholesterol were excreted by the coconut oil-fed rats. No consistent differences were observed in total C^{14} activity of various organs of the different dietary groups at any time period; Neither serum cholesterol nor serum C^{14} activity was affected by variation of the type of dietary fat given these rats.

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Solvent Extraction . . .

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Using a 3.2 mm diam hole die ring a maximum throughout of 3½–4 T/hr of cold pelleted soybeans was achieved with a power consumption of 8.5 kW./ton soybean. Harder pellets were produced with less fines e.g. 7% at the machine and 10% after conveying to the extractor. To maintain production we were forced to run with added flakes on these tests, however, pellets separated from the extracted meal, analyzed at 0.8% oil after a 64 min extraction time. Throughput was increased by 40–50% for the same steam consumption. Unfortunately we were not able to measure the heat savings precisely, on the other hand, the increased throughput for the same steam consumption coupled with a reduction in moisture of the toaster outlet meal from 22–24% to 19% are both indications of the potential economies.

The foregoing work was carried out with trichloroethylene as solvent. In the middle of the tests the project had to be re-appraised as a solvent change to hexane was envisaged. As the steam processing costs for hexane are only two thirds of the costs for trichloroethylene the steam economy is not so great. On the other hand, the extraction rate of soybeans with hexane is faster than with trichloroethylene (Fig. 3). Hence the extraction cycle can be reduced or a larger pellet used thus reducing pelleting costs. The advantages are set out below for a hexane plant combined with a D.T.

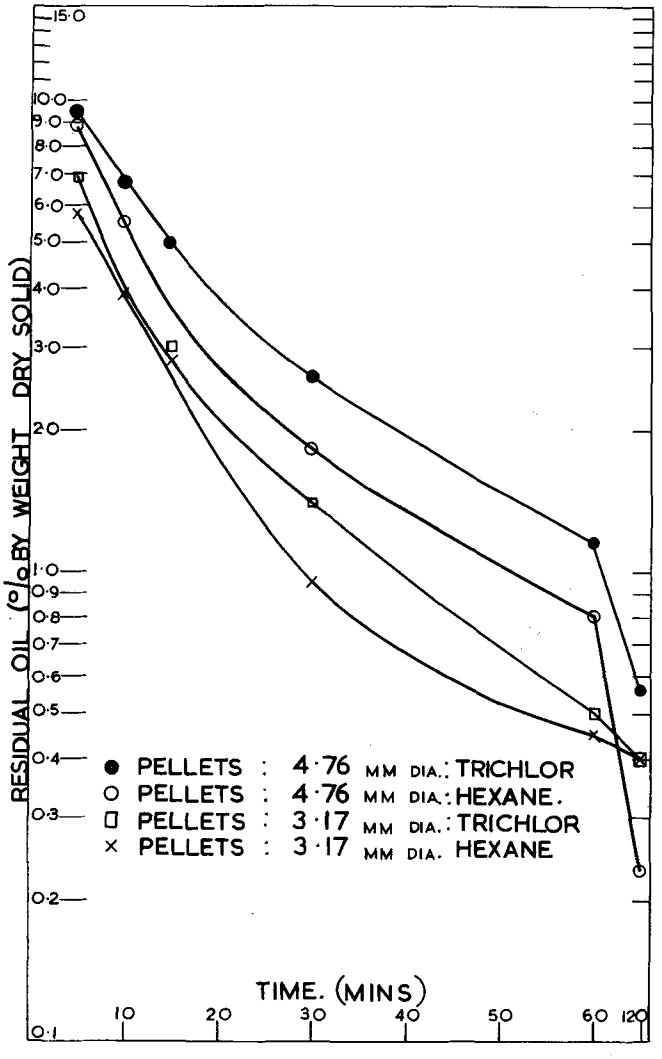

FIG. 3. Comparative extraction rates of soybean pellets with trichloroethylene and hexane at 55C.

Advantages of Soybean Pellets on a Hexane Plant

(a) For a given throughput the volumetric size of the extractor can be reduced by 25–30%. The increased drainage rate through a bed of pellets means the drainage time can be shortened and the extraction time lengthened to counteract a slightly slower extraction rate than on rolled soybeans.

(b) Steam saving in D.T.

Theoretical heat requirements for rolled soybeans at 0.44 W./W. retention of hexane = 19.2×10^4 B.t.u.'s per ton soybeans.

Theoretical heat requirements for 3.2 mm diam soybean pellets at 0.26 W./W. retention of hexane = 13.8×10^4 B.t.u.'s per ton soybeans. Assuming 150% of the theoretical heat is required the saving is about 85 lb steam/ton soybeans.

(c) The product from a D.T. is of relatively high moisture content and largely depends on the solvent used, the inherent moisture of the seed, the solvent retention of the meal entering the D.T., the extent of drying with the excess of superheated steam required for desolventization, and flashing in the exit worm. The reduced hexane retention on pellets would reduce the exit moisture from 18–19% to 15% which would require less steam to dry down to the customary 12%.

(d) With less static hold-up of solvent a lower solvent ratio can be used, morever, the very considerable reduction in air input to the extractor entails lower costs for exhaust solvent recovery. Both factors will contribute to an overall reduction in solvent loss.

(e) A smaller D.T. is required due to the reduced volume of material and of solvent to be evaporated.

(f) Reduced fines in miscella.

(g) A less dusty compacted product which may be of importance for plant using superheated solvent vapor desolventizers where fines are troublesome.

Discussion

This work has shown the feasibility of processing soybeans and rice bran in pelleted form compared with the more usual flaked or finely rolled material. With soybeans in particular, the plant scale tests showed that the Bibby basket extractor and steamer could be run at an increased capacity of 40–50% for the same steam costs. Using 3.2 mm diam pellets and an extraction time of 64 min the residual oil in the marc is not increased.

Consideration of the advantages of pelleting soybeans, rice bran (or any other material) will have to be offset against the cost of pelleting; the balance will no doubt vary both nationally and internationally. The life of a 3.2 mm diam hole die on soybeans—a major pelleting cost—was estimated as at least five times its normal life on animal feeds. The cost of the pelleting machines should be offset by savings in plant size when new plant is considered. The process however is thought to be most valuable for increasing the capacity and reducing costs of existing plant whether working with trichloroethylene or hexane. The choice of pellet size will depend on local conditions such as extraction cycle, residual oil requirements, etc. In general as pelleting costs are inversely proportional to size the largest acceptable pellets should be used.

ACKNOWLEDGMENT

E. B. Taylor of the Oil Production Department gave encouraging assistance in the work.

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RATE OF DISAPPEARANCE OF CHOLESTEROL-C^{14} FROM THE BLOODSTREAM OF DOGS. H. R. Casdorph, J. L. Juergens, A. L. Orvis, C. A. Owen, Jr. (Sections of Medicine, Biophys. and Clinical Pathol., Mayo Clinic and Found., Rochester, Minn.). *Proc. Soc. Exp. Biol. Med.* 112, 191–194 (1963). A simplified technic is offered for measuring plasma cholesterol-C^{14} after intravenous injection of this sterol; it consists of liquid scintillation counting of an alcohol-acetone extract of the plasma. The distribution of cholesterol-4-C^{14} in 2 normal dogs was calculated from a 60- to 70-day study of plasmatic radioactivity, assuming a 4-compartment mammillary system. Excretory rate constants of 1.5 and 1.6% per day of the retained dose were derived. Preliminary estimates of the "exchangeable cholesterol pool" were made. The size of this pool appeared to increase as serum cholesterol rose, either as the result of a high fat diet or of thyroidectomy.

STRUCTURAL STUDIES ON THE MYO-INOSITOL PHOSPHOLIPIDS OF MYCOBACTERIUM TUBERCULOSIS (VAR. BOVIS, STRAIN BGG.). C. E. Ballou, E. Vilkas, and E. Lederer (Institut de Chimie des Substances Naturelles, Gif-sur-Yvette, France, and the Dept. of Biochem., Univ. of Calif., Berkeley). *J. Biol. Chem.* 238, 69–76 (1963). The phospholipids from *Mycobacterium tuberculosis* (var. bovis, strain BGG) have been deacylated, and the water-soluble material has been separated to yield four products containing myo-inositol: glycerol myo-inositol phosphate, glycerol myo-inositol phosphate mannoside, glycerol myo-inositol phosphate dimannoside, and glycerol myo-inositol phosphate pentamannoside. In each, the glycerol phosphate moiety has been shown to be attached to the L-1-position of the myo-inositol ring, thus establishing the stereochemical identity of the phosphatidyl-myo-inositols of mycobacteria with those of plants and animals.

THIN-LAYER CHROMATOGRAPHY OF STEROLS ON STARCH-BOUND SILICA GEL CHROMATOPLATES. L. L. Smith and T. Foell (Wyeth Labs., Inc., Radnor, Pa.). *J. Chromatog.* 9, 339–44 (1962). A thin-layer chromatographic procedure for steroids is described wherein the thin-layer is prepared from silica gel with rice starch as the binder. The relative mobility of 55 steroids is given for four different solvent mixtures.

THIN-LAYER PARTITION CHROMATOGRAPHY, A QUICK METHOD OF CHROMATOGRAPHY FOR STEROIDS. J. Vaedtke and Anna Gajewska (Lab. of Hormones and Vitamins, Inst. of Phar., Warsaw, Poland). *J. Chromatog.* 9, 345–47 (1962). A method of thin-layer partition chromatography using Celite No. 545 and Zaffaroni's solvent systems is described. This method has a development time of three to seven minutes. The separation of steroids of widely differing polarities is satisfactory.

THIN-LAYER CHROMATOGRAPHY OF STEROLS. R. D. Bennett and E. Heftmann (National Inst. of Arthritis and Metabolic Diseases, U. S. Dept. of Health, Education, and Welfare, Bethesda, Md.). *J. Chromatog.* 9, 359–62 (1962). Eight 3-β-sterols differing in unsaturation in ring B and in the side chain were separated by thin-layer chromatography. Differences in resolving power between polar and nonpolar systems are given.

STEROIDS. CCXV. THE QUANTITATIVE ANALYSIS OF STEROIDS BY THIN-LAYER CHROMATOGRAPHY. J. S. Matthews, A. L. Pereda, and A. Aguilera (Syntex Res. Lab., Mexico City, Mexico). *J. Chromatog.* 9(11), 331–338 (1962). A method was developed for the quantitative analysis of ultraviolet and non-ultraviolet absorbing steroids utilizing thin-layer chromatography. Ultraviolet absorbing steroids are detected by using phosphor in the adsorbent. Non-ultraviolet absorbing steroids are detected by iodine vapor. They were determined quantitatively using a spectrophotometer for the ultraviolet absorbing steroids and by a colorimetric reaction for the non-ultraviolet absorbing steroids by removing them from the chromatoplates.

THE ACCEPTABILITY OF COOKED POULTRY PROTECTED BY AN EDIBLE ACETYLATED MONOGLYCERIDE COATING DURING FRESH AND FROZEN STORAGE. Mary E. Zabik, L. E. Dawson, (Dept. of Foods and Nutrition, Mich. State Univ., East Lansing, Mich.). *Food Technol.* 17(1), 87–91 (1963). Dressed poultry was coated with an edible acetylated monoglyceride. It was fresh stored for one and two weeks and frozen stored for one and eight months. The coated poultry was compared to uncoated controls after oven roasting and deep-fat frying. Flavor of the breast meat was found to be comparable to the controls when stored in the absence of other foods; but they were lower than the controls when stored with other foods. The coated poultry was found to have less total cooking losses and higher percent press fluid than the control poultry.

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