Continuous Treatment of Refinery Waste Waters[1]

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Abstract

Removal of BOD, suspended solids and oil from vegetable oil refinery waste waters is best accomplished by isolation and treatment of the most offensive streams. This approach reduces equipment and chemical treatment requirements, recovers by-products of value and reduces overall costs of waste treatment and operation. A continuous process for clarification of acid water stream from acidulation is given. Typical data on influent and clarified effluent streams from various refinery areas are presented, along with process parameters, chemicals and costs.

Introduction

Recent Federal legislation has been directed specifically to controlling water pollution, both in municipalities and industries in all 50 states. The 1965 Water Quality Act set definite standards: "No one has the right to pollute; stream quality must be improved; both current and future needs must be considered."

This legislation has had a direct impact on all refineries, regardless of location. The seed mill in a rural location or small village has just as rigid requirements to meet as a large vegetable oil installation, in a food plant complex in a large city. Whether a new facility or a 50 year old plant, there must be pollution abatement.

In a rural location, the requirements are different in scope than in a municipality. The plant waste waters generally must enter a small stream, lake, or river. All waters are classified on quality standards (8). For example, if the source water to which waste discharges is classified as potable, or may be used for culinary or food processing, or for fishing or bathing, the standards may be: "No readibly visible floating or settleable solids or sludge deposits; pH range 6.5–8.5; dissolved oxygen of at least 4.0 ppm; no toxic wastes, oils, colored wasted or heated liquids."

When streams are used for waste disposal and transportation, entering streams must be sufficiently free of oil, floating and settleable solids so as not to interfere with navigation. There must be sufficient oxygen present to control odors.

These standards, and even more rigid ones as imposed by local ordinances and certain states, often affect the location of a new plant facility. Plans of waste treatment systems usually must be submitted to local boards for approval, prior to starting construction.

Municipalities have specific standards and a rate structure for industrial and commercial users, based on flow, suspended solids, and biochemical oxygen demand. There is considerable variation in municipal ordinances for pollution control. The model ordinance, most frequently followed, has definite stipulations that any water or wastes admitted to public sewers must fulfill (7): (a) 5 day BOD no greater than 300 ppm; (b) no more than 350 ppm (w/w) of suspended solids; (c) if average daily flow is greater than 2% of average daily city sewage flow, the stream is subject to review; (d) where necessary, the owner must provide at his expense preliminary treatment to meet the above conditions.

Generally, sewer surcharges are imposed where these limits are exceeded. The formula for surcharges may vary, but is usually designed to give a factor of 1.0 if all criteria are met. For example, a typical formula may be: Factor = 0.60 + 0.10 (BOD ppm)/300 + 0.30 (Suspended Solids ppm)/350.

If BOD of 300 ppm and suspended solids of 350 ppm is substituted in formula, the resultant factor is 1.0. No surcharge is imposed for factor of 0.9–1.1, but charge is made for a greater value. The surcharges do vary with each municipality, and are computed on the unit cost of providing sewers, sewage treatment and standby capacity for peak loads (3,6).

From this brief description of typical regulations, the importance of studying and improving the waste water quality from a plant is very evident. These rules are specifically designed to encourage a plant water survey and control. An "In-Plant" water control program should include the following steps (1): (a) water balance of plant input and output; (b) reuse of water streams, wherever possible; (c) careful process monitoring to minimize waste streams and product loss; (d) byproduct development; (e) segregation of unpolluted streams; (f) isolation and treatment of most offensive streams; (g) decrease in peak loadings.

The processes and data to be presented on refinery waste treatment incorporate many of these criteria. Several refinery processes will be described and definite solutions offered as a means of pollution abatement.

TABLE I

Typical Acid Oil Analyses

Components, %	Soybean	Degummed soybean	Tallow	Coconut
TFA + OFA	92 – 95	95 – 98	93 – 96	92 – 96
FFA	73 – 83	56 – 64	73	73
Moisture	1.5–3.5	1.2–1.4	1.5–3.5	1.0–2.0
Typical acid water analyses				
pH	2.6–2.9	2.5–2.9	2.7–2.9	2.6–3.2
TFA	0.1–0.4	0.2	0.06–0.2	0.06
5 day BOD ppm	14,000–30,000	3,000–10,000	2,400–2,700	8,600

Soapstock Acidulation

Continuous acidulation of soapstock and wash water as it is discharged from the refinery has offered a by-product of acid oil of quality and an acid waste water with less contaminants to the vegetable oil industry. Typical analyses of acid oil and acid water streams from the De Laval continuous acidulation system are given in Table I.

Acid oil consistently may contain better than 90%+ TFA and OFA, with moisture in range of 1.2–3.5%. Acid water will be in pH range 2.5–3.0, with only 0.06–0.40% fat content. The variation in BOD values is due principally to phosphatides, protein and sugars present in the original crude oil.

In this process, by recirculation of a portion of the acid water stream to the entering feed stream from the refinery, the amount of sulfuric acid usage may be reduced 10–15%. The fat content of acid water is also reduced from range of 1.0–1.5% to 0.4% or less. This acid water stream from the continuous process is an improvement over the highly acid waste stream from batch operation, with its pH of 1.0 or less, high fat content and 40,000–90,000 ppm BOD values.

Continuous Neutralization and Clarification of Acid Water

Due to the high BOD values on acid water from acidulation of nondegummed crude soapstocks, a process was developed for neutralization and clarification of acid water. A review of soya acid water streams from various acidulation systems in different areas throughout the United States showed the range of analyses given in Table II.

The combination of sugars and phospholipid degradation products can give extremely high BOD values. In addition, both the fat and suspended solids exceed the limits of

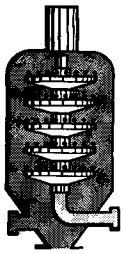
[1] Presented at the AOCS Meeting, New York, October 1968.

Bleached vegetable oil. In the Funda it can't get soaked up by the waste clay.

De Laval's Funda* processor is the most efficient way to remove bleaching clay from vegetable oil.

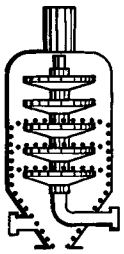
You get higher oil yield with the Funda because more oil is removed from the bleaching clay. Only the Funda can guarantee 30% or less oil residual in the spent clay.

What makes the Funda so efficient is its special horizontal filter leaf design. The filter leaves are evenly spaced on top of one another on a hollow, vertical central shaft. The oil with the bleaching clay enters the Funda and is passed through the filter leaves. The clay collects on top of the leaves, while the oil is discharged through the hollow shaft.



Because the unit's leaves are horizontal, cake stability is maintained throughout a run. Even a complete loss of feed pressure will not cause loss of the filter cake.

During the filtration and oil removal operations, the filter leaf bundle of the Funda is static. Afterwards, when a combination air and steam-blowing operation ensures maximum recovery of oil from the cake, the entire bundle is rotated and the clay discharged by centrifugal force.



De Laval's Funda processor is self-cleaning. And since no manual labor is required you can save on plant maintenance costs. A large southern oil processor, to cite just one example, discovered that bleaching with the Funda produced labor and oil savings which more than paid for the cost of the unit by the end of the first year's operation.

Get the complete Funda story. Just write The De Laval Separator Company, Poughkeepsie, N.Y. 12602.

*Funda is a TM of CHEMAP AG, Mannedorf-Zurich. The Funda is manufactured in the U.S.A. by the De Laval Separator Co. under license from CHEMAP AG, Mannedorf-Zurich.

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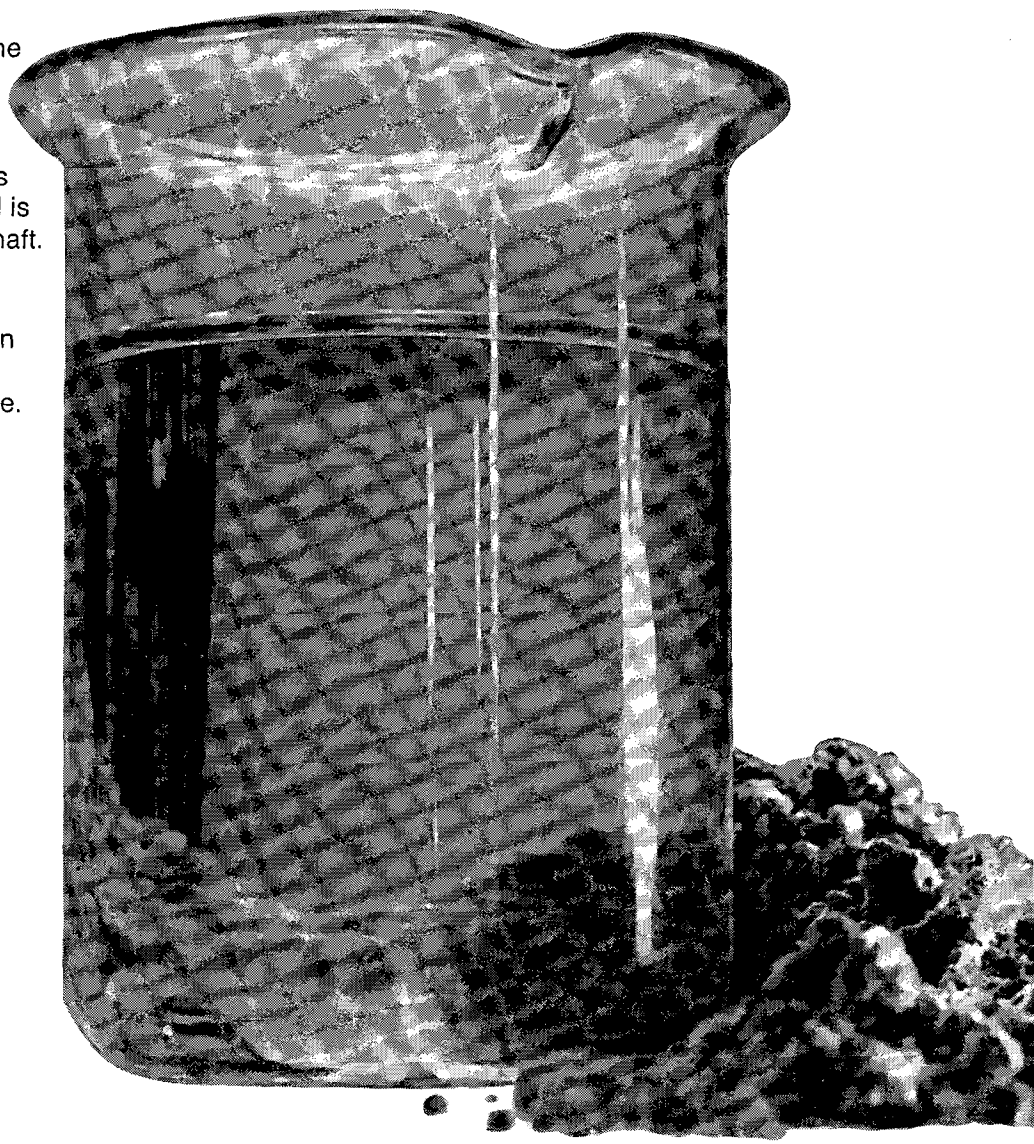

TABLE II

Typical Acid Water Analyses[a]

Components	Per cent
Total solids	4.0 –12.3
Organic matter	1.4 – 6.2
Suspended solids	0.2 – 0.9
Fat	0.1 – 0.9
Phosphorus	0.11– 0.43
Invert sugar	0.04– 0.64
5 day BOD ppm	16,400–52,400

[a] From acidulation of nondegummed soya soapstocks.

regulatory agencies. These data indicate the importance of isolation and treatment of this stream. In most plants today, this acid water stream is neutralized with caustic to a pH 7.0 and enters the main waste stream from the plant. Caustic neutralization is in the range of 0.3–1.0% as dry NaOH by weight of the acid water flow.

Figure 1 gives a schematic flow diagram of a Process for continuous neutralization and clarification of acid water. This system is especially applicable to acid water from nondegummed crude soapstock sources. In this process, a hydrated lime slurry is metered into the acid water stream. A pH cell monitors the reaction mixture and controls the lime slurry addition by the metering pump to give the proper pH range of 7.0–7.5. The intimate mixer disperses the lime throughout the acid water; neutralizing it and precipitating the impurities. The reaction mixture then passes directly to a self-cleaning clarifier or separator. The insoluble impurities are accumulated in the bowl and discharged periodically as a concentrated slurry. The clarified neutralized water may pass thru plate cooler to recover any available heat, prior to entering main waste stream flow.

In this process, the hydrated lime slurry performs two functions: (a) it neutralizes the acid water to pH 7.0–7.5; (b) it reacts with the free phosphate radical and prepcipitates it as a dibasic calcium phosphate. ($CaHPO_4 \cdot 2H_2O$). The precipitated salt carries with it any other insoluble impurities. Dibasic calcium phosphate is widely used in animal feeds as a mineral supplement and in fertilizers.

The volume of precipitate will vary, dependent on insolubles content and free phosphate content of the acid water stream. Quantity of precipitate by volume may be 3–10%. Temperature of operation is not critical, generally 120–180 F as result of acid water temperature from the acidulation system. The amount of hydrated lime is dependent on chemical products in the acid water. Usual treat has been in range of 0.6–1.4% by weight of acid water.

This neutralization and clarification process has the following advantages: (a) 62–76% reduction in BOD values; (b) 80–95% removal of invert sugars; (c) removal of free phosphate radical; (d) recovery of a useful by-product; (e) neutralized water with less than 300 ppm insoluble impurities.

In a survey of refineries, it was found that the acid water flow in the plant area may be as little as 2% of total stream flow, or as much as 50%, but usually 10–15% is typical. If it is assumed that the acid water is 15% of main waste stream flow and its principal offender, treatment of the soya acid water could reduce the factor in the surcharge formula from range of 2.5 to 1.0.

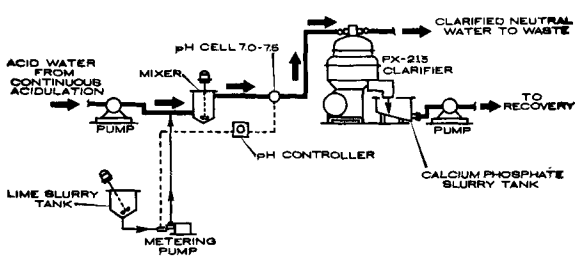

FIG. 1. Continuous neutralization and clarification of acid water.

TABLE III

Refinery Waste Waters

Components	Before treatment	After treatment
ppm Fat	740–2900	None detectable
ppm Organic matter	800–1900	80
ppm BOD	426–2850	148
pH	4.0–9.5	7

Chemical costs for this process using hydrated lime slurry are low, when compared to the usual practice of caustic neutralization of acid water. At a 50,000 pph refinery with acidulation, chemical costs for lime neutralization of acid water would be $27/day versus $84/day with use of caustic.

The removal of phosphates from waste water is an important part of any pollution abatement program. Phosphates are damaging in waste streams, since they stimulate the growth of aquatic plants, which will clog rivers and streams.

Treatment of Combined Refinery Wastes

There are many refinery operations that are not allied to large industrial complexes and have rather modest flows and only four or five waste streams. A study was made of such a plant with total flow of 15,000 gal/day. The largest stream flow at this plant, a combination of cleaning and condensate water, was the least offensive. Chemical analyses show 70 ppm fat, 110 ppm organic matter, 214 ppm BOD.

Three streams, with total flow of 4,000 gal/day, required treatment. Typical range of analyses for this combination of refinery waste waters were as shown in Table III under the column "before treatment."

These three offensive streams in the refinery area were blended and treated as a composite with neutralizing agent, a coagulant and a polyelectrolyte. By such treatment, the soluble and insoluble impurities were precipitated and flocked and then removed by either centrifugation or filtration. The clear effluent was free of fat and insolubles, had neutral pH and less than 150 ppm BOD. At this plant, cost of chemical treating agents would be about $200/year.

In chemical treatment of waste waters, Alum ($Al_2(SO_4)_3 \cdot 14\,H_2O$) is widely used as a coagulant and is effective in range of 10–30 ppm dosage. Since the aluminum ion is trivalent, it is an efficient coagulating agent at reasonable cost in the pH range 4.5–7.0 (5). Alum can be especially efficient when used in combination with a polyelectrolyte, at less than 0.5 ppm.

Polyelectrolytes are high molecular weight synthetic polymers, and may be either anionic, cationic or nonionic. Their ability to agglomerate suspended inorganic solids is based on premise that the long straight chain polymers are adsorbed by the suspended solids, forming a strong bond. Since the polyelectrolytes may have molecular weights of 1 million, many molecules are in solution and thus there is rapid agglomeration and flocculation. These polyelectrolytes are effective in range of 0.1 to 1.0 ppm (4).

The design of a system for treatment of waste water must be continuous, and will include tanks, mixers, dosing pumps and separation equipment. Choice of separation equipment, centrifuge or filter, is dependent on type and volume of insoluble impurities to be removed, and requirements for final effluent clarity. Self-cleaning centrifuges are particularly adaptable to this field of application. They can handle either liquid-liquid-solids or liquid-solids separation, in either separator or clarifier execution. Automatic control optimizes this unit's continuous operation, and may control periodic discharge of solids as a concentrated slurry.

In the areas where influent turbidity is in range of 10–250 ppm, an up-flow type filter (Fig. 2), offers good effluent clarity at high flow rates, 6–12 gpm/ft^2. The flow

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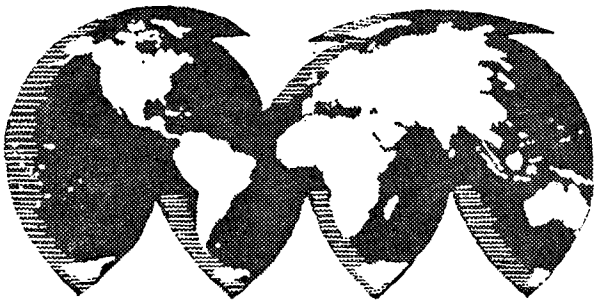
THE FOUR CORNERS...



By EUGENE MARSHACK, Chairman,
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K. S. KRISHNAN, TERUZO ASAHARA,
EDUARDO VIOQUE and REINHARD
MARCUSE,
Corresponding Secretaries

India . . . . . K. S. Krishnan

Oil Technologists' Association of India

Central Zone

A seminar on Sal Seed (*Shorea robusta*) was held at Harcourt Bulter Technological Institute, Kanpur, on November 21, 1969.

Sal is one of the forest trees of Eastern India, having a potential to yield about 600,000 tons of sal-fat per annum. Its exploitation depends on effective collection of sal seeds prior to onset of monsoon (i.e., summer rains), which is engaging the attention of Government forest-departments, private contractors and related agencies.

The seminar was inaugurated by B. Gopala Reddi and Governor Uttar Pradesh, and presided over by Hirdey Narain. It was divided into three sessions: Availability and Collection of Sal Seeds (Chairman, N. S. Maini); Processing and Technology (Chairman, K. T. Achaya); and Chemistry, Analysis and Utilization (Chairman, D. R. Dhingra). Special lectures were delivered by T. R. Seshadri on Multiple Uses of Trees, and by K. T. Achaya on Commercial Synthetic Fatty Materials.

The seminar was convened by N. S. Rajagopal.

Eastern Zone

The 25th OTAI Annual Convention and Seminar was held in Park Hotel, Calcutta on January 10 and 11, 1970. It was inaugurated with a thought-provoking presidential address by T. R. Seshadri, F.R.S., President of OTAI. Also addressed by S. N. Mukherjee, Minister for Agriculture of the Government of West Bengal and the Vice-Chancellor of Calcutta University.

The seminar was divided into three sessions: Developments in Processing and Testing Techniques (Chairman, T. R. Seshadri); Synthetic Detergents and Their Impact on Soap Industry (Chairman, J. G. Kane); and Import Substitution in Paint Industry (Chairman, A. S. Bhaduri).

The seminar was convened by M. M. Chakrabarty, University College of Science and Technology, 92-Acharya Prafulla Chandra Road, Calcutta-9.

Northern Zone

The 26th Convention and Symposium of OTAI will be held in New Delhi on January 16 and 17, 1971. The theme for the symposium will be Planning for Oils and Fats in the Seventies. The seminar will be convened by S. S. Ramaswamy, Production Manager, M/s., The D.C.M. Chemical Works, Najafgarh Road, New Delhi, 15.

Southern Zone

A seminar on Re-evaluation of Hydrogenated Fats was convened by S. Venkob Rao at the Regional Research Laboratory, Hyderabad, A.P., on April 11 and 12, 1970. It was organized to review the nutritional aspects of hydrogenated edible fat, with particular reference to the content of polyunsaturated fatty acids.

The seminar was attended, among others, by G. C. Boyd, J. W. E. Coenen and A. Corssley from the United Kingdom and R. M. Starr from the United States, whose contribution to the seminar was very significant.

Other activities of the zone included a lecture on Hydrogenation of Oils, by W. H. Lehmann of the National Soybean Processors' Association of the United States, on February 11, 1970.

Western Zone

A seminar on Synthetic Detergent Industry, Its Problems and Prospects was held in Taj Mahal Hotel, Bombay on November 22 and 23, 1969. It was inaugurated by Padmabhushan N. N. Godbole.

The seminar was divided into five sessions as follows:

Session 1: Chemistry and Raw materials (Chairman, B. P. Godrej). Papers: Chemistry of Synthetic Detergents, by D. Rebello, A. D. Hydrocarbons, by S. Varadarajan; STPP, by V. N. Godbole; Builders Other Than STPP, by N. R. Bhow; and Optical Brightener, by S. Chatterji.

Session 2: Processing (Chairman: T. Thomas). Films and papers: Ballestra Sulfonation and Spray Drying Plants, by Sapporoti; Mazzoni Sulfonation and SLB Plants, by D. D. Daftary; Chemithon Sulfonation System, by M. S. Misra; Techno-economic Considerations on Oleum and SO_3-Sulfonation, by K. S. Krishnan; and Spray Drying Technique, by D. N. Daruwala.

Session 3: Surface Active Products (Chairman: S. M. Mistry). Papers: Raw Materials, by M. D. Dhamankar; Condensation Products, by R. R. Shah; Alcohol Sulfates by V. M. Kale; Emulsifiers, by B. B. Bhagalkote; and Applications of Surface Active Products, by M. V. Nimkar.

Session 4: Storage, Handling and Packing (Chairman: K. K. Ajila). Papers: Storage and Handling of Detergents, by Y. P. Pundol and M. A. Bhatt; and Packaging Problem, by M. C. Patel.

Session 5: Marketing (Chairman: M. A. Wadud). Papers: Marketing of Household Detergents, by J. C. Chopra, H. K. Lall and P. K. Choudhary; and Marketing of Industrial Detergents, by S. M. Mistry.

There was a special popular lecture on Detergents by B. M. Milwidsky of Haifa, Israel, which was presided over by V. G. Rajadhyaksha. The seminar was convened by N. R. Bhow, General Manager (Projects), M/s. The Tata Oil Mills Co. Ltd., Bombay House, Bruce Street, Bombay-1.

Oil Technological Research Institute, Anantapur

The following is a write-up on recent research conducted by the Oil Technological Research Institute, Anantapur, A.P.:

Sesame Seed Dehusking

Sesame seed is gaining limelight in recent years as a source of nutritious protein. The outer cuticles, which are of unattractive color and contain oxalic acid and crude fiber, hinder more extensive use of sesame seed especially as a source of protein. A simple, continuous mechanical method of decuticling sesame seed is, therefore, developed at the Institute. The method consists of soaking sesame seed in water, passing the moist seed between two discs (one of which moves and the other remains stationary), washing away the loosened skins, and drying the dehusked seed in sunlight or artificial dryers.

(Continued on page 216A)

Chicago, Illinois, Scene of the 44th Fall Meeting of AOCS and 10th Biennial Congress of ISF September 27-October 1, 1970

All Roads Lead to Chicago

There are certain spots on the globe that were meant by destiny to occupy key positions no matter what the change in civilization or the new twists in man's developments with their attendant results on his habits, and one of these is Chicago.

Situated at the bottom of Lake Michigan in the richest section of the Mississippi Valley and within a few hundred miles of both the nation's center of population, as well as its geographical center, Chicago occupies a strategic location unparalleled anywhere.

This Fall, the spotlight is on Chicago, as it plays host to the 44th Annual Fall Meeting of the American Oil Chemists' Society in joint session with the 10th Biennial Congress of the International Society for Fat Research, at the famed Conrad Hilton Hotel September 27 through October 1st.

With world food problems being brought more into focus, and with the reformulation of soaps, detergents and cosmetics moving at a rapid pace, this World Congress should be the most important marketing event in the oils and fats industries in 1970.

Technical Program

Bob Reiners and his excellent staff have put together the most comprehensive technical program ever prepared for a meeting of this type. Papers will be presented on the scientific, technological and economical aspects of oils, other lipids and associated substances. The program will consist of four daily plenary lectures by invited speakers, a broad array of symposia and many reports of original research divided into topical sessions. As an example of the excellent quality of the symposia being offered, we are advised that Reinhard Marcuse of the Swedish Institute for Food Preservation Research at Götenborg, Sweden, has assembled an imposing group of speakers for his symposium on "Metal Catalyzed Lipid Oxidation." Abstracts of the complete technical program will appear in the July issue of your AOCS Journal.

In addition, two excellent short courses have been scheduled in conjunction with the World Congress; one immediately before the Congress and one immediately after. They are: "Processing and Quality Control of Fats and Oils" and "Behavior of Membrane Lipids at Surfaces." These courses are expected to appeal to a broad spectrum of participants, from both industry and the academic world as well. Do not overlook the opportunity to attend one or both of these fine courses.

There will also be an International Conference on the "Science, Technology and Marketing of Rapeseed and Rapeseed Products," at the Le Chantecler Hotel, Ste. Adele, Quebec, Canada, September 20–23. This Conference is being organized by Bernd Weinberg of the Edible Oils Section, Department of Industry, 112 Kent Street, Ottawa 4, Ontario, and requests for additional information should be addressed to him.

Plant Visits

The Chicago Area provides an important concentration of industrial and academic facilities devoted to the various facets of the fat, oil and lipid sciences. Visits to a number of these outstanding plants and laboratories will be available to registrants.

International Fats and Oils Exposition

The first truly "international" Fats and Oils Exposition will be held in conjunction with the World Fat Congress. Here is an opportunity for all registrants to examine and discuss the latest innovations in laboratory and plant equipment, processes and techniques, ingredients and additives, and the latest in literature.

Anyone wishing to inquire about display space should contact W. R. Deutscher, Exhibits Chairman, at Somes-Nick & Co., 407 South Dearborn Street, Chicago, Illinois 60605.

Social Events

When the business meetings are over, it is time to relax; to talk with old friends and make new ones. It is time to have fun.

On Sunday evening, there will be the traditional Reception and Cocktail Party. "Christine" at the electric organ will provide entertainment, while colleagues from every corner of the globe will gather to celebrate the opening of this first ISF Congress to be held in the United States.

Monday evening is left free to enjoy as you wish. Registrants will be provided with complete information on Chicago's renowned restaurants and supper clubs, as well as the other forms of entertainment available within easy distance of the hotel.

On Tuesday evening, we will be treated to a special concert by the world-famous Swedish Glee Club with the singing magic of their 60 beautiful voices.

Highlighting the social schedule of the Congress will be the banquet on Wednesday evening. There will be dinner in the Conrad Hilton's Grand Ballroom, dancing to Lou Breeze and his orchestra, and superb entertainment starring the well known comedian and television personality, Don Rice.

In addition to all this, Toni Trinchese, Ladies' Chairman, assures us that she has a special, exciting program planned, just for the ladies.

• *Four Corners . . .*

(Continued from page 213A)

Technology of New Oil-bearing Materials

Exploratory work has been completed on the characteristics and processing of hitherto uninvestigated oil-bearing materials in India such as muskmelonseed, sweet orange seed, palm oil fruits and spent silk worm pupae. Pilot plant processing has been carried out on muskmelonseed and sweet orange seed. A centrifugal method of recovering palm oil using indigenous equipment has been developed. Spent silkworm pupae, produced to the extent of 7,000 tons per year, have been found to contain 25% of fat. Its extracted meal is high in protein content (70%), which is found suitable as substitute for fishmeal in poultry feed and as a sumptuous feed for sheep when mixed with molasses.

Regional Research Laboratory, Hyderabad

The Regional Research Laboratory is the only national laboratory of India which functions under the auspices of the Council of Scientific and Industrial Research, and in which research on oilseeds and oils, as well as on surface coatings, is conducted. Much attention is devoted to castor oil on which the following work is currently in progress: preparation of monoglycerides of over 90% purity by a solvent-glycerolysis technique, preparation and evaluation of direct ethylene oxide condensates of castor oil, development of a continuous method for alkali-fusion of castor oil to sebacic acid and 2-octanol and development of a one-stage process to obtain tristearin from castor oil.

In the area of hydrogenation, a study is in progress regarding the effect of modifying agents on the nickel-catalyzed hydrogenation of peanut oil, with particular reference to the course of the reaction. The presence of a trace of phosphoric acid greatly speeds up the saturation reaction without affecting its course. Considerable acyl migration has been shown to occur during commercial fat hydrogenation, and the presence of linolic moieties in the 1 and 3 positions facilitates hydrogenation.

A process for continuous conversion of fatty oils to fatty alcohols is under development in which comparatively low pressure of only 70 atm are used. The first seed oil of the Malpighiaceae family, *Hiptage benghalensis,* has shown a remarkable resemblance in fatty acid composition to castor oil, which belongs to the Euphorbiaceae family. In contrast to stearic oleate oil, *Garcinia indica,* the seed fat of *Garcinia xanthochymus* is found to be a palmitic oleate oil with some hexadecenoic acid.

Indo-Soviet Symposium on Natural Products

The second Indo-Soviet Symposium on the Chemistry of Natural Products (including Pharmacology) was organized by the Indo-Soviet Joint-Committee for Scientific Collaboration, under the auspices of the National Institute of Sciences of India, in New Delhi on February 1 to 6, 1970. It included the following papers relating to lipids.

Synthetic Studies on Optically Active Phosphoinositides, by N. A. Preobrazhensky from the Institute of Fine Chemical Technology, Moscow, USSR.

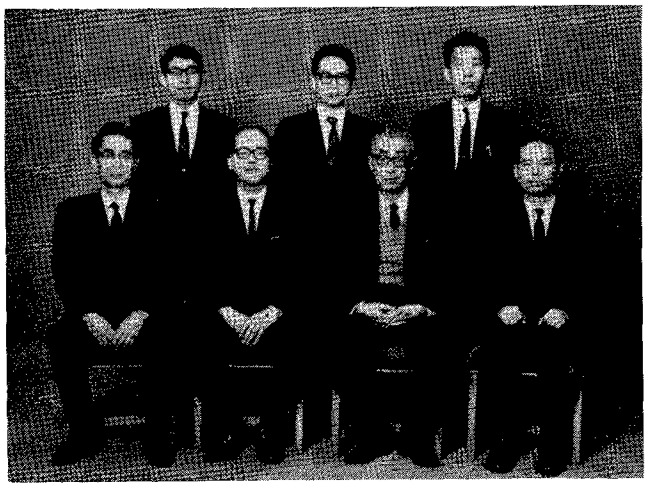
Two unusual Natural Fatty Materials (Kamalaseed Oil, i.e., *Mallotus philippinesis* and Seed Oil of Snake Gourd, i.e., *Trichosanthes anguina*) by M. R. Subbaram and coworkers, from the Regional Research Laboratory, Hyderabad-9, India.

The symposium was convened by S. Rangaswami of the Department of Chemistry, University of Delhi; abstracts of papers are available from S. Rajaraman, National Institute of Sciences of India, Bahadur Shah Zafar Marg, New Delhi-1.

Japan . . . . . Teruzo Asahara

General Meeting

At a recent meeting in Tokyo, several oil chemists, who conducted research on fats and oils and on flavor chemistry at Rutgers University, New Brunswick, New Jersey, gathered for the following portrait. S. S. Chang, AOCS President, who worked with them while they were in the United States, received the picture from the chemists.



Top row (left to right) Yoshiyuki Kawase, Nisshin Oil Mills, Ltd.; Tsukasa Kawada, Kao Soap Company, Ltd.; Yukinobu Murase, Asahi Denka Kogyo Company. Front row (left to right) Choichiro Hirai, Nihon University; Kosaku Yasuda, Nisshin Oil Mills; Yoshiyuki Toyama, professor of all the Japanese oil chemists in the picture, Toyo University; Akio Kato, Government Chemical Industrial Research Institute.

Activities of the JOCS

—A biodegradation test method for nonionics is being studied by the Detergent Committee of JOCS. An interim report presented by the Technical and Materials Division of the Soap and Detergent Association will be considered as the prototype procedure for this study.

—A Preparatory Committee for the JOCS Joint Meeting with AOCS in 1972 was formed. The meeting is expected to be very successful, considering the intensive cooperation expected from both societies in the next two years. As part of this preparation many participants from Japan are expected to attend the coming AOCS-ISF Joint Meeting.

Statistics

Production of Soaps and Detergents in Japan for the Calendar Year of 1968 and 1969 (unit metric tons).

	1968	1969	ratio (%)
Soaps	154,263	152,633	99
Detergents	558,453	634,775	114
Total	712,716	787,408	110

Supply Plan of Fats and Oils in Fiscal Year of 1970 (unit thousand metric tons).

	Edible	Industrial	Export	Total
Import	837	324	23	1,184
Domestic production	208	77	24	309
Total	1,045	401	47	1,493

Annual Meeting of the Chemical Society of Japan

The 23rd Annual Meeting of the Chemical Society of Japan was held starting on April 3. Almost 10,000 registrants joined this meeting and over 2,000 papers were reported. Thirty-seven lectures by guest speakers included Solvation Effects on the Conformational Equilibria of Carbohydrate Substances, by R. U. Lemieux of the University of Alberta, Canada; Progress in the Chemistry of

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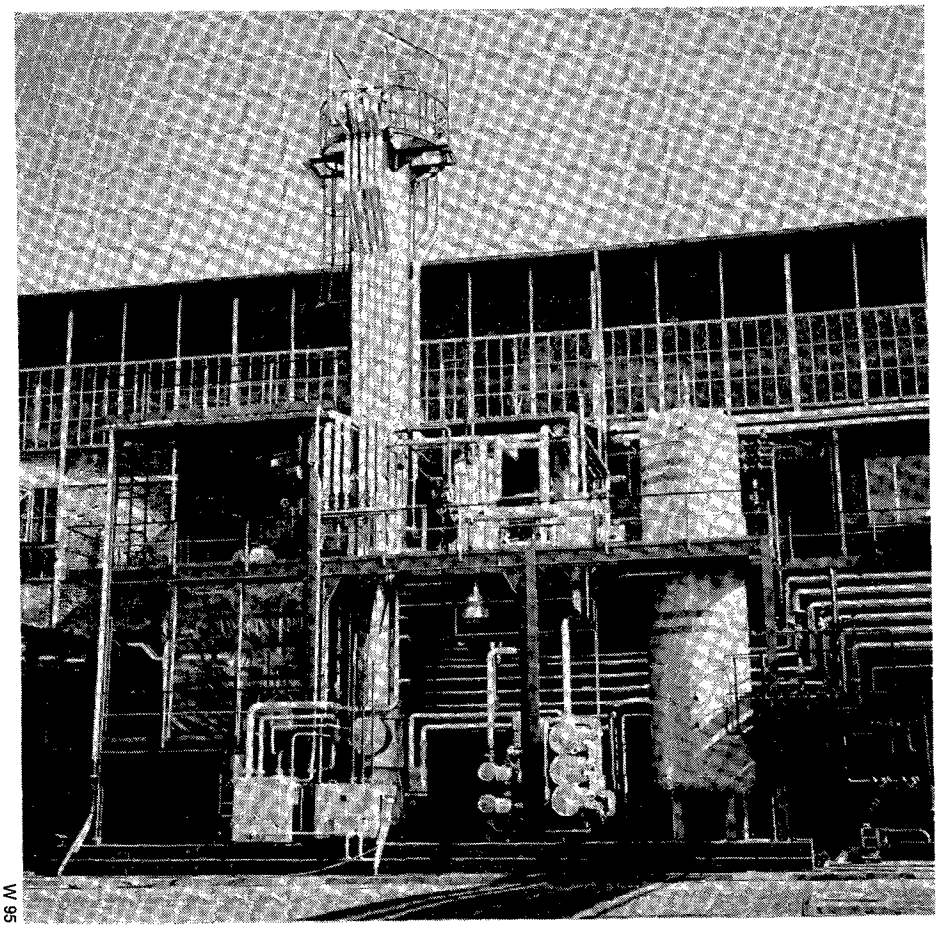

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Antibiotics from Higher Plant by R. Tschesche of Universität Bonn, West Germany; and Effect of Solvents on the Rates and Routes of Oxidation Reactions, by G. E. Zaikov of the Academy of Science, USSR. Dr. Zaikov presented another paper, Contribution From Solvation to the Action of Inhibitors, at a panel discussion co-sponsored by the Japan Oil Chemists' Society (JOCS) and other three societies, on April 15 in Tokyo.

JOCS held its 16th Annual Meeting on April 4th and papers were presented as one of the sections of the 23rd Annual Meeting of the Society of Japan.

Spain . . . . . Eduardo Vioque

The Spanish Society of Cosmetic Chemists, Sixth Congress of the International Federation of Societies of Cosmetic Chemists (I.F.S.C.C.)

The Spanish Society of Cosmetic Chemists, organizer of the next Congress of the I.F.S.C.C. to be held in Barcelona, September 20–25, 1970, invites all members of the Societies of Cosmetic Chemists who integrate the International Federation and all interested persons to present original unpublished papers. The papers may include any of the following subjects: (a) Color in cosmetics. (b) Physical chemistry in cosmetic. (c) Biochemistry and dermatology in cosmetic. (d) Practical aspects of the preparation of cosmetics. (e) Regulation in cosmetic standardization of raw materials.

In order to reward the best paper presented to this Congress, the I.F.S.C.C. has offered a prize of $1000. Additional information may be obtained from the Sociedad Espanola de Quimicos Cosmeticos, Mallorca 279, Barcelona (9) Spain.

The World Olive Oil Year

The World Olive Oil Year began on November 1, 1969 and will last until the next campaign in 1970. The idea for the celebration came from the International Olive Oil Council (COI) which will commemorate the 10th anniversary of its foundation. The COI and the OEI (Ibero-American Office of Education) are the only two international organizations with official residence in Madrid.

The COI was created in 1959 with the purpose of carrying out the goals of the International Convention of Olive Oil in 1956–1958. Lucien Denis, director of the COI, has devoted much energy to defend and promote the olive tree culture and its products, not only from an economic point of view, but also with regard to propaganda and scientific knowledge.

The President of the Spanish delegation is F. J. Villaure, general vice director of the International Organization of the Foreign Office. The same delegation has representatives from several cabinets (Agriculture, Finance and Commerce) and other organizations related to the production and commerce of olive oil and table oils, such as the Olive Tree Syndicate, the Institute for Foreign Propaganda of Olive Oil Products (IPEPO) and the Fats Institute.

During the International Olive Oil Year at Lucca, Italy, an International Congress on the Biological Value of Olive Oil was held October 10–12, 1969. Several other meetings have been held throughout the year in Madrid.

Among the many other activities planned is the celebration of World Day of the Olive Tree, similar to Harvesting Day for grapes, etc.

The National Meeting of Food Quality Control

The Second National Meeting on Food Quality Control took place in Madrid on July 7 and 8, 1969, as a contribution of the Spanish Association for Food Quality Control and the National Institute of Food Science and Technology (INCYTA) to the International Food Fair (AIDA 1969).

Martinez Moreno, president of the INCYTA, served as chairman of the first section. The two main subjects were: Quality Control in the Oil Industry and its Application to Olives, by M. J. Fernadez and A. Garrido, both of the Fats Institute of Seville, and Quality Control in Margarine Industries, by E. Ruiz from Agra S.A., Bilbao.

The second section, with E. Primo, vice president of INCYTA, as the chairman, was dedicated to: Quality Control in Canned Goods, by L. Duran, from the Institute of Agrochemistry and Technology of Foods, and Industrial Aspects of Quality Control in Canned Foods, by V. Corell from CODESA.

Official Inauguration of Pilot Plants of the Fats Institute of Seville

One of the events included in the World Olive Oil Year was the inauguration of pilot plants, with the assistance of high personnel from the Spanish government and international organizations. Among those present were: the Spanish Minister of Commerce, the President of the High Council of Scientific Research, the Vice President of the Spanish Deputies' Assembly and the Director of the International Council of Olive Oil.

The Director of the Fats Institute of Seville indicated the following three main concerns of the pilot plants:

(a) The quality of olive oil; the first and fundamental reason for its presence in the market as well as the quality of table olives.

(b) The mechanization and automatization of olive oil extraction; not only from an economical point of view, but also from a social one, because the harvesting of olives is very difficult and therefore causes many problems in the olive tree regions.

(c) The training; instruction of technicians is one target of the Fats Institute. Some experience in this field has already been acquired, since short courses for those in the olive oil and table oil industries have been offered since 1960.

The Director of COI, Lucien Denis, said: "The inauguration today is of great importance for the solution of many problems in the olive oil industry. Important problems are due to the peculiar characteristics of olive oil and to its competition from other edible oils, whose prices can not be compared to that of olive oil. It is quite necessary for the olive industry to gain benefits from improvements obtained by the technicians directed to harvest, transport and store the olives, as well as those directed to extract and stock the oil."

During the ceremony, the Medalla Marqués de Acapulco was delivered to Manuel Ortega, Agriculture engineer, by the Assembly of Members of the Fats Institute of Seville. The award is for his relevant contributions of knowledge concerning the olive oil industry.

Fourteenth Biennial Meeting of the Real Sociedad Espanola de Fisica y Quimica

The Fourteenth Biennial Meeting of the Real Sociedad Espanola de Fisica y Quimica was held in Seville, September 28 to October 4, in the Faculty of Sciences of the University. Papers dealing with many different aspects of Chemistry were discussed. Among the papers of interest in the field of fats and oils were:

Chemical Transformations of Olives During Pickling: The Desoxyoleanolic Acid and Other Products in the Residual Lye, by F. J. Ribelles and J. M. Viguera.

Reaction Mechanism of the Alcaline Metal Catalyzed Transesterification, by M. P. Jordan and R. Martinez.

Secondary Products in the Acyloinic Condensation of Alifatic Fatty Acids, by M. Martinez and R. Martinez.

Ester Formation When Passing Oils Through Ionexchange Resins Which Have Been Regenerated in the Presence of Ethanol, by M. A. Albi, A. Vioque, and T. Albi.

Air Pollution by Organochlorine Pesticides IV: Interference of Polychlorides Biphenyl in the Gas Liquid Chroma-

(Continued on page 233A)

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ABSTRACTS R. A. REINERS, Editor. ABSTRACTORS: N. E. Bednarcyk, J. E. Covey, J. G. Endres, J. Iavicoli, Sin'itiro Kawamura, F. A. Kummerow, E. G. Perkins, J. A. Thompson and R. W. Walker

• Fats and Oils

FATTY ACID COMPOSITION OF LIPID EXTRACTS OF A THERMOPHILIC BACILLUS SPECIES. H. H. Caron (Dept. Animal Sci., Agr. Exp. Sta., Auburn Univ., Auburn, Ala. 36830). *J. Bacteriol.* 101, 145–151 (1970). Fatty acids of C_{16} and C_{17} accounted for over 80% of the fatty acids of a thermophilic *Bacillus*. Under most conditions branched chain acids were more abundant than *n*-fatty acids. The unsaturated fatty acid content varied inversely with growth temperature but was never more than 14%. Increasing growth temperature from 40 to 60C resulted in a three to four-fold increase in the ratio of *n*- to branched-chain C_{16}. Two *n*-hexadeeenoic acids were found, their relative abundance was influenced by temperature.

LIPID COMPOSITION OF BACILLUS CEREUS DURING GROWTH AND SPORULATION. D. R. Lang and D. G. Lundgren (Dept. Bacteriology and Botany, Biol. Res. Labs., Syracuse Univ., Syracuse, N.Y. 13210). *J. Bacteriol.* 101, 483–89 (1970). The lipid composition of *B. cereus* during growth and sporulation consisted of 30–40% neutral lipids and 60–70% phospholipid. The phospholipids were phosphatidylethanolamine and glycerol and diphosphatidyl glycerol. Also present was diglycosyl diglyceride and the alanine ester of phosphatidyl glycerol. Diphosphatidyl glycerol, which is difficult to extract in the vegetative and stationary growth phases, becomes more easily extractible during spore maturation when its cellular level increases. Phosphatidyl glycerol had a high turnover rate and accounted for 70% of the phospholipid synthesized during sporulation. Phosphatidyl ethanolamine, the major phospholipid, had a low turnover rate.

LIPIDS OF BACTERIODES MELANINOGENICUS. V. Rizza, Anne N. Tucker and D. C. White (Dept. Biochem., Univ. of Kentucky Med. Center, Lexington, Ky. 40506). *J. Bacteriol.* 101, 84–91 (1970). Four percent of the chloroform-methanol extractable lipids of *B. melaninogenicus* was neutral lipid which contained the vitamin K_2 isoprenologues K_2-35, K_2-40 and K_2-45. The rest of the extract consisted of phosphatidic acid, phosphatidyl-serine and -ethanolamine as well as ceramide phosphorylethanolamine, ceramide phosphorylglycerol and ceramide phosphorylglycerol phosphate.

THE EFFECTS OF PHOSPHOLIPIDS AND AMINO ACIDS ON THE STABILITY OF RAPESEED OIL. K. Babuchowski *et al. Zeszyty Nauk. Wyzszej Szkoly Rolniczej Olsztynie* 25(689), 415–21 (1969). The phospholipids of rapeseed oil, in the form of technical lecithin, appreciably prolong the induction period when added to refined rapeseed oil at the level of 1.5%. Addition of 0.36 mg of acidic and basic amino acids per 100 g of oil along with the phospholipids had no effect on the stability of the oil. The important factor which lowers the stability of the oil following degumming and neutralization is removal of the phospholipids. (Rev. Franc. Corps Gras)

ISOMERIZATION OF METHYL ESTERS OF OLEIC AND ERUCIC ACIDS DURING HYDROGENATION. K. Modzelewska. *Prace Inst. Lab. Badawczych Przemyslu Spozywczego* 19(3), 417–43 (1969). The rates of hydrogen uptake by oleic and erucic acid molecules hydrogenated separately are nearly the same. The rate constants for formation of saturated acids are 3.7×10^{-3} mole/min and 3.8×10^{-3} mole/min, respectively. The formation of saturated acids follows zero order kinetics, which shows that the process depends only on diffusion. Although the degree of geometrical isomerization is nearly the same for both acids, the rate of isomerization is much higher for erucic acid. At equilibrium, the ratio of trans to cis isomers is 2:1 for both acids. (Rev. Franc. Corps Gras)

RECOVERY OF THE FAT FROM COCOA SHELLS BY EXTRACTION WITH ETHANOL. J. Salmonowicz *et al. Tluszcze Jadalne* 14(1), 7–18 (1970). The amount of shell in the cocoa bean varies from 12 to 14%. The shell contains about 7% fat, 2.6% theobromine, small amounts of caffein, tannins, natural pigments and very active antioxidants. Cocoa shell fat, obtained by ethanolic extraction, is similar to cocoa butter in physical and chemical characteristics. As such, it can be refined and used as a cocoa butter substitute. Recovery of the fat from the miscella by crystallization, in addition to eliminating distillation, offers the possibility of recovery of other by-products. (Rev. Franc. Corps Gras)

DISTILLATION OF OLEIC ACID IN A STREAM OF HYDROGEN. G. M. Pavlov *et al. Izv. Vysshikh Uchebn. Zavedenii, Pishchevaya Tekhnol.* 1970, 71–73. Distillation of oleic acid can be carried out at atmospheric pressure in a stream of hydrogen. The rate of distillation depends on the temperature and on the rate of hydrogen flow. The best results are obtained at 230C and a hydrogen flow of 5.5 l/min. (Rev. Franc. Corps Gras)

LIPID CONTENT OF THE BALTIC SPRAT. T. Krassowska *et al. Przemysl Spozywczy* 23(7–8), 340–41 (1969). *Spratus balticus* attains a maximum lipid content of about 17% in November and December. It cantains only 6–7% fat in May and June. Seasonal variations occur only in the contents of moisture and fat. The amounts of protein and ash remain the same throughout the year. An inverse linear correlation exists between moisture and fat contents. Above 75% water, the sprat is too lean and not good for smoking. (Rev. Franc. Corps Gras)

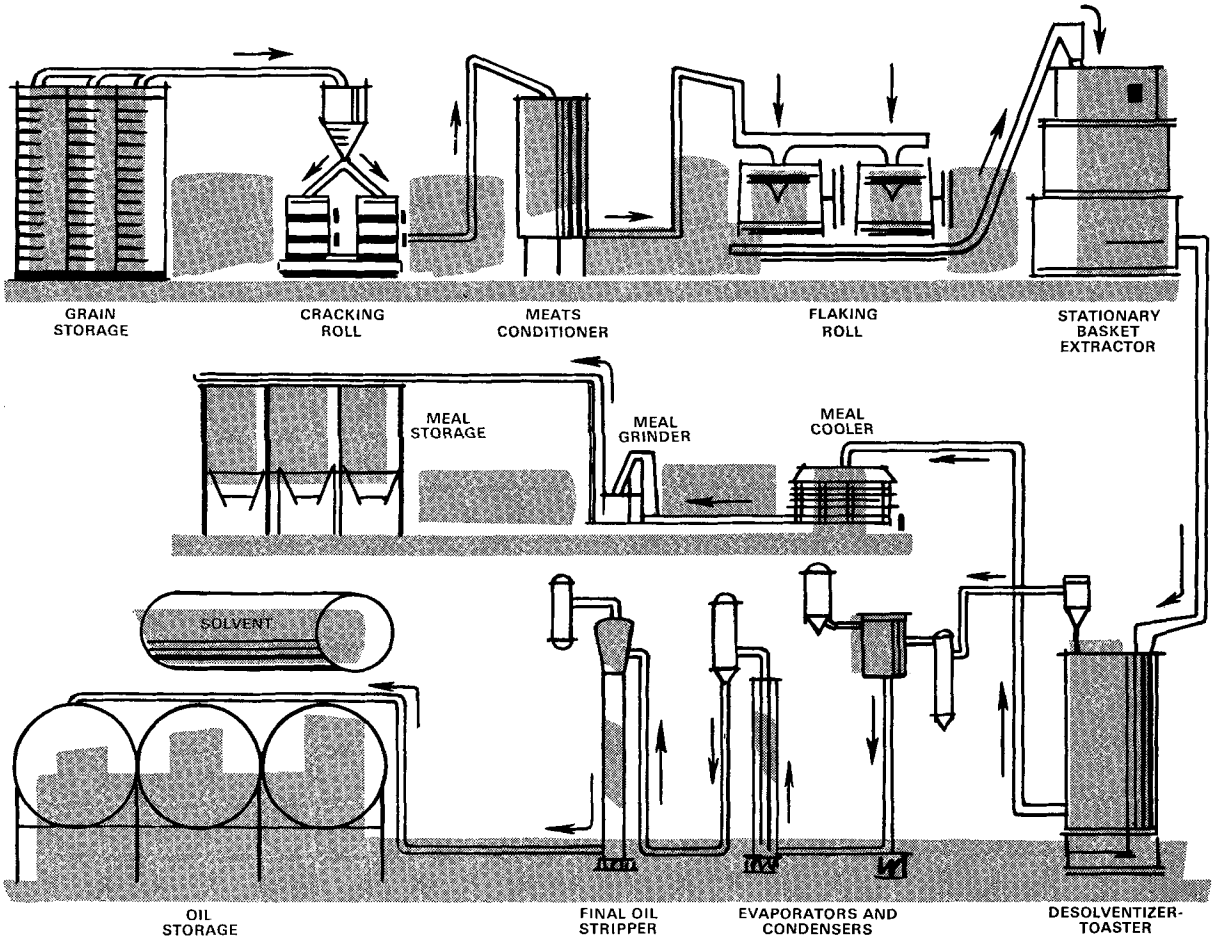
STABILITY OF AN OIL BLEACHED WITH A CATION-EXCHANGED ACTIVATED EARTH. R. Guillaumin, J. F. Pertuisot and M.-F. Bosquet (Lab., Inst. des Corps Gras, Paris). *Rev. Franc. Corps Gras* 17, 21–24 (1970). An oil may be adequately bleached while forming few conjugated double bond systems by using an activated earth with the protons replaceed by Ca or Mg ions. In the present study, a peanut oil was bleached with 0.5% of an activated Montmorillonite earth containing Ca ions at 80C for 30 minutes. This oil together with a control bleached with the same earth before exchange, was stored in sealed bottles in the light at room temperature (18–21C). After 100 days, there were no significant differences (P.V., uv absorption, Kreis test) between the two oils. Organoleptic evaluations during the first five weeeks also showed no differences.

SOVIET SUNFLOWER TECHNOLOGY. B. Solomon (Inst. des Corps Gras, Paris). *Rev. Franc Corps Gras* 17, 25–37 (1970). The more important Russian articles on sunflower technology published since 1951 are reeviewed. The subjects covered include treatment of the sunflower seeds, *i.e.*, cleaning, decortication, breaking, pressing, and extraction; storage of the crude oil; refining, including degumming, winterization, and neutralization; and hydrogenation of the oil. Flow diagrams for the winterizing operation and for the continuous hydration of vegetable oil phosphatides are included.

NUCLEAR MAGNETIC RESONANCE STUDIES OF INTERACTIONS OF PHOSPHOLIPIDS WITH CYCLIC ANTIBIOTICS. E. G. Finer, H. Hauser and D. Chapman (Unilever Res. Lab. Colworth/Welwyn, The Frythe, Welwyn, Hertfordshire, G.B.). *Chem. Phys. Lipids* 3, 386–93 (1969). The cyclic antibiotics alamethicin, valinomycin and gramicidin S dihydrochloride interact with aqueous dispersions of phospholipids (ox brain phosphatidyl-serine and egg yolk lecithin). A mixture of each of these antibiotics with the phospholipid dispersed in 0.2 M phosphate buffer (pH 8.0) forms tightly bound phospholipid-antibiotic aggregates, in which the N.M.R. spectrum shows that some sort of cooperative hydrophobic interaction has caused a reduction in the intramolecular motion of the alkyl chains of the phospholipids. In the absence of salt, the interaction of egg yolk lecithin with alamethicin and valinomycin is similar to that observed in phosphate buffer, whereeas its interaction with gramicidin S dihydrochloride results in a different type of complex. The resultant particles are smaller and the phospholipid alkyl chains are less tightly bound, resulting in greater molecular motion of the phospholipid compared with egg yolk lecithin/alamethicin (or valinomycin) mixtures. The use of other techniques has shown that the multilamellar structure of the phospholipids is broken down on the addition of each of the antibiotics. These findings may be relevant to the mode of action of some cyclic antibiotics, to the mechanism of induced ion transport across

(Continued on page 223A)

SYSTEMS FOR OIL SEED PROCESSING



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(Continued from page 220A)

natural membranes observed with many cyclic antibiotics and also to the question of lipid-protein interactions and membrane organization in general.

NUCLEAR MAGNETIC RESONANCE SPECTRA OF SOME OCTADECADIYNOIC ACIDS AND OF SOME METHYL CIS, CIS- AND TRANS, TRANS-OCTADECADIENOATES. F. D. Gunstone, M. Lie Ken Jie and R. T. Wall (Dept. of Chem., Univ., St. Andrews, Scotland). *Chem. Phys. Lipids* 3, 297–303 (1969). The NMR speectra of a number of octadecadiynoic acids and of the derived cis,cis- and trans,trans-octadecadienoates have been studied using a 100 MHz instrument. Characteristic spectral features associated with the number of methylene groups between the two unsaturated centres are described. In diunsaturated acids and esters of the general formula $CH_3 \cdot (CH_2)_p X \cdot (CH_2)_n \cdot X \cdot (CH_2)_r \cdot COOR$ where X represents the unsaturated centre, those compounds can be differentiated by their NMR spectra.

SYNTHESIS OF GALACTOSYL GLYCERIDES AND RELATED LIPIDS. H. P. Wehrli and Y. Pomeranz (Kansas St. Univ., Dept. of Grain Sci. and Ind. and Crops Res. Div. Agr. Res. Ser., U.S. Dept. Agr.). *Chem. Phys. Lipids* 3, 357–370 (1969). Synthesis of natural monogalactosyl glycerides is reported. The synthesis involves acylation of the primary hydroxyl groups of 2,5-methylene-D-mannitol, cleavage of the mannitol moiety between C-3 and C-4 by lead tetraacetate, reduction of the resulting aldehyde, attachment of galactose by the Koenig-Knoor reaction, hydrolysis of the acetal, acylation of the hydroxyl group and hydrazinolysis of the acetylated glycolipids. A simplified procedure, in which the optical activity at C-2 of the glycerol moiety is lost, is also described.

ON THE NOMENCLATURE OF ASYMMETRICALLY SUBSTITUTED MYOINOSITOL DERIVATIVES WITH PARTICULAR REFERENCE TO PHOSPHATIDYLINOSITOL. B. A. Klyashchitskii, V. I. Shvets and N. A. Proebrazhenskii (The M. V. Lomonosov Instit. of Fine Cheemical Tech., Moscow, USSR). *Chem. Phys. Lipids* 3, 393–400 (1969). A nomenclature based on the system of stereospecific numbering is proposed for optically active asymmetrically substituted myoinositols.

A METHOD FOR THE DIFFERENTIAL ANALYSIS OF MIXTURES OF ESTERIFIED AND FREE FATTY ACIDS. R. L. Glass and Susan W. Christopherson (Dept. Biochem., Univ. Minn., St. Paul, Minn. 55101). *Chem. Phys. Lipids* 3, 405–08 (1969). A procedure is described which permits the preferential methanolysis of esterified fatty acids in the presence of free fatty acids and the subsequent esterification of the free fatty acids. Analysis, by gas chromatography, of the mixture before and after esterification of the free fatty acids gives an accurate determination of the esterified and free fatty acids in the presence of each other.

THE PARTIAL SYNTHESIS OF SOME NATURALLY OCCURRING GLYCOSPHINGOLIPIDS WITH SPECIAL REFERENCE TO O-β-D-GALACTOSYL-(1 → 4)-O-β-D-GALACTOSYL-(1 → 1)-CERAMIDE. J. B. Hay and G. M. Gray (Lister Inst. of Preventive Med., London, S.W. 1). *Chem. Phys. Lipids* 3, 59–69 (1969). A procedure is described for the preparation of some naturally occurring glycosphingolipids by partial synthesis from natural ceramide (N-acylsphingosine). The ceramide was obtained in quantitative yield from sphingomyelin by the action of phospholipase C. It was converted to 3-O-benzoylceramide which was then condensed with the chosen acetobromosugar in the presence of mercuric cyanide. Details of the preparations of O-β-D-glucosyl-(1 → 1)-ceramide, O-β-D-lactosyl-(1 → 1)-ceramide and O-β-D-galactosyl-(1 → 4)-O-β-D-galactosyl-(1 → 1)-ceramide are given.

GAS PHASE ANALYTICAL SEPARATION AND STRUCTURAL STUDY OF CERAMIDES. G. Casparrini, E. C. Horning and M. G. Horning (Inst. Lipid Res., Baylor Univ. College of Med., Houston, Texas 77025). *Chem. Phys. Lipid* 3, 1–10 (1969). Ceramides may be subjected to direct separation and structural study by gas phase analytical methods. Suitable derivatives may be prepared by reaction with silylating reagents (leading to trimethylsilyl ether derivatives), and separations may be carried out with 1% SE-30 columns by temperature programming at 2C/min to 340–350C. The structure of individual ceramides is indicated by their mass spectra; both the acyl group and the sphingosine base moiety can be recognized in this way.
A STUDY OF PALMITIC-STEARIC TRIGLYCERIDES AND THEIR BINARY MIXTURES BY DIFFERENTIAL THERMAL ANALYSIS (DTA). I. PURE TRIGLYCERIDES. R. Perron, J. Petit and A. Mathieu

(Continued on page 226A)

Speculative Open Interest in Soybean Futures

D. M. BARTHOLOMEW, Commodity Analyst, Merrill Lynch, Pierce, Fenner & Smith Inc.

Open interest is one of the important indicators used in analysis of technical aspects of futures markets. To some degree it is related to fundamental conditions, i.e., large production may be expected to reflect large open interest if at the same time substantial price movement is possible. Conversely, large production may result in small open interest if price fluctuation is anticipated to be small due to government price support mechanisms, for example.

Beyond this relationship to fundamentals, however, open interest is primarily to technical factor. By definition, open interest is a measure of the size of unliquidated long and short positions in the futures market. For soybeans and grains it is expressed in number of bushels. For most other commodities, including soybean oil and soybean meal, it is expreessed in number of contracts. The figures for the end of trade on a given day are released on the following market day. Sometimes this report may influence trading activity depending on the magnitude of change in open interest.

For the open interest to show an increase there must be both new long and new short positions established. Likewise for the open interest to show a decrease there must be both liquidation of longs and covering of shorts. The open interest would not change if, for example, there were new purchases made from sellers who were liquidating a long position. Likewise, open interest would not change if new short positions were sold to previous shorts who were covering their position. This explains one reason why volume of trade is usually larger than open interest change.

Volume of trade is another technical factor which is usually considered in conjunction with open interest. Volume figures are released with the open interest. Another obvious reason why volume is much larger than open interest changes at the end of the day is because of the participation of "day traders." These are speculators who initiate and liquidate positions several times during the day and seldom carry a position over night. It is the "day traders" who provide the necessary liquidity to futures markets so that commercial trade interests may always find a buyer when they are ready to sell, or a seller when they are ready to buy. (Volume is of no significance in this study, but is mentioned by way of explanation.)

Open interest changes at the end of the day are watched for a signal of change in trader confidence in the market, but one day's results must not be afforded too much significance unless the change is usually large. On the other hand, several days' change in the same direction merits considerable attention. Such a situation represents collective attitude which cannot be ignored.

Once a month the government releases a report which shows types of traders holding open positions in the market. This is analyzed by the Commodity Exchange Authority (CEA) and represents a profile of the open interest in the regulated commodity futures. It is usually released about the eleventh of the month for the close of business on the last day of the preceding month. It shows long and short positions of large speculators, large hedgers, large spreaders and small speculators and hedgers combined. By observing changes in these categories from the previous month, some judgment may be formed as to change in market sentiment by the various participants. Of course, price action must also be related to these changes. Furthermore, market action must be observed from the first of the month until the date the report is released. The market profile may have changed significantly during the intervening time.

The purpose of this study is to see if a relationship exists between the market position of large speculators and subsequent price action. Large speculators are considered to be representative of the market sentiment of speculators in general because small speculators frequently

(Continued on page 231A)

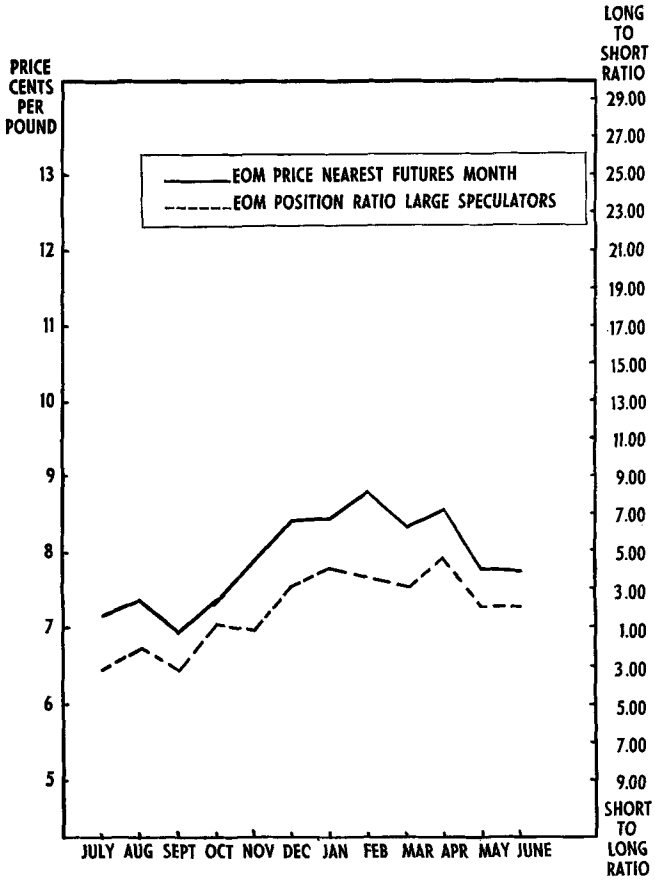


Fig. 1. 1968-69 Soybean Oil

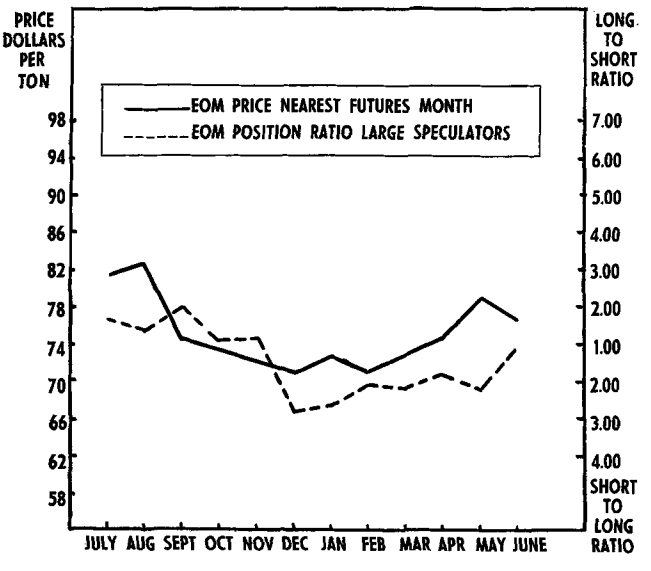
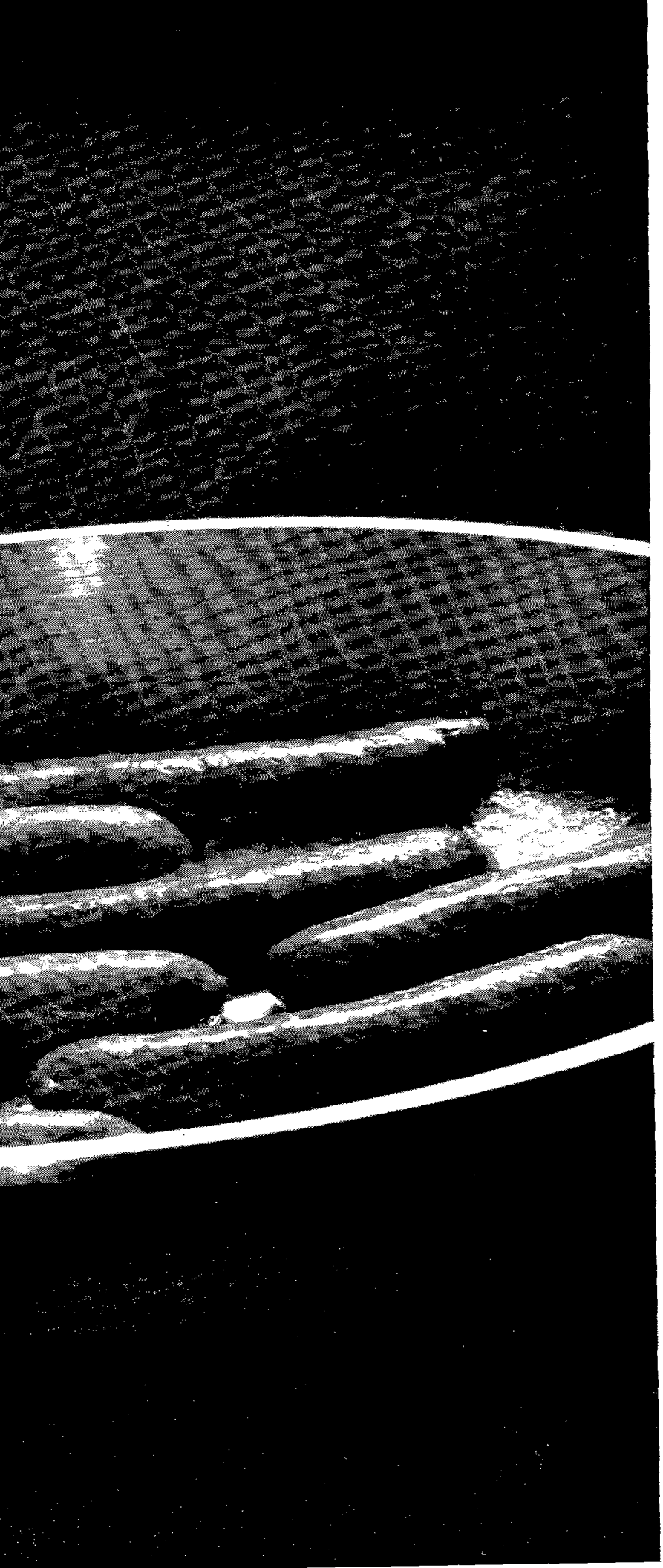


Fig. 2. 1968-69 Soybean Meal



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SUSTANE is quality BHA.

(Continued from page 223A)

(Groupe de Lab. du C.N.R.S., 2 à 8, Rue Henry Dunant, 94, Thiais, France). *Chem. Phys. Lipids* 3, 11–28 (1969). The cryothermograms of the six pure triglycerides derived from palmitic and stearic acids have been determined by DTA. As well as revealing itself to be an excellent method of distinguishing between the positional isomers of the mixed triglycerides, DTA also showed that cooling triglycerides at a rate of 1.2C/min yielded an α_L form (except PSP), which on subsequent heating gave the β_L form with the symmetrical triglycerides, and the β'_L form with the non-symmetrical triglycerides. In the process of cooling melted triglycerides, various forms may appear depending on the rate of cooling. The symmetrical triglycerides, with the exception of SSS, give stable forms more easily than the non-symmetrical triglycerides. Further, a sub-β'_L form can be detected in the case of PSP, PSS and SPP.

LIPIDS OF STREPTOMYCES SIOYAENSIS. V: ON THE 2-HYDROXY-13-METHYL-TETRADECANOIC ACID FROM PHOSPHATIDYLETHANOLAMINE. J. Kawanami, A. Kimura, Y. Nakagawa and H. Otsuka (Shionogi Res. Lab., Shionogi and Co., Ltd., Fukushima-ku, Osaka, Japan). *Chem. Phys. Lipids* 3, 29–38 (1969). Phosphatidylethanolamine from *St. sioyaensis* afforded a double spot on a thin-layer chromatogram, typical of most glycosphingolipids from animal tissue. They were phosphatidylethanolamines one of which had only non-hydroxylated fatty acids and the other hydroxy fatty acids in addition to non-hydroxylated fatty acids, respeectively. The distribution of the fatty acids was studied by hydrolysis with snake venom phospholipase A. Hydroxy fatty acids were located in the β-position of the glycerol moiety, differing from the results for *Brucella abortus* phospholipids in which location in the α-position has beeen reported. The main hydroxy fatty acid was purified by preparative gas-liquid chromatography. The structure of the hydroxy fatty acid was analyzed by oxidation with lead tetraacetate, proton magnetic resonance and mass spectrometry, etc. From these results, it was shown that the main acid was 2-hydroxy-13-methyltetradecanoic acid.

FATTY ACIDS. PART 19. CONVERSION OF ALKENOIC ACIDS TO ALKYNOIC ACIDS BY BROMINATION-DEHYDROBROMINATION. F. D. Gunstone and G. M. Hornby (Dept. Chem., Univ. St. Andrews, North Haugh, St. Andrews, Scotland). *Chem. Phys. Lipids* 3, 91–7 (1969). Alkynoic acids (including octadec-10-ynoic, hendec-10-ynoic, and 12-hydroxy-octadec-9-ynoic) can be prepared from the cis alkenoic acids by bromination followed by dehydrobromination with sodium in liquid ammonia or with DBU (1,5-diazabicyclo(5.4.0)undec-5-ene). With other bases extensive migration of the unsaturated centre was observed and no satisfactory procedure for converting trans alkenoic acids to alkynoic acids without migration was discovered. Both types of alkenoic acids could be converted to enebromides, sometimes in high yield, with DBU and DBN (1,5-diazabicyclo(4.3.0)non-5-ene).

PHOSPHOLIPIDS OF MARINE INVERTEBRATES. V. E. Vaskovsky and E. Y. Kostetsky (Inst. Biol. Active Substances, Siberian Dept. of the Acad. of Sci. of the URRS, Vladivostok 22, USSR). *Chem. Phys. Lipids* 3, 102–5 (1969). The quantitative and qualitative phospholipid composition is reported for all the main phyla of the marine animals. No simple correlation was found between the phospholipid composition and taxonomic system of marine animals. Unusual phospholipids were shown in a great number of invertebrates.

CHARACTERIZATION OF THE STRUCTURE OF A 4-METHYL-$\Delta^{8,24}$-CHOLESTADIEN-3β-OL ISOLATED FROM RAT SKIN. A. Sanghvi (Dept. of Biochem., College of Med. Sci., Univ. of Minnesota, Minneapolis, Minn. 55455). *J. Lipid Res.* 11, 124–30 (1970). A new sterol has been isolated from the skin of rats treated with triparanol. Its chromatographic behavior on silicic acid-Celite columns and in gas-liquid chromatographic systems indicated it to be a 4-methyl-$\Delta^{8,24}$-cholestadien-3β-ol. The specific rotation, the delayed color reaction with Liebermann-Burchard reagent and the nuclear magnetic resonance (NMR) data support the $\Delta^{8(9)}$-unsaturation. Previous workers have shown that triparanol treatment results in an accumulation of Δ^{24}-unsaturated sterols in animal tissues. Consonant with this observation, the infrared, NMR and mass spectrometric data confirm the presence of a C-24(25) unsaturated side chain in this sterol.

GEL PERMEATION CHROMATOGRAPHY OF NEUTRAL HYDROXY LIPIDS ON SEPHADEX LH-20. M. Calderon and W. J. Baumann (Univ. of Minn., The Hormel Inst., Austin, Minn. 55912). *J. Lipid Res.* 11, 167–69 (1970). Gel-permeation chromatography on Sephadex LH-20, using ethanol as eluent, permits the resolution of neutral hydroxy lipids according to molecular size. The influence of molecular shape, functional groups, chain lengths and degree of unsaturation, as well as the effect of the eluent on the elution pattern are discussed. The usefulness of the method for the separation of classes of hydroxy lipids, which cannot be resolved by other chromatographic procedures, is demonstrated. Examples include the separations of 1,2- and 1,3-diglycerides from long-chain alcohols and of alkyl ethanediol monoethers from cholesterol.

FLUORIMETRIC DETERMINATION OF SPHINGOSINE AND ITS APPLICATION TO NATURAL MIXTURES OF GLYCOSPHINGOLIPIDS. L. Coles and G. M. Gray (The Lister Inst. of Preventive Med., Chelsea Bridge Road, London, S. W. 1, Eng.). *J. Lipid Res.* 11, 164–66 (1970). A sensitive estimation of sphingosine, by measurement of the fluorescence of a complex formed with 1-naphthylamino-4-sulfonic acid, is described. The practical range is 5–35 nmoles sphingosine. The method is used to estimate, in terms of sphingosine, amounts of ceramide and glycosphingolipids. The isolation of microamounts (5–30 μg) of individual glycosphingolipids from a mixture and their quantitative estimation is described. The percentage composition of a glycosphingolipid mixture from the kidneys of adult C57/BL male mice is given.

GAS-LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY OF SYNTHETIC CERAMIDES CONTAINING 2-HYDROXY ACIDS. S. Hammartrom, B. Samuelsson and Karin Sammuelsson (Dept. Med. Chem., Royal Vet. College, Dept. Neurol., Karolinska sjukhuset, Stockholm, Sweden). *J. Lipid Res.*, 11, 150–57 (1970). Ceramides containing either sphingosine or sphinganine and one of the 2-hydroxy acids, 14h:0, 16h:0, 18h:0, 20h:0, 22h:0, 24h:0, and 26h:0 were prepared and separated by gas chromatography as the 1,3,2'-tri-O-tri-methylsilyl derivatives. Mass spectrometric analyses of these derivatives showed that the

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AOCS-ISF Announces Computer Symposium for Chemists

A computer symposium designed especially for chemists includes descriptions of computer systems and applications in various chemical fields. The symposium is part of the AOCS-ISF World Congress to be held September 27-October 1, 1970, at the Conrad Hilton Hotel in Chicago, Illinois, USA.

Computer systems from programmable calculators and desk top computers to time-sharing with a large computer complex and including dedicated laboratory computer systems will be described for chemists by authorities in these fields. Applications in spectroscopy, chromatography, fatty acids, foods, pesticides, lipids and other areas will be presented by individual researchers from Australia, Europe and North America. Data acquisition, instrument interfacing and laboratory automation will be discussed.

The symposium is designed for the chemist who is contemplating the use of computers or who may be using one computer system and needs organized, factual information presented in a concise manner to enable him to choose the best solutions for his individual requirements. The World Congress is sponsored jointly by the American Oil Chemists' Society and the International Society for Fat Research.

Abstracts of the symposium papers are available prior to the meeting. Those interested in attending should contact the symposium chairman, Leonard H. Ponder, Research Chemist, American Enka Corporation, Enka, North Carolina 28728, USA.

The program will include:

Introduction to Modern Computers: Development, Terminology, Uses, James Brown, Managing Editor, Auerbach Standard EDP Reports.

An Off-Line System for Data Acquisition and Analysis, R. C. Master, Engineering Manager, Analytical Chemistry, Nuclear Data.

Time Sharing Today, J. G. Rude, Chairman of the Board, Call-A-Computer.

The Desk Top Computer: I. General Capabilities; II. Applications in a Clinical Chemistry Laboratory, W. R. Dito, Director of Laboratories, Pontiac General Hospital.

Application of a Desk Top Computer to Chemistry, A. P. Damoglou, Research Scientist, CSIRO (Australia).

A Computer Approach Toward Automation of a Chemical Services Laboratory: I. Instrument Support, E. L. Schneider, Manager, Ralston Purina Company, and Arvid Munson.

A Computer Approach Toward Automation of a Chemical Services Laboratory: II. Management Information, Arvid Munson, Manager, Ralston Purina Company, and E. L. Schneider.

A Computerized Search System for Infrared Spectral Data, B. M. Vasta, Chief, Chemical Compound Information, FDA.

Use of the Computer as a Technical Service Tool in Pesticide Formulations, B. F. Fay, Laboratory Supervisor, Atlas Chemical Industries.

Computer Processing of Gas Chromatographic Data: Analysis of Fatty Acid Mixtures Using an Off-Line Magnetic Tape System, G. J. Nelson, Lawrence Radiation Laboratory.

Collection, Storage and Processing Gas Chromatographic Data by Digital Integrator-Paper Tape Punch Computer System, H. E. Pattee, Research Chemist, Market Quality Research, USDA, and J. A. Singleton, Chemist.

Digital Registration on Magnetic Tape of Data From 15 Gas Chromatographs, F. Woutman, Chemist, AKZO Research Laboratories, (The Netherlands).

Applications of Nonlinear Programming to Detergent Formulations, E. C. Steinle, Project Scientist, Union Carbide Corporation, C. D. Hendrix, Research Scientist, and R. R. Fields, Chemist.

Improved Software for GC Automation Via the Time Share Computer, G. D. Dupre, J. M. Gill and J. R. Hubbard, Vidar Corporation.

Meetings

AOCS National Meetings

Sept. 27-Oct. 1, 1970—Chicago, Conrad Hilton Hotel.
May 2-6, 1971—Houston, Shamrock Hotel.
Oct. 2-6, 1971—Atlantic City, Chalfonte-Haddon Hall Hotel.

AOCS Section Meetings

Northeast Section—June 2, 1970, Whyte's Restaurant, New York.

Other Organizations

June 7-12, 1970—Fourth ISA Process Analytical Instrumentation Short Course, Temple Buell College, Denver, Colorado.

June 9-12, 1970—14th International Conference on the Biochemistry of Lipids, Lund, Sweden.

June 21-26, 1970—73rd Annual Meeting of the American Society for Testing and Materials, Royal York Hotel, Toronto, Canada.

June 23-25, 1970—Fourth International Sunflower Conference, Sheraton-Peabody Hotel, Memphis, Tenn.

June 22-27, 1970—14th International Congress of Esthetics and Cosmetology, Amsterdam, The Netherlands.

July 7-9, 1970—International Association of Seed Crushers, the Royal Garden Hotel, London, England.

July 26-August 1, 1970—5th International Water Pollution Research Conference, San Francisco, California.

Aug. 9-14, 1970—Third International Congress of Food Science and Technology, Washington, D.C.

Aug. 23-25, 1970—41st Annual Meeting of the National Soybean Processors Association, Fairmont Hotel, San Francisco, Calif.

Sept. 20-23, 1970—International Conference on the Science, Technology and Marketing of Rapeseed and Rapeseed Products, Chantecler Hotel, St. Adele, Quebec.

Oct. 11-14, 1970—Ninth Annual Meeting, ASTM Committee E-19 on Chromatography, Brown Palace Hotel Denver, Colorado.

Oct. 14-17, 1970—International Symposium on Computer Applications in Engineering Sciences, Istanbul Technical University, Istanbul, Turkey.

Oct. 12-15, 1970—84th Annual Meeting of the Association of Official Analytical Chemists, Marriott Motor Hotel, Twin Bridges, Washington, D.C.

Oct. 26-29, 1970—ISA 25th Annual Conference and Exhibit on Instrumentation, Systems and Automatic Control, Civic Center, Philadelphia, Pa.

* Oct. 26-28, 1970—17th Spectroscopy Symposium and Exhibition of Instrumentation, Skyline Hotel, Ottawa, Ontario, Canada.

* Oct. 26-30, 1970—Fourth Materials Research Symposium, National Bureau of Standards, U.S. Department of Commerce, Gaithersburg, Md.

* Nov. 2-4, 1970—Technicon International Congress on Automated Analysis, New York Hilton Hotel, New York.

*Additions to previous calendar.

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ions formed on eelectron impact can be used to determine unequivocally the structures of the long-chain base and the fatty acid residue in the ceramide. Proposed structures of ions and the mechanisms of reaction of their formation are supported by mass spectra of homologous derivatives, by deuterium labeling experiments and by high-resolution on mass spectrometry.

SPECTROPHOTOMETRIC DETERMINATION OF PROTEIN AND FAT IN MILK SIMULTANEOUSLY. S. Nakai and Anh Chi Le (Dept. of Food Sci., Univ. of British Columbia, Vancouver 8, B.C., Canada). *J. Dairy Sci.* 53, 276–78 (1970). A clear solution was obtained by adding 5 ml of 97% acetic acid to 0.05 ml of whole milk. The protein was calculated from the absorbance at 280 mμ. Turbidity depending on fat content was developed thereafter by adding 2.5 ml of a solution containing 20% urea and 0.2% imidazole. The fat was determined from absorbance at 400 mμ with a round cuvette. This method does not require prehomogenization of milk for turbidity measurement, because of a dispersing effect by the combination of reagents. Application of this method to other food products is suggested.

THE GLYCERIDE STRUCTURE OF SAPIUM SEBIFERUM SEED OIL. W. W. Christe (Hannah Dairy Res. Inst., Ayr, Great Britain). *Biochim. Biophys. Acta* 187, 1–5 (1969). *S. sebiferum* seed oil is known to contain some tetraester triglycerides. The oil was separated by preparative thin-layer chromatography into normal triglycerides (76.9%) and estolide (23.1%) components which were each subjected to stereospecific analysis procedures. In the normal triglycerides, saturated and monoenoic fatty acids were in greatest abundance in the 1-position, while linoleic and linolenic acids (18:3ω3) were in greatest abundance in the 2- and 3-positions, respectively. The estolide fatty acids were entirely in the 3-position of the tetraester fraction. The fatty acid compositions of the 1- and 2-positions of the two components of the oil were very similar.

THE EFFECT OF TECHNOLOGICAL PROCESSING ON THE TOCOPHEROL CONTENT OF RAPESEED OIL. A. Rutkowski and L. Mzyk (Univ. of Agr., Olsztyn, Poland). *Riv. Ital. Sostanze Grasse* 46, 614–6 (1969). The changes in α and γ tocopherol content during industrial extraction and refining of rapeseed oil have been investigated. The results show that refining causes a decrease of about 75% of the tocopherol content initially present in the crude oil, with the largest losses occurring during alkali refining and during bleaching. The ratio of alpha to gamma tocopherol does not change significantly during the refining processes. Thus relative losses of alpha and gamma tocopherols are the same. The concentration of tocopherols in the deodorization condensate is higher than in other waste products of the refining processes. In all these waste products the ratio of alpha to gamma tocopherol is equal to that in the crude oil.

ISOLATION AND CHARACTERIZATION OF THE HYDROPEROXIDES OF METHYL OLEATE, II. I.R. CHARACTERIZATION. M. Piretti (Univ. of Bologna, Bologna, Italy). *Riv. Ital. Sostanze Grasse* 46, 591–601 (1969). The I.R. spectra of methyl oleate hydroperoxide, reduced methyl oleate hydroperoxide and methyl oleate have been obtained in the interval of 2 to 15 μ. Within the range of applicability of Lambert and Beer's law, the extinction coefficients of methyl oleate hydroperoxide have beeen calculated at $\lambda = 2.82$ μ (free OH) and at $\lambda = 2.91$ μ (bound OH) in CCl_4 and at $\lambda = 2.85$ (free OH) in CS_2. The experimental results suggest the possible existence of intramolecular hydrogen bonds in methyl oleate hydroperoxide and in its reduction product.

DEGRADATION OF LINOLEIC ACID DURING FRYING. L. Kilgore and M. Bailey (Mississippi State Univ.). *J. Am. Dietetic Assoc.* 56, 130–2 (1970). The decrease in linoleic acid content of fats used for frying has been studied on samples of safflower oil, cottonseed oil, corn oil and a commercial shortening advertised as being highly unsaturated. The percentage of linoleic acid (based on total fatty acids) for the fresh fats was: safflower, 72%; corn, 57.2%; cottonseed, 55.5%; and shortening, 30.2%. After the fats had been used for intermittent frying periods totaling 7½ hrs., during which 10 lbs. of potatoes were fried, the percentages of linoleic were: safflower, 69.2%; corn, 51.6%; cottonseed, 49.0%; and shortening, 26.7%. The linoleic acid content of the fat extracted from the tenth pound of potatoes fried was equal to slightly lower than the content in the oil at the end of the 7½ hrs.

NEW FRACTIONATION PROCEDURES IN FATS AND OILS TECHNOLOGY. E. Bernardini and M. Bernardini (Costruzioni Meccaniche Bernardini, Pomezia, Italy). *Riv. Ital. Sostanze Grasse* 46, 607–13 (1969). A novel solvent fractionation process for fats and oils is described, consisting mainly of a solvent phase crystallization with a final filtration, yielding three fractions: one with relatively high I.V., another with relatively low I.V. and an intermediate recycle fraction. Operational data and process information are given.

FATTY ACIDS IN NEWER BRANDS OF MARGARINE. P. Miljanich and R. Ostwald (Univ. of Calif., Berkeley, Calif.). *J. Am. Dietetic Assoc.* 56, 29–30 (1970). The composition of some newer margarine products has been determined. This information is as yet unavailable on the labels of these products and should be useful to dietitians and consumers concerned with their dietary intake of polyunsaturated fatty acids.

FURTHER INVESTIGATIONS ON LEGUMINOSAE SEED OILS. V. Averna, G. Lotti and F. P. Tartaglia (Univ. of Palermo, Palermo, Italy). *Riv. Ital. Sostanze Grasse* 46, 602–6 (1969). The oils extracted from the seeds of herbaceous and arboreal Leguminosae were examined. The data reported, on a total of 15 botanical species, include chemical analysis, fatty acid composition, U.V. and I.R. absorption characteristics.

PREPARATION OF PURE FATTY ACIDS. E. Fedeli, F. Camurati and A. Lanzani (Exper. Stat. for Fats and Oils, Milan, Italy). *Riv. Ital. Sostanze Grasse* 46, 514–9 (1969). The results of experiments on the preparation of high purity fatty acids are discussed. The methods used have been mainly physical (distillation, crystallization, chromatography) to avoid the isomerization which often accompanies chemical treatment of fatty acids.

PREPARATION OF COLORED FATTY COMPOSITION. G. W. Brankamp (Procter & Gamble Co.). *U.S. 3,489,573.* Fats and oils are provided with heat-stable color by incorporating in them water-soluble dyes in combination with particular polyglycerol esters, such as decaglycerol trilinoleate and tetraglycerol monooleate.

HYDROGENATION OF UNSATURATED ALIPHATIC COMPOUNDS. L. P. van't Hof (Lever Bros. Co.). *U.S. 3,489,778.* Unsaturated aliphatic compounds, especially soybean oil, are catalytically hydrogenated by contacting with hydrogen in the presence of a solution of a paltinum compound, for instance chloroplatinic acid, and a stannous halide, for instance stannous chloride, in a solvent consisting of a lower dialkyl ether, dialkyl ketone or aliphatic carboxylic acid or its ester.

FATTY EMULSIONS AND THEIR PREPARATION. D. P. J. Moran (Lever Bros. Co.). *U.S. 3,490,919.* Emulsions of edible fats are described, having a semi-solid plastic fat as a continuous phase and a stabilized dispersion of liquid oil in an aqueous medium as the disperse phase.

COOKED SWEET CORN FLAVORING COMPOSITION FOR VEGETABLE OILS. D. Melnick and H. L. Zmachinski (Corn Products Co.). *U.S. 3,490,921.* A flavoring composition which, when added to a liquid vegetable oil imparts to it the flavor of freshly cooked sweet corn, comprises a combination of 1.0 to 4.0 parts by wt. of ethyl vanillin and 1 part by wt. of ethyl n-butyrate. The flavoring composition should be added to the vegetable oil in an amount of from about 30 parts per billion to about 400 parts per billion. In addition, if it is desired to add a buttery flavor too the flavored oil, diacetyl, in an amount of at least 90 parts per billion, may be added.

GLYCERIDE OIL TREATMENT. R. A. Reiners and F. J. Birkhaug (Corn Products Co.). *U.S. 3,491,132.* A method is described for reducing the free fatty acid levels of glyceride oils so that they may be later efficiently refined, the method consisting of combining a cyclodextrin with oil and water, breaking the mixture so formed and obtaining the oil with the desirably reduced levels of free fatty acids. The cyclodextrin is recovered by decomposing the clathrate of the cyclodextrin and the fatty acid.

HARD BUTTER COMPOSITIONS AND METHOD OF PRODUCTION. J. Harwood (SCM Corp.). *U.S. 3,492,130.* Compositions have been found which comprise mixtures of certain symmetrical and asymmetrical mono-unsaturated triglycerides and asymmetrical di-unsaturated triglycerides of domestic origin and which are temperable to a stable triple chain length beta crystalline form. The term 'symmetrical glyceride' refers to positional isomer symmetry of the unsaturated acyl groups rather than the kind or type of saturated acyl groups present. When tempered, the compositions are compatible with cocoa butter and can be used as extenders or substitutes for it. Cocoa butter itself is temperable to the stable triple chain length beta crystalline form, but naturally occurring domestic glycerides generally temper to a double chain length or beta prime crystalline form or a mixture of beta prime and beta crystalline forms and when in such forms are not compatible with cocoa butter.

PROCESS FOR VACUUM DISTILLING RANDOMLY INTERESTERIFIED TRIGLYCERIDES TO PRODUCE NOVEL TRIGLYCERIDE FRACTIONS. P. Seiden (Procter & Gamble Co.). *U.S. 3,494,944.* Hardened lauric acid oils are randomly rearranged, or randomly interesterified, with hardened non-lauric acid oils containing predominantly C_{16} and higher saturated fatty acids. The hardened randomized oils are distilled to produce fractions and residues useful in hard butter and margarine oil formulations.

STABILIZATION OF OXIRANE CONTAINING FATTY DERIVATIVES. R. J. Sims (Swift & Co.). *U.S. 3,497,531.* Fatty, oxirane-containing compounds are stabilized against loss of oxirane oxygen by the presence of phenolic fat antioxidants such as propyl gallate.

STABILIZATION OF FATS AND OILS WITH EDTA AND RELATED COMPOUNDS. W. J. Lennon (Geigy Chemical Corp.). *U.S. 3,497,535.* Fats and oils which are subject to oxidative deterioration are stabilized by means of an effective amount of an antioxidant and from about 0.05 to about 1000 parts per million by wt. of esters of EDTA as chelating agents.

• Biochemistry and Nutrition

THE BIOSYNTHESIS OF $\Delta^{9,12,15,18}$-TETRACOSATETRAENOIC AND OF $\Delta^{6,9,12,15,18}$-TETRACOSAPENTAENOIC ACIDS BY RAT TESTES. R. B. Bridges and J. G. Coniglio (Dept. of Biochem., Vanderbilt Univ., Nashville, Tenn. 37203). *J. Biol. Chem.* 245, 46–9 (1970). Two 24-carbon polyenes previously reported in rat testes have been isolated and characterized to be $\Delta^{9,12,15,18}$-tetracosatetraenoic and $\Delta^{6,9,12,15,18}$-tetracosapentaenoic acids. The compounds were separated and purified by gas-liquid chromatography, and their structures were established by use of gas-liquid chromatography before and after hydrogenation, by ultraviolet spectroscopy of the alkaline isomerized derivatives and by identification of fragments resulting from cleavage at double bonds by oxidative and reductive ozonolyses. The biosynthesis of the 24-carbon polyenes was studied after intratesticular injections of either 1-^{14}C-linoleate or 1-^{14}C-arachidonate. The two metabolic products, individually, were cleaved by oxidative ozonolysis, and the location of the ^{14}C in the molecule was determined by gas-liquid radiochromatography of the fragments. The distribution of the ^{14}C was consistent with the hypothesis that the 24-carbon polyenoic acids were biosynthesized by elongation and further desaturation of linoleic acid. Final proof was obtained by chemical carbon by carbon degradation and measurement of the specific activity of individual carbon atoms. After 1-^{14}C-linoleate injection, $\Delta^{6,9,12,15,18}$-tetracosapentaenoic acid from testicular tissue was labeled primarily in the 7th carbon. After 1-^{14}C-arachidonate injection, testicular $\Delta^{9,12,15,18}$-tetracosatetraenoate was labeled primarily in the 5th carbon. The suggested pathway of biosynthesis of the 24-carbon tetraenoic and pentaenoic acids is by a 2-carbon elongation of docosatetraenoic and of docosapentaenoic acids.

ENZYMATIC ALKYLENATION OF PHOSPHOLIPID FATTY ACID CHAINS BY EXTRACTS OF MYCOBACTERIUM PHLEI. Y. Akamatsu and J. H. Law (Dept. Biochem., Univ. Chicago, Chicago, Ill. 60637). *J. Biol. Chem.* 245, 701–8 (1970). The enzymatic synthesis of

ANNOUNCEMENT

1970-71

SMALLEY CHECK SAMPLE PROGRAM

The Smalley Committee annually offers a number of Check Sample Series in various analytical categories. Interested analysts should write to Smalley Committee, AOCS, 35 E. Wacker Drive, Chicago, Illinois 60601, prior to July 15, 1970 for order forms and complete information, which will be distributed before each series begins.

The following Check Sample Series (the number of samples being shown in parenthesis) are offered:

Cottonseed (10)	Oilseed Meals (15)	Cottonseed Oil (4)
Soybeans (10)	Edible Fats (5)	Soybean Oil (4)
Peanuts (7)	Drying Oils (6)	Copra (4)
Safflower Seed (7)	Tallow & Grease (5)	N.I.O.P. Fats & Oils (5)

Gas Chromatography (fatty acid composition) (6)
Cellulose Yield (cotton linters) (10)

Additional series will be offered should sufficient interest be indicated. Please advise the Smalley Committee of series you feel would be of value.

R. T. Doughtie, Jr., Chairman
Smalley Committee

tuberculostearic acid (10-methylstearic acid) was catalyzed by extracts of *Mycobacterium phlei*. This process involved two reactions of the olefinic fatty acid chain of phospholipids. The chain was first alkylenated at the 10-carbon to give a methylene group, which was subsequently reduced to a methyl group. The first reaction could be measured by using S-adenosylmethionine-methyl-^{14}C. The enzyme was found in the supernatant fraction when extracts of cells broken down by sonic oscillation were subjected to centrifugation at 100,000 g. S-Adenosyl-L-methionine was the only effective donor of the 1-carbon unit. Phosphatidylglycerol, phosphatidylinositol and phosphatidylethanolamine were substrates for the reaction, and both 16- and 18-carbon chains were alkylenated although only the Δ9-olefinic chains appeared to be converted.

THE ENZYMATIC SYNTHESIS OF FATTY ACID METHYL ESTERS BY CARBOXYL GROUP ALKYLATION. Ibid., 709–13. The reaction was studied by incubation of fatty acid with S-adenosylmethionine-methyl-^{14}C and isolation of the labeled ester. This was characterized by thin-layer and gas-liquid chromatography and by isolation of labeled methanol from alkaline hydrolysates of the ester. Of several substrates tested only S-adenosylmethionine was an effective methyl donor ($K_m = 2.5 \times 10^{-5}$M) and oleic acid was the most effective fatty acid acceptor ($K_m = 1.3 \times 10^{-3}$M). Some methyl ester was formed when phospholipids were added to the incubation mixture, presumably because lipase action liberated fatty acids which could serve as substrates.

RAPESEED PRESSCAKE. XV. DEGRADATION OF SULFUR COMPOUNDS DURING PROCESSING OF THE PRESSCAKE. A. Rutkowski and H. Kozlowska (Dept. of Food Technol., Agricultural Univ. of Olsztyn, Olsztyn, Poland). *Oléagineux* 24, 687–90 (1969). The 5-vinyl-2-oxazolidinethione thiocyanates produced by hydrolysis of the goitrogenic thioglucosides are heat-labile. Heat treatment (100–125C for 1 hour) of the rapeseed presscake lead to a marked drop in their concentration. This treatment did not affect the isothiocyanates, whose level can be reduced by steam stripping. The conditions used in the desolventizing-toasting process enable a presscake of satisfactory quality to be obtained.

EFFECT OF DIETARY LIPIDS ON THE RATES OF SYNTHESIS OF NUCLEIC ACIDS AND OF DEVELOPMENT OF ADIPOSE TISSUE. J. Raulin (Unite U 56 de l'INSERM, Hôpital Parrot, 78 rue de General Leclerc, 94-Bicêtre). *Rev. Franc. Corps Gras* 16, 767–70 (1969). In the rat, the size of the adipose cells increased both with the quantity of lipids fed and also with the hardness of the fat. In animals of the same age, having the same amount of adipose tissue, the number of adipocytes was greater when the diet was richer in polyunsaturated fatty acids (from sunflower oil) and less when the dietary lipids were more saturated (i.e., lard). The amount of DNA in the perigenital tissue was greater when the diet contained sunflower oil and lower when the diet contained lard. Using radioactive precursors, the author found that the specific activity of the adipose subcellular particulates (nucleus, mitochondria) depended on the nature of the dietary lipid. In general, the rate of synthesis (or breakdown) and the development of adipose tissue appeared to be closely related to the composition of dietary lipid.

INFLUENCE OF DIETHYLSTILBESTROL ON THE TURKEY WITH SPECIAL REFERENCE TO HISTOLOGICAL CHANGES IN THE AORTA. L. M. Krista, J. H. Sautter and P. E. Waibel (Depts. of Animal Sci., and Vet. Pathol., Univ. of Minnesota, St. Paul, Minn. 55101). *Poultry Sci.* 48, 1961–68 (1969). Physiological and metabolic changes were induced by DES treatment. Even though distinct morphological differences are hard to establish, the levels of DES could be related to changes in body weight, blood pressure, carcass composition, general conformation and secondary sex characteristics. The lowest level of DES did not influence body weight, blood pressure or aortic rupture, but an increase in body fat and liver size was observed. The medium level of DES resulted in a significant reduction in weight gain at 12 weeks of age, a significant decrease in blood pressure at eight weeks of age and a significant increase in aortic rupture, plaque formation and degeneration. The highest level of DES had an obvious toxic effect on the birds as indicated by a debilitated appearance and depressed weight gains by six weeks of age. Morphological changes due to

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• *Fats and Oils Report . . .*

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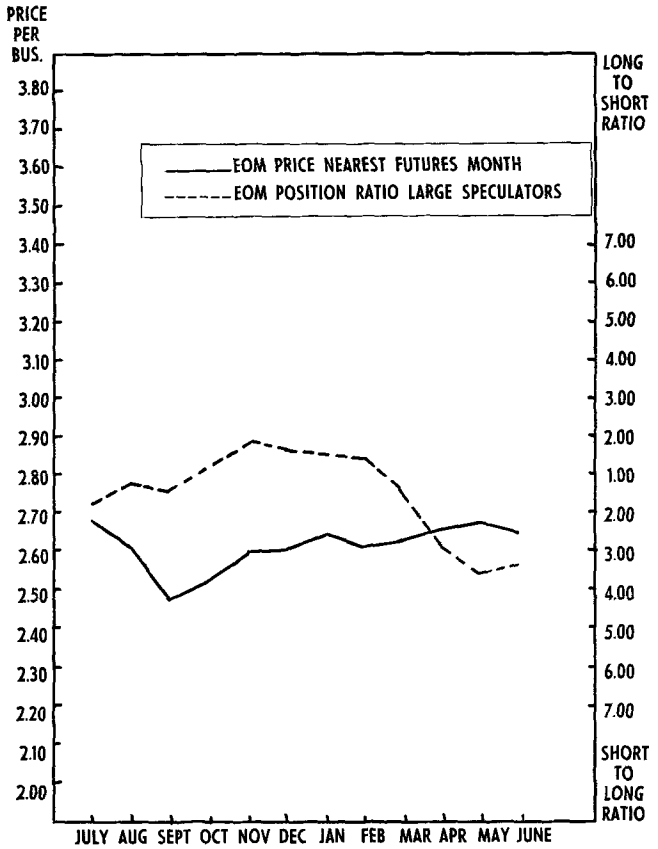

Fig. 3. 1968-69 Soybeans

lack confidence in personal judgment and tend to duplicate the action of large speculators. This may be due to an assumption that large speculators became large because of successful market judgment more than 50% of the time. At any rate it is impossible to segregate small speculator positions since these are lumped together with small hedges in one figure.

This study deals with the soybean, soybean oil and meal markets during the period July 1965 to June 1969. It was observed that during this period large speculators' positions fluctuated from heavily long to heavily short.

No attempt was made to show price action during the month. Only prices used were the closing futures prices for the spot month on the last day of each month, which is the same date on which the CEA position report is compiled. Certainly there were price fluctuations, some very drastic ones, during the month but these are frequently related to the closing out of a futures contract in its final days of trade which may not accurately reflect reasonable market value. The charts for 1968/69 illustrate the large speculator position profile plotted against price at the end of each month. This is expressed as a ratio of long vs short or short vs long depending on which was largest.

Conclusion: The most obvious conclusion is that price goes up as large speculators move more heavily to the long side and go down as they move to the short side. This is not intended to indicate that speculator action causes price change, or that price change causes speculator action. It is valid to conclude, however, that when large speculators have greater short positions than long there will be price improvement soon. It is also demonstrated that prices will weaken when large speculators are heavily long but this reaction may be delayed when there exists a substantially bullish situation. It necessarily follows that speculative position changes occur in relation to price changes, for they seldom hang onto a losing position.

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DES included increased reorientation of fibers (presumably smooth muscle cells) from a parallel position to a radial position. This reorientation of fibers and subsequent thinning of the aortic wall and degeneration of the elastic tissue of the media are factors that may lead to the rupture of the wall. Plaque size increased with age. Many of the vacuoles observed did not stain with Oil Red O. Dosage of DES represents an important variable in relation to results obtained and should be carefully considered in experimental work.

ESTIMATES OF CHANGES IN PLASMA CHOLESTEROL AND PROTEIN IN RELATION TO CERTAIN REPRODUCTIVE TRAITS IN FEMALE BREEDER TURKEYS. T. K. Mukherjee, G. W. Friars and J. D. Summers (Dept. of Poultry Sci., Univ. of Guelph, Guelph, Ontario, Canada). *Poultry Sci.* 48, 2081–86 (1969). When 534 turkey hens from three generations were shifted from approximately an 11 to a 14 hour photoperiod per day for 14 days, average increases of 72.91 mgm/100 ml and 0.87 gm/100 ml were observed for cholesterol and total protein of blood plasma respectively. The birds that hatched later in each generation showed a higher increase in plasma cholesterol levels than the earlier hatched birds within each strain. No such trend was observed in the levels of plasma protein. The measures of increments in the plasma cholesterol and protein levels due to increased photoperiod were used as independent variables in predicting measures of subsequent reproductive performance. It was noted, in general, that the traits associated with reproduction are not dependent on the increments in the levels of these two biochemical components. Heritability estimates obtained by the regression of progeny performance on dam's record for the increments in the plasma cholesterol and protein levels were 0.24 ± 0.40 and 0.24 ± 0.54 respectively. Estimates of heritability for cholesterol and protein levels measured after 14 days of extended photoperiod were 0.28 ± 0.30 and 0.26 ± 0.42 respectively. Significant ($P < .05$) positive correlations were observed between the increments in cholesterol and protein levels in the different subclasses under study.

A RAPID ASSAY FOR LIPOPROTEIN LIPASE. M. C. Schotz, Arlene S. Garfinkel, R. J. Huebotter, and J. E. Stewart (Radioisotope Res., Veterans Admin. Center, Los Angeles, Cal. 90073). *J. Lipid Res.* 11, 68–9 (1970). A rapid assay for lipoprotein lipase activity employing a ^{14}C-labeled substrate is described. The method is very sensitive and suitable for routine use.

SIZE AND LIPID COMPOSITION OF CHYLOMICRONS OF DIFFERENT SVEDBERG UNITS OF FLOTATION. R. Fraser (Dept. of Expt. Pathol., J. Curtin School of Med. Res., Australian Nat. Univ., Canberra, Australia). *J. Lipid Res.* 11, 60–5 (1970). Chylomicrons from thoracic duct lymph of rabbits which were fed corn oil were separated in a preparative ultracentrifuge into subfractions of different S_f values in order to compare their size, as determined by electron microscopy, with that expected from ultracentrifugation data. The lipid composition of the chylomicrons of different S_f values was also correlated with their morphology in order to elucidate their structure. Although the diameter distribution of chylomicrons from subfractions of lower S_f ranges corresponded approximately to the expected size distribution, that of the higher S_f ranges contained many small particles. The findings were consistent with the hypothesis that, irrespective of the S_f range of chylomicrons, the core is comprised of triglycerides, while phospholipids is spread as a monomolecular layer on the surface of the particles.

COMPOSITION OF HUMAN SERUM SPHINGOMYELINS. E. L. Hirvisalo and O. Renkonen (Dept. of Biochem., Univ. Helsinki, Helsinki, Finland). *J. Lipid Res.* 11, 54–9 (1970). Serum sphingomyelins were analyzed by argentation chromatography of the corresponding ceramide diacetates. Six subfractions were obtained. Three of them contained 4-sphingenines in combination with saturated, *trans*-, or *cis*-monoenoic fatty acids; the remaining three contained sphingadienine, also in combination with saturated, *trans*-, or *cis*-monoenoic fatty acids. Palmitic acid was the principal fatty acid combined with 4-sphingenines, while nervonic acid was the principal fatty acid combined with sphingadienine. About 4% of the total fatty acids of sphingomyelin were *trans*-monoenoic. They were comprised of many positional isomers of straight-chain C_{22-24} compounds. The *cis*- monoenoic acids made up 33% of the total acids and consisted of almost pure nervonic acid. The rest of the acids were saturated. The 4-sphingenines contained small amounts of iso-C_{18} and anteiso-C_{19} compounds in addition to the straight-chain C_{16-18} bases.

STIMULATION OF LIPOLYSIS IN ADIPOSE TISSUE IN VITRO BY INHIBITORS OF LIPID MOBILIZATION. F. P. Kupiecki and Diana I. Schneider (Dept. of Diabetes Res., The Upjohn Co., Kalamazoo, Michigan 49001). *J. Lipid Res.* 11, 38–41 (1970). 5-Methylpyrazole-3-carboxylic acid (U-19425) and nicotinic acid, which apparently inhibit lipolysis *in vivo* as indicated by low plasma FFA and glycerol concentrations, stimulate lipolysis *in vitro* in adipose tissue removed from fasted rats 30–90 min after treatment. This stimulation is not the result of low initial levels of FFA in adipose tissue. An increased rate of lipolysis is not induced *in vitro* by preincubating tissue of untreated rats with U-19425.

A METHOD FOR THE QUANTITATIVE DETERMINATION OF NEUTRAL GLYCOSPHINGOLIPIDS IN URINE SEDIMENT. R. J. Desnick, C. C. Sweeley and W. Krivit (Dight Inst. for Human Genetics, Univ. of Minnesota, Minneapolis, Minn. 55455). *J. Lipid Res.* 11, 31–7 (1970). A method is described for the isolation and quantitation of six neutral glycosyl ceramides from human urinary sediment. Total lipids were extracted from sediments of 24-hr. urine collections, and the glycosyl ceramides were isolated by silicic acid column chromatography followed by thin-layer chromatography. Methanolysis of the individual glycosyl ceramides yielded methyl glycosides which were quantitated as the trimethylsilyl ethers by gas-liquid chromatography. By this technique, the submicromolar concentrations of six glycosyl ceramides in normal subjects and in individuals with Fabry's disease, an hereditary glycosphingolipid storage disease, were determined. Trihexosyl ceramide (galactosyl-galactosylglucosyl ceramide) and a digalactosyl ceramide accumulated in the urinary sediment of patients with Fabry's disease.

BIOSYNTHESIS OF FATTY ACIDS IN MAMMARY TISSUE. I. PURIFICATION AND PROPERTIES OF FATTY ACID SYNTHETASE FROM LACTATING GOAT MAMMARY TISSUE. A. K. N. Nandedkar, E. W. Schirmer, T. I. Pynadath and S. Kumar (Dep't of Chem., Georgetown Univ., Washington, D.C.). *Arch. Biochem. Biophys.* 134, 554–62 (1969). Fatty acid synthetase of a high degree of purity has been prepared from the particle-free supernatant fraction of lactating goat mammary tissue. Ultracentrifugation and polyacrylamide gel electrophoresis revealed heterogeneity of the preparation. However, the enzyme complex was sufficiently free of malonyl-CoA decarboxylase activity to enable the demonstration of the requirement for the 'primer' acyl-CoA in addition to malonyl-CoA and NADPH. The enzyme appeared to utilize butyryl-CoA more efficiently than acetyl-CoA as 'primer.' The nature and extent of the fatty acids synthesized using these two 'primers' were characteristically different and were pronouncedly influenced by the concentration of malonyl-CoA.

II. SYNTHESIS OF BUTYRATE IN LACTATING RABBIT MAMMARY SUPERNATANT FRACTION BY THE REVERSAL OF β-OXIDATION. A. K. N. Nandedkar and S. Kumar. *Ibid.* 563–71. An enzyme fraction has been obtained from lactating rabbit mammary particle-free supernatant fraction which synthesizes butyrate from acetyl-CoA by the reversal of β-oxidation. This fraction

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tographic Determinations of Insecticides, by G. Baluja, J. M. Franco and M. E. Pereiro.

Densitometry on Tin Layer Chromatography, by E. Vioque, H. Murillo and M. P. Maza.

Biochemistry of Development: Biosynthesis of Fatty Acids in the Metamorphosis of *Ceratitis capitata,* by J. M. Odriozola, A. Pineiro, A. Ribera and A. Martin.

Biochemistry of Development: Evolution of Positional Fatty Acid Distribution in the Phosphatydylethanolamine During the Metamorphosis of *Ceratitis capitata,* by L. J. M. Fernandez-Sousa, A. Martin and A. Ribera.

Changes in the Glycerides of Olives During Ripening, by A. Vazquez and M. Mancha.

Mixed Monolayers of Cholic Acid and Lecithin, by J. Llopis, A. Albert, J. L. Saiz and D. Alonso.

The Fatty Acid Distribution in the Cocoa Butter Glycerides, by F. Mazuelos and J. L. Aguila.

Studies on the Superficial Monomolecular Layers IX: Compression Isotherms of Soybitan Esters, by E. Otero and O. Valls.

Studies on the Superficial Monomolecular Layers X: Association of Cholesterol and Sorbitan Cholesterol. E. Otero, O. Valls and M. Castillo.

Rheology of Sodium Dodecyl-oxydibencene-disulfonate, by J. Alba and C. Gomez.

Retention of Miscelle in Olive Press Cake of High Humidity, by V. Flores, F. Lopez and J. Pereda.

Contribution to the Cinetic study of Fat Hydolysis, by J. Rodrigo and B. Lopez.

Syndicalist National Week of Research Industry

The Syndicalist National Week of Research Industry meeting will be held April 20–25, 1970, and has been promoted by the Syndicalist Organization with the cooperation of official organizations of investigation.

The purpose of the meeting is to demonstrate the need for and the convenience of investigation for both industrial people and scientific research institutions. The general topics to be discussed will be: (a) Investigation as a factor of development. Spanish investigation and international cooperation. (b) Participation of syndicates in industrial investigation and development. (c) The industrial investigation and its economical conditioning. The official research centers and their projection towards the industry. (d) Lecture and seminar on possible assistance for investigation.

Sweden . . . . . Reinhard Marcuse

Scandinavian Forum for Lipid Research and Technology (Lipidforum)

An association of Scandinavian lipid scientists and technicians and other persons interested in lipids has been established. The General Secretary is Reinhard Marcuse, Swedish Institute of Food Preservation Research, Göteborg. The Membership which is acquired by simple application is free of fee and the number of members is about 200.

The association is taking over the organization of Scandinavian Symposia on Lipids which formerly were arranged by the Scandinavian Board of Research about each third year. The next symposium will be held in Denmark next year. The chairman of the organizing committee of this symposium is also chairman of the board of Lipidforum. It is at present director Anders Herløw, Grindstedvaerket, Braband, Denmark. The board consists of representatives of the Scandinavian countries.

Lipidforum is intended to promote professional information and education and to become a center for contact with colleagues and organizations in the Scandinavian countries as well as abroad. The activity is now being developed in accordance with the results of an inquiry and will comprise seminars, symposia and congresses. To begin with, information is distributed twice a year to the members. Communications or notes on events of interest to be forwarded in this way are very welcome and should be sent to the office. Mailing address: Fack, S-400 21 Göteborg 16, Sweden.

International Summer School on Glycolipids in Membranes at the University of Helsinki, Finland

On behalf of the Finnish Biochemical Society, the 16th FEBS (Federation of European Biochemical Societies) Summer School on Glycolipids in Membranes has been arranged by Ossi Renkonen to take place August 10 to 14. Twenty-eight papers will be presented. Those interested in attending the School are invited to write O. Renkonen, Department of Biochemistry, Laboratory of Lipid Research, University of Helsinki, Haartmaninkatu 3B, Helsinki 29, Finland.

The Proceedings of the Fifth Scandinavian Symposium on Lipids

The Fifth Scandinavian Symposium on Lipids took place at Tyringe, Sweden, during June 10 to 13, 1969, and was attended by about 150 persons. The proceedings are now available for distribution to all attendants. They can be ordered from R. Ohlson, AKO, Dept. o. Research, S-292 00 Karlshamn, Sweden at Sw. crws. 20. They are published in Scandinavian languages, a few in English. The publication comprises 40 papers including five plenary lectures by: K. G. Jensen (The Role of Fat in the Scandinavian Countries); G. Andersson (The Development of Swedish Oil Seed Breeding); K. Larsson (Molecular Packing in Fats); R. Marcuse (Metal Catalyzed Lipid Oxidation); and S. Friberg (Equilibria in Liquid-Water System and Their Influence Upon the Properties of Products). Further plenary lectures were given by E. Stenhagen (The Use of Masspectrometry for Lipid Analysis) and B. Samuelsson (New Possibilities for Determining the Effect of Dietary Fat Composition).

Scandinavian Symposium on Lipids to be Arranged in 1971 in Denmark

The Sixth Scandinavian Symposium on Lipids will take place in June 1971 in Denmark, probably at Grenaa, Jutland. On behalf of the Danish Institute for Lipid Research, Ole Tolboe, of the Jutish Institute of Technology at Aarhus, has taken over the chairmanship of the organizing committee.

The Food and Nutrition Group in Göteborg

CLiNG, The Food and Nutrition Group in Göteborg, was formed February 12, 1969, and has an office at The Swedish Institute for Food Preservation Research, Fack, S-400 21 Göteborg 16, Sweden. The purpose of this group is to create better possibilities for worthwhile contacts between research workers from different disciplines but with a common interest in food and nutrition. Hopefully new team projects in research and education will arise as a result of the formation of CLiNG. New contacts between scientists have already been taken. It is also likely that existing resources in the Göteborg area in personnel, know-how and equipment will be more efficiently used. Suitable areas for cooperation in research concern lipids and proteins respectively. A considerable amount of research in these two areas is presently being carried out in Göteborg, but a need for coordination and cooperation over the faculty boundaries is strongly felt among the participating scientists.

An inventory of research workers and research projects in the area of Göteborg has been made. Two interdisciplinary seminars have been held, one concerning "Fats

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• *Four Corners . . .*

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in Foods," where the consumption of fat was discussed from mercantile and organoleptic points of view. Chemical, medical and technical aspects on fat were also discussed. The second seminar was about medical aspects of protein deficiency and new sources of protein. A seminar about enzymes will be held in September 1970.

Other immediate activities include plans for a joint educational program in connection with the new Swedish doctors degree.

Scandinavian Symposium on Surface Chemistry at Tylösand, Sweden

The Fourth Scandinavian Meeting on Surface Chemistry will take place at Tylösand in Sweden August 27–29, 1970. The structure of lipids is one topic in the program. Among the invited speakers are Egon Matijevic, director of Institute of Colloid and Surface Science, Potsdam, N.Y. and James L. Fergason, associate director of Liquid Crystal Institute, Kent, Ohio.

For information contact the Institute of Surface Chemistry, Drottn. Kristinas v. 45 S11428 Stockholm Ö, Sweden.

Different Forms of Obesity Studied by Group in Göteborg

At the annual meeting of the Swedish Medical Association in December 1969, results of research on two forms of obesity in man have been presented by a group working in association with Per Björntorp at the First Medical Service of Sahlgrenska Sjukhuset in Göteborg. One form is due to an increased diameter (without any considerable change of number) of the adipose tissue fat cells (Hypertrophic obesity), the other shows mainly an increased number of the fat cells (Hyperplastic obesity). Hypertrophic obesity is more closely connected to well-known metabolic disturbances found in obesity as increased insulin production and possibly diabetes mellitus. Increased levels of blood lipids and cardiovascular diseases may be more frequent as well. The hyperplastic form, probably inherited to at least some extent, is presumably less dangerous.

Group Flight From Copenhagen to the World Congress in Chicago

A group flight for participants of the World Congress is being arranged by SAS, departing from and returning to Copenhagen. This flight should be particularly suitable for participants from Scandinavia and other Northern European countries. Two alternative schedules of two or three weeks in Chicago are being offered, i.e., departing from Copenhagen September 19 or 26.

Detailed information can be obtained from R. Marcuse, Lipidforum, c/o SIK, Fack S-400 21 Goteborg 16, Sweden, or from Wallace J. Quick, President, Chemtex Products, Inc., 400 E. Randolph Street, Chicago, Illinois 60601, U.S.A.

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has been shown to contain acetoacetyl-CoA thiolase, NADH-dependent acetoacetyl-CoA reductase, and crotonyl-CoA hydratase. The reduction of crotonyl-CoA appears to be brought about by the fatty acid synthetase using NADPH or NADH. The two reducing reactions are believed to overcome the thermodynamically unfavorable reaction involved in the condensation of two molecules of acetyl-CoA.

CHEMICAL, PHYSICAL AND BIOLOGIC PROPERTIES OF BUTTER AND GHEE. R. I. Tannous and A. Merat (American Univ. of Beirut, Beirut, Lebanon). *J. Am. Dietetic Assoc.* 55, 267–72 (1969). Fermenting milk into yoghurt increases the total acidity and biacetyl value of butter and ghee compared with samples made from milk. Other chemical and physical properties were generally similar. During fermentation also, lauric, myristic and palmitic acids increased, while a decrease in oleic acid was observed. Comparison of butter properties with those of ghee show a lower biacetyl value for ghee and a distinctive flavor difference from butter. These are attributed to the effect of the heat treatment involved in converting butter into ghee. In animal experiments, feeding either ghee or corn oil at a 20% level in the diet for three weeks caused no appreciable increase in blood cholesterol. The recovery of ghee from the gastrointestinal tract of rats was lower than that of corn oil only when measured at three hours after ingestion, but not after six hours.

THE EFFECT OF CHOLANIC ACID ON STEROL AND FATTY ACID SYNTHESIS. G. R. Jansen, M. E. Zanetti, C. F. Hutchison, F. J. Andriuli and E. E. Howe (Merck Inst., Rahway, N.J.). *Arch. Biochem. Biophys.* 134, 185–95 (1969). The effects of cholanic acid on incorporation of glucose-U-^{14}C into digitonin-precipitable sterol (DPS) and fatty acid in liver and extrahepatic tissues of mice and rats have been investigated. Cholanic acid lowers plasma triglycerides in both species, but lowers cholesterol only in mice. Incorporation of glucose-U-^{14}C into liver fatty acid was lowered by cholanic acid in both mice and rats, as was the weight percentage of this fraction. Incorporation into liver DPS in both species was reduced after 1-day treatment with cholanic acid, but was considerably elevated when the cholanic acid was fed for a 7-day period. Cholanic acid caused the weight percentage of DPS in the liver to decrease in mice but to increase in rats. Incorporation of glucose-U-^{14}C into extrahepatic fatty acid or DPS was not influenced in rats or mice by feeding cholanic acid in the diet for up to 7 days. When fed in the diet for 6 weeks, cholanic acid caused the percentage of body fat as well as the weight of the epididymal fat pads to be reduced approximately 35%. Under these conditions incorporation of glucose-U-^{14}C into fatty acid in epididymal fat was stimulated by a three-fold factor.

LYSOLECITHIN METABOLISM OF THYMUS AND BURSA CELLS OF THE CHICKEN. J. Kruger, E. Ferber and H. Fischer (Max Planck Inst. fur Immunbiologie, Freiburg, Germany). *Proc. Soc. Exp. Biol. Med.* 132, 543–47 (1969). The purpose of the present investigation was to determine whether lysophosphatide-metabolizing enzymes in lymphocytic cells might be an important component of certain tissue-damaging immune reactions. Thymus and bursa cells were used for technical reasons. The two cell populations differed in total lipid content according to differences in cell size but there was no difference with regard to phospholipid composition. In the cell homogenate the "apparent" reaction rates and Michaelis constants of the following enzymes were determined: ligase, acyltransferase, acyl-CoA-hydrolase, lysophospholipase and phospholipase A, the only difference between both cell homogenates was shown for the transferase activity. The investigation of the incorporation of radio labeled substrates used in the enzyme assays indicated that the enzymes determined in the cell homogenates (with the exception of phospholipase A) are also active in the intact cells, but to a much lesser extent.

FACTORS AFFECTING WHOLE- AND PART-LACTATION MILK YIELD AND FAT PERCENTAGE IN A HERD OF HOLSTEIN CATTLE. R. H. Miller and N. W. Hooven (Animal Husbandry Res. Div., USDA, Beltsville, Md. 20705). *J. Dairy Sci.* 52, 1588–1600 (1969). Relationships among milk and fat-corrected milk yield, fat percentage, weight change, body weight, and days open were studied in 1004 lactations collected over a 14-year period in a herd of Holstein cattle. Least-squares analyses of 31 to 60-day, 121 to 150-day, and of 181 to 210-day part lactations and total lactation were performed on an intra-sire basis. The regressions of milk and fat-corrected milk on weight change

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• *Refinery Waste Waters . . .*

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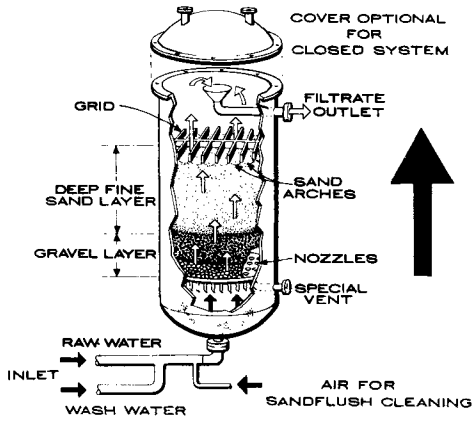

FIG. 2. The De Laval Immediumfilter. Immediumfilter is the registered trademark of Industrieele Maatschappij Activit N. V., Amsterdam N., Netherlands.

enters the bottom of the filter, passes thru gravel and fine sand layer, held in place by grid, and exits at the top. The whole sand bed serves as a dirt retention zone. The top fine grain sand is the final polishing zone. This unit offers large dirt holding capacity, long filter cycles, and may be readily cleaned by flow of raw water and air thru an expanded bed to dislodge the dirt.

Solvent Extraction Plants

At solvent extraction plants, there is frequently a degumming or miscella refining operation. Since the miscella soapstock and filter bleach clay are usually added to the meal in the desolventizer-toaster of solvent extractor, miscella refineries do not have the pollution problems associated with conventional refinery installations.

Average waste water flows were sampled at two solvent plants, with miscella refinery and conventional degumming operation. Typical analyses of composite waste water appear in Table IV. The refinery operation definitely increases impurities in the waste water. There is increase in organic and suspended solids, fat content and BOD figures.

TABLE IV

Chemical Analyses of Waste Water: Values in ppm

Components	Solvent plant miscella refinery	Solvent plant degumming operation
Total solids	1820	417
Suspended solids	570	127
Organic solids	740	203
Fat	232	Trace
BOD	462	67
pH	6.3	7
After chemical treatment and centrifugation		
Fat	None	None
Suspended solids	None	None
BOD	<50	<15

At a seed mill, with solvent extraction plant, the usage of fresh water is high, 50–70 gal/min for a 750 ton/day installation. This represents 75,000–100,000 gal of water per day. When such a plant is situated in a western area of the United States, where fresh water supply is limited, the treatment of solvent plant waste waters has real merit. Water can be recovered for reuse as cooling water to reduce fresh water demands.

It has been found that the waste water from a solvent plant can be chemically treated with coagulant in 90–100 ppm dosage, followed by polyelectrolyte at 1 ppm, and centrifugation in a PX Separator, to give a clear effluent. By treatment and centrifugation of this waste water, a clear water phase with no fat or suspended solids is recovered, and there is 78–90% BOD reduction. The precipitated solids, that may be concentrated and removed by centrifuge, are principally protein. This concentrated protein slurry may be added to desolventizer-toaster. In the area where this study was made, the well water had higher total solids content than the clarified process water.

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[Received February 28, 1969]

Newest Detergency Concepts to be Heard at Chicago Congress

Eminent scientists will speak at a Symposium on "Basic Aspects of Detergency" on September 29 at the 10th World Congress in Chicago. Recent concern for pollution, the environment and ecology has focused continuing attention on the influence of various detergents. There have been recommendations from various sources to eliminate certain detergent components which allegedly contribute to pollution. It is, however, essential to know and understand the chemistry and physics of cleaning quite thoroughly if cleaners are to be developed which are both effective and environmentally safe. The planned Symposium is to provide a review and up-dating of key properties involved in detergency and will be basic to many aspects of the cleaning process.

The Symposium has been organized by M. E. Ginn of the Masury-Columbia Company (formerly of Armour-Dial Inc.). Titles and speakers will include:

1. "Recent Advances in Detergency Theory," by A. M. Schwartz, Gillette Research Institute.
2. "Gel Filtration of Surfactants," by Toshio Nakagawa, Shionogi Research Laboratory, Shionogi & Co., Ltd.
3. "The Association of Surfactants Into Liquid Crystal Systems and Its Influence on Solubilization and Emulsification Phenomena," by Stig Friberg, Swedish Institute for Surface Chemistry.
4. "Interactions of Colloidal Particles With Complex Ions and Polymers," Egon Matijevic, Institute of Colloid and Surface Science, Clarkson College of Technology.
5. "Statistical Analysis of Detergency Tests With a Natural Soil," J. R. Trowbridge, Colgate-Palmolive Research Center.

The Symposium is part of a Joint Meeting, September 28-October 1, 1970 between the International Society for Fat Research and the American Oil Chemists' Society at the Conrad Hilton Hotel in Chicago. The international flavor of the meeting should enhance an exchange of differing points of view.