

Dietary fats and human health

The following report on a conference held at Ohio State University during November 1987 was written by J. Edward Hunter of Procter & Gamble, Associate Editor for JAOCS News for Health and Nutrition.

The Ohio State University (OSU) Department of Human Nutrition and Food Management conducted a conference entitled "Dietary Fats and Human Health: A Reappraisal" on Nov. 23, 1987, in Columbus, Ohio. The objectives of the conference were to review current research developments related to the influence of dietary fats on human health and to present information on current technological developments in fats and oils for human consumption. Approximately 150 physicians, food/nutrition scientists, dietitians and health educators attended the conference.

Addressing the topic of "The Western Diet and Chronic Disease," David Kritchevsky of The Wistar Institute noted that degenerative diseases such as cancer and coronary heart disease are the major causes of death in developed countries. Although diet has been identified as a risk factor for these conditions, the precise role played by diet in disease prevention remains to be elucidated. "Until then, the best advice for otherwise healthy people should be moderation. It's not flashy, but we can live with it," Kritchevsky said.

J. Edward Hunter of Procter & Gamble Co. discussed P&G's interest in canola oil (low erucic acid rapeseed oil), which, in addition to having the lowest level of saturated fatty acids of any vegetable oil now available, is a significant source of the omega-3 fatty acid α -linolenic acid and the monounsaturated fatty acid oleic acid. Recent human studies have indicated that dietary α -linolenic acid may be associated with increased clotting time, reduced platelet aggregation and reduced blood pressure. Other recent human work has demonstrated that a diet high in oleic acid but low in saturated fatty acids has the potential for lowering low density lipoprotein (LDL) cholesterol levels while conserving high density lipo-

protein (HDL), the form of cholesterol considered to be protective against coronary heart disease. P&G believes that canola oil's overall fatty acid composition is consistent with current health professional advisory statements and emerging research with respect to diet and chronic disease.

High monounsaturated sunflower oil is a newly developed oil from genetically improved hybrid sunflowers, according to Michael J. Hein of SVO Enterprises Corp.

The oil has a high monounsaturated fatty acid content (80+% oleic acid), which has been associated with favorable blood cholesterol benefits and is low in saturated fatty acids. Another advantage of this oil, particularly for frying, is its high stability due to a low polyunsaturated fatty acid content.

Alfred E. Harper of the University of Wisconsin spoke on "Implications of Current Health Status for Development of Dietary Guidelines." He questioned the appropriateness of proposing diet modifications for an entire population with the objective of preventing chronic degenerative diseases such as coronary heart disease and can-

Simplese: New fat substitute

The NutraSweet Co. announced in late January that it hoped to have Simplese, its dairy-based fat substitute, on the market in 12 to 18 months. Simplese, made from protein in egg whites or milk, has possible uses in products such as ice cream, frozen novelties, butter, margarine, yogurt, processed cheese, cream cheese, sour cream, salad dressings and mayonnaise, according to the company.

Although NutraSweet hopes to use Simplese in a wide range of products, the fat substitute can't be used in baking and frying because the protein gels and loses its creaminess.

The company claims Simplese's fat-like traits are a result of a patented heating and blending process called microparticulation, which shapes the protein into spheroidal particles so small (0.1 to 0.2 microns) that the tongue perceives them as fluid. The protein particles "fool the tongue," according to Robert Shapiro, NutraSweet's chairman of the board and chief executive officer, who added, "They taste and feel just like fat, but they are protein, not fat."

Because Simplese is protein-based, its caloric content is lower per gram than fat. The company says one gram of Simplese contains 1 1/3 calories compared to 9 calories for fat. Because Simplese is made from protein and only the physical form of the protein is changed during processing, the company at first said it would not be subject to Food and Drug Administration (FDA) review. However, after discussions with FDA officials, the company said it would petition FDA for affirmation of Simplese for generally recognized as safe (GRAS) status.

Meanwhile, olestra, the generic name of Procter & Gamble Co.'s fat substitute formerly referred to as sucrose polyester, is undergoing FDA review. If olestra is approved, some analysts say it has the potential to be a \$1 billion a year business. Other companies such as Unilever, General Foods and General Mills also are looking at the possibilities of developing sucrose polyester. Several Japanese companies and PepsiCo's Frito-Lay already have patents for sucrose polyester-like compounds.

cer. Because these are diseases associated with aging, Harper said, there is not sufficient evidence to demonstrate that a particular diet will prevent them. Furthermore, marked improvements in health status (e.g., increases in infant survival, growth and development, and life expectancy) have been experienced during this century by populations of industrialized countries despite a wide diversity of diets. While general dietary guidelines aimed at meeting nutritional needs (e.g., eat a variety of foods and maintain desirable body weight) are appropriate for populations, Harper urged that emphasis be placed on identifying and treating individuals at risk rather than developing mass intervention programs for the general public.

The contributions of red meat to the U.S. diet were the subject of a presentation by Burdette C. Breidenstein of the National Livestock and Meat Board. In the current U.S. diet, meat provides about 16% of total calories and about 10%

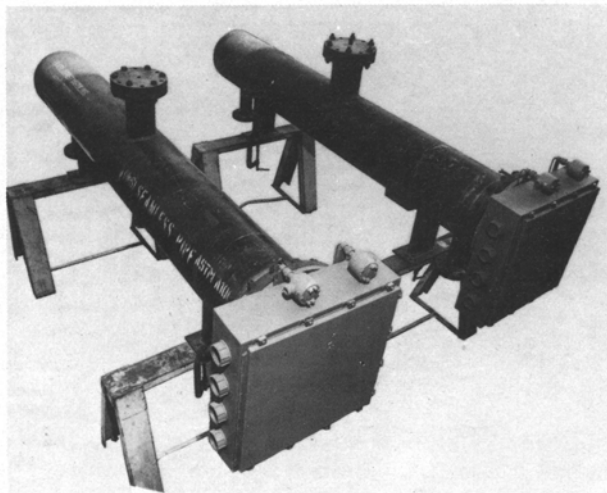
of total calories from fat; it also is an excellent source of high quality protein and essential minerals such as iron and zinc. Breidenstein said beef is leaner now than it was during the 1950s and that many consumers now report trimming fat from beef and removing skin from poultry before eating these foods. A current advertising slogan of the National Livestock and Meat Board is, "Lean is in, fat is out."

Jean T. Snook of OSU discussed the possible role of fish oils in human health. Moderate consumption of omega-3 fatty acids in fish or fish oil supplements has been found to lower serum triglyceride levels but does not consistently lower serum cholesterol levels. Of potentially greater importance with respect to reducing heart attack risk is the tendency for these omega-3 fatty acids to decrease platelet aggregation and increase clotting time, both associated with reduced thrombosis tendency. In one recently conducted study at OSU, however, female subjects consum-

ing 20 g of fish oil/day for five weeks showed increased serum levels of apo-B (the major apolipoprotein of LDL) and decreased levels of apo-A-I (the major apolipoprotein of HDL), responses that may be detrimental from a coronary heart disease risk standpoint. Snook noted that more research is needed before firm recommendations can be made on fish oil consumption.

Discussing food industry responses to health and nutrition issues, Marjorie Fitch of Kraft Inc. noted that the industry considers consumer needs and marketing potential in developing new or diet-modified products. In response to consumer demand, for example, Kraft has developed a broad line of reduced calorie (i.e., reduced-fat) products including cheeses, salad dressings, mayonnaise and margarine. Fitch commented that decreased consumer acceptability often is associated with reduced-fat products and is a major challenge for food companies.

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ASA meeting: Increasing feed use helps demand

Increasing demand for animal feed in China may provide a greater outlet for U.S. soybeans through the turn of the century, according to Don Bushman, director of the American Soybean Association's (ASA) Beijing office. Bushman told the more than 230 participants at an ASA Leadership Conference in St. Louis, Missouri, in January that by 1990, Chinese demand for soybeans for feed use could reach 6.23 million metric tons (MT). By 2000, that demand may climb to 17.74 million MT.

Bushman's estimates for 1987 indicated that China had 10.9 million MT of soybeans available for food and feed usage. Of that, 3.58 million MT went to feed use. Because Chinese planting area is limited, Bushman forecast that China would have only 12 million MT available for domestic consumption in 1990, with 7.5 million MT for food and 4.5 million MT for use in feed. However, with a potential demand for 6.23 million MT of soybeans for feed in 1990, this could cause a demand for an additional 63.6 million bushels of soybeans, Bushman said.

Bushman based his forecasts on the assumption that China would need to produce 50 million MT of feed in 1990 and 100 million MT in the year 2000. He also assumed that percentages of soybean meal would increase in feed for imported and exported swine, poultry and aquaculture.

The most significant increase in feed demand would be in aquaculture, Bushman said. "Presently, there's a lack of quality feed for aquaculture, but the Chinese would like to go from nearly none to about 3.5 million tons in three years (by 1990)." The 3.5 million MT would use approximately 875,000 MT of soybean meal, according to Bushman's estimates; Bushman predicted that figure will more than quadruple by 2000. During the same period, soybean meal demand for swine and poultry feed will each more than double, he said.

Although Bushman called China "a most exciting potential market," he added that advancement into the market would depend on China's willingness to spend foreign exchange and its ability to produce enough soybeans to meet protein, oil and bean demand for domestic food consumption.

Loss of market share and declines in U.S. production dominated Dan Sharpe's comments. Sharpe, ASA staff vice president of economics and corporate relations, described the U.S. decline from first place in world soybean trade in 1979/80 to third place in 1986/87. Although world soybean markets have grown, the U.S. has lost market share, Sharpe said, noting, "The pie grew, but our piece got smaller."

Sharpe noted that in 1979/80, South America held 46% of the world market in soybean meal trade, while the U.S. held 27.8%. By 1986/87, the U.S. share had dropped to 18.1% and South America's rose to 52%. Likewise, U.S. soybean oil share declined as world market shares of other oils such as rapeseed increased, Sharpe said.

According to Sharpe, the main reason U.S. soybean growers continue to lose market shares is the U.S. government's commodity program. "We need a policy that enhances rather than hinders access to markets," he said.

In an attempt to alter policy, Rep. Dan Glickman, a Kansas Democrat, announced that he would introduce a bill supporting a marketing loan rate for soybeans. Under a marketing loan system, payments to growers would be based on prevailing world market prices rather than on predetermined government prices. Glickman said he would introduce the idea to the House Agricultural Subcommittee on Wheat, Soybeans and Feed Grains early this year. His proposal would suggest that the marketing loan should become effective in 1989-1990. The bill also would introduce a marketing loan for sunflowerseed.

Glickman said the Reagan ad-

ministration has opposed a marketing loan rate for budgetary reasons. "Any changes in agricultural policy will run right into budget problems," he said.

In a related matter, the official 1988 grain and cotton programs announced by USDA in late January noted that plantings of soybeans or other crops will not be permitted on idled acreage. This was seen as one factor for farmers in their decision on soybean acreage for 1988.

International

Brazil

The Brazilian Association of the Vegetable Oil Industry (ABIOVE) was expected to request the Brazilian government to object formally to the U.S. Export Enhancement Program (EEP), according to a report published in the Jan. 22, 1988, issue of *Oil World*. The oils and fats weekly said ABIOVE feels that U.S. subsidies of \$92 to \$120 per ton cut world prices and prohibit Brazil from competitively exporting soybean oil to countries that receive products through EEP.

China

China oilseed production for 1987/88 has reached a record 33.7 million metric tons (MT), up 8% from the previous year, according to the fats and oils weekly *Oil World*.

Rapeseed production officially was set at 7.4 million MT, up 1.5 million MT from the record set the previous year. Oilseed production excluding soybeans and cottonseed officially was reported at a record 16.5 million MT, up 1.7 million MT from the previous year and up 0.7 million MT from the record registered two years ago. Peanut, sunflowerseed and sesameseed production declined slightly.

Finland

Finland's largest oilseed crusher, Oljynpuristamo Oy, has entered a

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joint venture to develop new varieties of Polish rapeseed with Continental Grain Co. of Canada. The project, which includes research funding and seed marketing, will develop hybrids for Canada and Scandinavia.

Philippines

Damage from the late November 1987 typhoon "Sisang" that hit the Philippines destroyed approximately 4 million coconut trees and damaged 55 million others in 12 provinces. Another typhoon had hit part of the area in August. As a result, coconut production will be reduced through 1990, according to the Dec. 17, 1987, newsletter from the United Coconut Association of the Philippines.

Japan

Ajinomoto Co. Inc. of Japan has built a biotechnological service firm in Tokyo in association with Charles River Laboratories of Wilming-

ton, Massachusetts, U.S. The new firm, Charles River Bioservice Ltd., is a subsidiary of Nippon Charles River Co.

Also, the Tokyo Grain Exchange has announced plans to trade in corn, soybean oil and soybean meal futures and to start option trading. Option trading may start within a year, but the new commodity futures are not expected to be offered for at least a year and possibly not before three years.

World

World soybean production for 1987-88 will be lower than originally forecast, according to the U.S. Department of Agriculture (USDA), which revised the figures in mid-January. USDA estimated production at 101 million metric tons (MT), down 1.4 million MT from December's forecast. Even so, the new estimate is up nearly 3% from the 98 million MT produced in 1986-87.

USDA said the change was due mostly to a reduction in the U.S. harvest estimate, now set at more than 51.8 million MT for 1987-88. USDA said Brazil is headed for a record harvest of 18.5 million MT, up from 17.3 million MT produced last year. Argentina's 1987-88 harvest is estimated at 8.5 million MT, up from 7.3 million MT last year. China, also a soybean exporter, was estimated to produce 11.8 million MT.

Peanut program

The National Peanut Council of America's (NPCA) export committee has announced additional funding for the U.S. processed product promotion program for the 1988 calendar year.

Under authority of the U.S. Targeted Export Assistance (TEA) program, the export committee will



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receive funds from the U.S. Department of Agriculture's (USDA) Foreign Agricultural Service to promote exports of U.S. processed peanut products overseas, with emphasis on, but not limited to, Japan.

The processed peanut program was established during 1987, and seven companies submitted proposals. U.S. manufacturers must apply for the funds through the NCPA's export committee, with final approval made by the Foreign Agricultural Service.

Engelhard buy

Engelhard Corp. of Menlo Park, New Jersey, has agreed to buy the Harshaw/Filtrol Partnership from KaiserTech Ltd. for \$264 million.

Harshaw/Filtrol is a major supplier of processing materials, including catalysts and bleaching earths, to the vegetable oil industry. Engelhard, a specialty chemicals and metallurgical products company, already sells catalysts to the petroleum industry.

According to company officials, the sale is subject to approval by both boards of directors and federal government review.

Chromatography

A symposium on "Chromatography in the Analysis of Oils and Fats" was held Nov. 11, 1987, in Liverpool, England. The event was organized by the Chromatographic Society and the Society for Chemical Industry, both of the United Kingdom.

Topics included techniques for the detection of lipids in high performance liquid chromatography (HPLC), supercritical fluid chromatography, new chromatographic approaches to the analysis of fatty acids and triacylglycerols, triglyceride analysis using the PTV injector, flame ionization detection (FID) for the HPLC of lipids and the use of various chromatographic techniques in the development of vegetable oil purity criteria.

P.A. Sewell of Liverpool Poly-

technic discussed the use of infrared detectors in the analysis of lipids by HPLC. Sewell covered the sensitivity of detection and the limitations imposed by the infrared spectrum of the eluting solvent. In some forms of analysis, such as partial glycerides, it is possible to form derivatives of the analyte, which modifies its spectral properties; this enables much more sensitive detection in some systems.

P. Rippington of Anachem Ltd. spoke on the use of supercritical fluid techniques in chromatography. The use of supercritical fluids enables greater solvation power than the gases in gas chromatography but enables better detection systems than those used in HPLC. Supercritical fluid chromatography (SFC), therefore, bridges the gap between gas chromatography (GC) and HPLC. For instance, FID detectors can be used with SFC, in which CO₂ is the mobile phase. Gradient elution can be achieved by modifications of pressure, which, in turn, influences the density and solvating power of the mobile phase. Almost normal capillary column GC can be used, but there need to be modifications to the system; otherwise, the stationary phase is washed out of the column. These and other advantages and peculiarities of the SFC system were carefully reviewed. Rippington, however, was unable to provide details about applying this technique to oil and fat analysis.

Dave Baty of the University of Dundee spoke on derivatives of fatty acids that fluoresce in ultraviolet (UV) light and the use of these in detecting fatty acids in human (blood) plasma during HPLC.

Preston Shanks of the Anglia Oil Co. discussed the use of the new PTV injector in analysis of triglycerides by capillary column GLC. Shanks described how the PTV injector can be temperature-programmed and its relationship to the use of an autosampler with split/splitless injection. Retention times of triglycerides analyzed according to their carbon numbers had been found to be influenced by the degree of unsaturation. Shanks gave a number of practical hints in the use of the apparatus

and ways of alleviating problems that commonly occur.

Eugene Hammond, formerly of Unilever but now with United Biscuits, reviewed the use of FID with HPLC. One of the earlier systems was the moving wire detector pioneered by Pye; a more recent system is the Tracer 945. Hammond reviewed the advantages and shortcomings of this detector; one disadvantage, he said, is its short linear range, which, in triglyceride analysis, may cause some oils to have major peaks that cannot be accommodated within the same linear range as the remaining relatively minor peaks.

Barry Rossell of the Leatherhead Food R.A. discussed the use of chromatographic techniques in the development of vegetable oil purity criteria. He reviewed the use of fatty acid composition, composition of acids at the triglyceride 2 position, triglyceride carbon number compositions, and sterol and tocopherol compositions of major vegetable oils. Rossell presented the ranges established for these criteria during the analysis of over 600 authentic samples at the Leatherhead Food R.A. and explained how the ranges should be used in the resolution of purity disputes.

The symposium was held to coincide with the Hildrich Memorial Lecture, presented in the early evening by Kurt Aitzetmueller from the Federal Institute for Lipid Research in Münster, West Germany. Aitzetmueller reviewed the various aspects of HPLC and the way in which it can be applied to lipid analysis. He explained how HPLC has been used extensively in the pharmaceutical industry, but it only has been adopted slowly in the oils and fats field, due mainly to the lack of convenient detection systems.

Aitzetmueller, in reviewing several aspects of oil and fat analysis, mentioned the analysis of phospholipids by HPLC in various oils and fats and the analysis of chlorophyll pigments in varieties of rapeseed oil grown in Western Europe. Glucosinolate analysis with new varieties of rapeseed is a political problem, as subsidies are paid to farmers depending on the glucosinolate content of the seed. Thus far, various methods of analysis have been

Fats & Oils News

suggested, but, he said, a recently developed HPLC technique now appears superior to the earlier methods.

Chang honored

Stephen S. Chang, professor of food chemistry in the Department of Food Science at Rutgers University and a past president of AOCS, has received the Outstanding Achievement to the Chinese Food Industry Award, given by the Chinese Institute of Food Science and Technologists.

Chang was cited for the following special achievements: promoting the edible oil industry in Taiwan to improve equipment and technology and to modernize; recommending that the Ministry of Education emphasize food science and technology education; recommending the construction and operation of an edible oil processing plant at the Food Industry Research and Development Institute in Hsinchu, Taiwan; serving as convener of the advisory committee to the Taiwan Food Industry now sponsored by the Council of Agriculture of the Republic of China; and establishing the Cathay Food Consulting Co. in the U.S., for which he serves as chairman of the board, to encourage the transfer of food technology to the food industry in the Republic of China.

Soyfood use

A record 330 new soyfood products were introduced in the U.S. during 1987, according to The Soyfoods Center, Lafayette, California.

Soyfood products, made from soybeans, can take a variety of forms, from burgers and hot dogs to ice cream, milk, cheese, yogurt and salad dressings. The Soyfoods Center has a computerized database, "Soya-Scan," listing more than 4,530 soyfood products worldwide from the year 1546 A.D. to the present.

According to database figures, an average of 11 new soyfood products were launched each year in the U.S. during the 1950s. This rose to 16 each year during the 1960s and 26 during the period 1970-1974. Most of these were based on modern, high-tech soy protein products, such as soy protein isolates and concentrates or textured soy flour. In the late 1970s, the number of new products rose rapidly, with 78 in 1976, 162 in 1979, 224 in 1982, 296 in 1985 and now 330 in 1987.

Most of the growth since the late 1970s has come in the area of traditional, low-tech products such as tofu, tempeh, soymilk, miso, soy sauce and soy nuts, as well as modern dairylike soyfoods such as soy ice creams, yogurts and cheeses.

In the U.S., tofu was a major ingredient in 41% of the new products, followed by soymilk and tempeh (each 9%), soy ice creams (8%) and isolated soy proteins (8%). Leading product categories were basic soyfoods (21%), dairylike products (17%), meatlike

products (14%), entrees (11%), beverages (6%), ice creams (5%) and dressings, dips and spreads (4%).


For more soyfood information, contact William Shurtleff, The Soyfoods Center, PO Box 234, Lafayette, CA 94549.

AOAC position

The Association of Official Analytical Chemists (AOAC) in February announced it was seeking a qualified person to serve as its executive director after the resignation of its previous executive director.

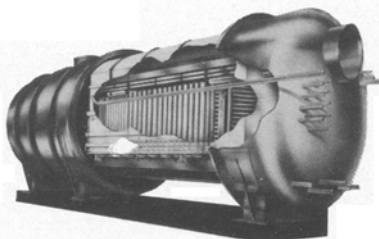
The AOAC executive director manages internal association operations and external volunteer activities devoted largely to the development and collaborative study of analytical chemical and microbiological methods for analysis of foods, drugs, feeds, fertilizers, pesticides, water, forensic materials and other substances. AOAC has more than 3,000 members worldwide.

For information, contact Robert C. Rund, AOAC president, Department of Biochemistry, Purdue University, West Lafayette, IN 47907, telephone 317-463-1040.

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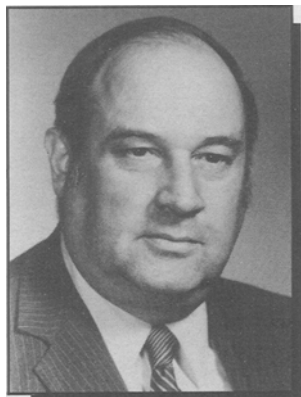


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Johnson retires



Ogden C. Johnson

AOCS member Ogden C. Johnson retired Jan. 1, 1988, from his position as senior vice president for Hershey Foods Corp.

He joined Hershey in 1974 as corporate vice president of scientific affairs and became vice president of science and technology in 1978 and executive vice president in 1981. He served as acting president of Cory Food Services during 1980 and 1981. He was named senior vice president and elected to Hershey Foods' board of directors in 1984.

Johnson joined AOCS in 1953. Prior to joining Hershey Foods, he was director of the U.S. Food and Drug Administration's Office of Nutrition and Consumer Sciences. He previously served as chief of the domestic unit of the Health Services and Mental Health Administration's Nutrition Program, U.S. Department of Health, Education and Welfare; assistant secretary for the American Medical Association's Counsel on Food and Nutrition; and senior research chemist with A.E. Staley Manufacturing Co.

He received his B.S., M.S. and Ph.D. in food science from the University of Illinois.

In other news at Hershey Foods Corp., William F. Suhring has retired as vice president for corporate development. Meanwhile, William Lehr Jr. has been elected senior vice president of the corporation and Michael F. Pasquale has been elected senior vice president and chief financial officer.

News briefs

Nippon Oil and Fats Co. Ltd. of Japan has acquired all of the stocks of the joint venture firm Metal Coating International Inc. (MCII), a rust-proofing agent manufacturer based in Ohio, U.S. News reports from Japan said Nippon paid \$8 million to Diamond Shamrock for that firm's 50% share of MCII.

Central Soya Co. Inc. has promoted three individuals to newly created positions. They are Thomas G. Hauenstein, senior vice president for feed; L.D. Williams, senior vice president for chemurgy; and Dennis B. Longmire, vice president for premix.

Cacao De Zaan B.V. has appointed J.W.A. Leijdekker commercial vice president, to succeed J.W. Broekhuis.

The French Oil Mill Machinery Co. has named Allan L. Monroe to its sales and customer support staff. Monroe formerly was operations manager for Bunge Corp.'s Decatur, Alabama, plant.

William A. Bomball has been named group manager of chemical intermediates research and development in the Horizon chemicals division of Staley Continental Inc.

Campbell Soup Co. has announced it will acquire the refrigerated salad dressings and olive businesses of Specialty Brands Inc. based in San Francisco, California.

Joachim A.F. Rathke of Unimills International has been appointed president of the EEC Seed Crushers' and Oil Processors' Federation (FEDIOL).

Obituaries

LEONARDO F. IGNACIO JR.

AOCS has been informed of the Jan. 14, 1988, death of Leonardo F. Ignacio Jr., who served as executive director of the United Coconut Association of the Philippines Inc. (UCAP). Ignacio died of cardiac arrest at age 57.

He was editor of *UCAP Weekly Bulletin*, a newsletter published by UCAP, as well as *Coconuts Today*, *Coconut Statistics* and *The Coconut Kit*. He had been associated with UCAP for 22 years.

JACOB FITELSON

Jacob (Jack) Fitelson, regarded as one of the giants in the field of analytical chemistry of foods, died during spring of 1987 at his home in West Palm Beach, Florida. He was 82 years old.

He started working at the Philadelphia district office of the U.S. Food and Drug Administration in 1925 upon graduation from the University of Pennsylvania. He was transferred to the New York office several years later. Attending New York University at night, he earned his doctorate. He rose steadily through the FDA ranks to become chief chemist in 1948.

Through his research, he made many contributions to the Association of Official Analytical Chemists (AOAC). His work included detection of the adulteration of olive oil. In the 1930s, he was the first to succeed in detecting tea seed oil used to adulterate olive oil; his method, the Fitelson test, is still used and cited in food chemistry textbooks. During the 1940s, he developed a test for determining the squalene content of olive oil. When FDA found that a group was purchasing squalene in large quantities and using this in olive oil, Fitelson persuaded the supplier of this chemical to add an innocuous marker to the squalene. When this was detected in oils on the market, FDA was able to seize the adulterated product. Fitelson's testimony in the court case was the first use of spectrophotometry to show the presence of a specific entity in a product.

In 1951, he left FDA after 25 years of service to establish his own private testing and analytical laboratory. He became a consultant to the Flavor and Extract Manufacturers Association. He was active as an associate referee for AOAC and was a member of the first group elected as Fellows of AOAC in 1963. He was a member of AOCS during the 1940s and 1950s.