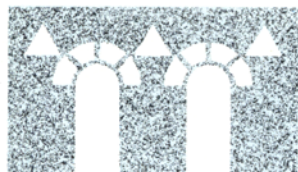

WORLD CONFERENCE REPORT



Barge traffic on the Maas River was a frequent sight during world conference.



Maastricht '89

800 participate in processing world conference

Approximately 800 persons from around the world wound their way the first week of October to the Dutch provincial capital of Maastricht in the south of The Netherlands for an intensive week of lectures, exhibits and social events that made up the World Conference on Edible Oils and Fats Processing—Basic Principles and Modern Practices.

Edward J. Campbell, general chairman for the week-long conference, opened the conference by noting that as the year 1989 marked the end of the decade, the year perhaps also marked the “end of ge-

ography as we know it.” Increasing international trade in commodities, international investment practices, the Uruguay Round of GATT negotiations, the U.S.-Canadian free trade agreement, and the looming elimination of EEC internal trade barriers in 1992 were cited by Campbell as signs that national geographical boundaries are diminishing in importance.

Keynote speaker J.A.E. Vlieland, chairman of The Netherlands Commodity Board for Margarine, Fats and Oils, devoted the final part of his comments to developments in Eastern Europe. “I

want to point out to you the startling developments in middle and eastern Europe,” he said. “Such developments only occur once in a lifetime. The Second World War caused the partition of Europe. After the war the Americans hastened to the rescue of bankrupt Europe with the Marshall Plan. Eastern Europeans were not allowed to benefit from this general plan. For them the war had ended, but the hardship remained. Today we Europeans have a dream. A dream of a united Europe extending from the Atlantic (Ocean) to the Ural (Mountains), the dream of the great Gen-

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eral de Gaulle. If we sit and wait, Eastern Europe may get into long-lasting turmoil causing great risks for peace. Hay should be made while the sun shines."

In addition to approximately 550 technical registrants at the meeting, there were 132 exhibit personnel. The meeting's accompanying exposition—the largest ever at an AOCS-sponsored world conference—had 50 companies occupying nearly 80 booth spaces (exposition report, Page 1700). Immediate proximity of the exposition floor to the lecture hall facilitated registrants' attending the exhibits. Initial evaluations showed a majority of registrants reporting they spent six hours or more in the exhibit hall. One processing veteran noted that when he attends such meetings, he uses the availability of so many technical representatives to resolve technical problems. "I talk to one firm, then go to another booth to talk to the next supplier, and maybe two or three more firms that might help solve the problem," he said. "It's easier than trying to reach them by international telephone calls from home."

There were 102 persons registered for the spouses' program, which provided walking and bus tours of Maastricht and environs.

The conference opened with a report on the world fats and oils situation. *Oil World's* Tom Mielke reviewed the supply-demand trends for fats, oils and related materials. The American Soybean Association's Dennis Sharpe discussed international economics and politics (See text on Page 1694). Ronald Fleming, of Capital City Products, reviewed trading rules and regulations.

Mielke said that, despite 1989/90 world oilseed production recovery to 211 million metric tons (MMT) from 198 MMT the previous season, there may be little chance for replenishment of world oilseed stocks, drawn down last year because of drought-induced limited production. Potential large increases in palm oil and soybean oil production may be needed to meet rising demand, Mielke said. In his talk delivered Oct. 2, Mielke said



World Conference General Chairman Edward Campbell, right, and technical program co-chairman David Erickson, above, were among opening session speakers at the meeting.



oil prices could increase if one or more additional demand factors develop. India might provide such a factor if it needs to increase edible oil imports to meet domestic demand in 1990.

The biggest topic in trading rules in recent years has been the "previous cargo" issue, in which the organizations sought to work out regulations that would protect against fats and oils being contaminated by residue of previous cargo in ocean vessels. Fleming, president of the National Institute of Oilseed Products, outlined the process by which NIOP adopted rules listing which cargoes are acceptable as immediate prior cargoes for edible oils that may or may not be processed after transport, which substances are acceptable as immediate previous cargo for edible oils that definitely will undergo further processing after transport, and which materials are unacceptable as immediate prior cargoes for edible oils.

The industry's concern with potential contamination via previous cargoes is evident as both speakers in the first technical session—storage, handling and shipping practices—focused on the subject again. Joseph E. Ludwiczak, of Stolt-Nielsen Inc., described in some detail the loading and handling of oils in ocean-going transports and the cleaning procedures employed between cargoes. Peter Backlog, of Unilever Grondstoffen Maatschappij B.V., discussed the various terms under which fats and oils are traded, and how disputes may be resolved. In discussing recent activities to reduce possible contamination of fats and oils, Backlog described studies to improve tank cleaning procedures, efforts by paint companies to provide better coatings for interior tank surfaces, development of new techniques to detect contaminants, and development of improved operational procedures by shipping companies.

Technical sessions covered vir-

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tually all facets of processing for fats and oils: separation/extraction, refining, nutrition in relation to processing, formulation and processing of finished products, individual oils, quality control and analytical topics, meal and by-products, and environmental concerns. Abstracts for the technical presentations were published in the September 1989 issue of *JAACS*; the proceedings will be published as a separate volume by the American Oil Chemists' Society during 1990. All technical registrants at the conference will be mailed one copy of the proceedings at no additional charge; non-attendees will be able to order copies from the American Oil Chemists' Society.

Key members of Campbell's organizing committee were program co-chairmen David Erickson of the American Soybean Association and J.A. Wijsman of TNO CIVO-Food, local chairperson C.J.M. Meerhoeck, and poster session chairperson Richard Wilson.

In a three-day series of poster presentations, speakers from Europe, Asia, Latin America and North America presented reports on processing, analytical techniques, new instrumentation, new



J.A. Wijsman (left), technical program co-chairman, talks with keynote speaker J.A.E. Vlieland (right) following opening session.

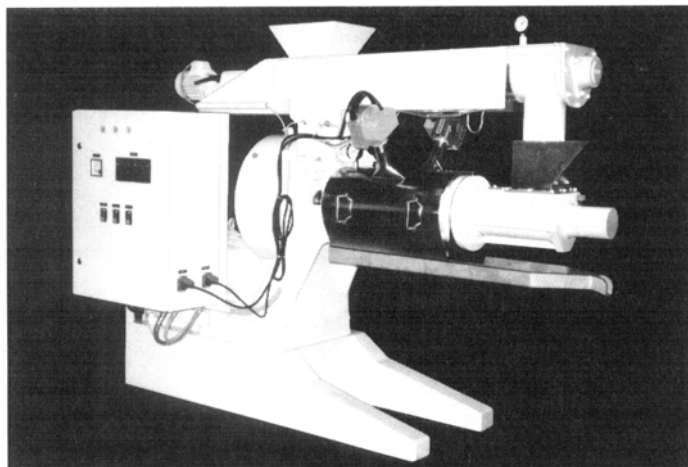
applications of fats and oils in food products, and other topics. Registrants were able to visit the poster presentations during coffee breaks and lunch breaks on Monday, Tuesday and Thursday. Most poster presentations dealt with processing topics. Analytical technique was the second most common theme. There was a steady stream of visits to the poster area in the lobby of the main auditorium where plenary lectures were held.

The world will need an additional 14.8 MMT of crushing capacity to supply sufficient vegeta-

ble fats and oils for the world population by the year 2001, according to a poster presentation by James M. Stanton of Experience Inc. Stanton based his calculation on assumptions that world population growth and per capita disappearance of edible oils will continue at the current rates. Areas that may need additional crushing capacity include Africa, China, Mexico, the Mideast, Pakistan, South America, South Korea, Taiwan and the Soviet Union (Table 1).

World conditions are not likely to remain static, however, and Stan-

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ton noted that most likely the changes would be that developing countries will increase their vegetable oil consumption, while some developed nations will decrease per capita consumption. He also expects more countries to become self-sufficient in oilseed crushing capacity, either by increasing domestic oilseed production or importing seed.

Another poster presentation by Ralph Daniels described a revised processing system so that acid water would yield material for potential use in fertilizers. Use of potassium hydroxide instead of sodium hydroxide in caustic refining would result in acid water containing potassium salts, he said. Neutralizing the acidic water phase with ammonia would produce a multinutrient fertilizer solution, Daniels said. Bench scale studies are encouraging, Daniels said, but

larger scale trials have not been conducted.

Each day's plenary program concluded with a question-and-answer session at which registrants could query speakers on virtually any topic. In the discussion session for speakers on storage, handling and extraction of oilseeds, the questions generating the most audience participation were those relating to the "previous cargo" issue. Stolt-Nielsen's Ludwiczak noted that if refined oils are being shipped, the only acceptable immediate previous cargo would be another edible oil or an innocuous product such as wine. Albert Mogerley of Hudson Tank Terminals noted that Backlog had commented in his talk about a reduction in contamination complaints in European areas, but asked NIOP's Fleming about results in the U.S. Fleming said complaints about cargo problems were down significantly in the U.S. as well. Fats and oils consultant Kurt Berger pressed a bit harder and said he felt there still was a problem as to whether "we really know how to clean these vessels." Ludwiczak said he felt the problem was not with cleaning procedures, but in adequate policing to make sure the prescribed procedures are followed. He also said improved coatings may prevent pre-

vious cargo material from being retained behind a coating when the tank is emptied, then blending into the next cargo when the tank is refilled. Backlog noted portable analytical instruments incorporating GLC technology are being developed to help detect banned substances.

The listing of partially hydrogenated menhaden oil (PHMO) as GRAS (generally recognized as safe) status by the U.S. Food and Drug Administration occurred only a few weeks before the conference and sparked some questions. Ahmad Moustafa noted that margarine in the United States is one of the foods having a "standard of identity" that lists specific oils that may be used. The standard would need to be modified before PHMO could be used in margarines, Moustafa noted. He added that the other table spreads with less than 80% fat, however, are not covered by the standard of identity. Thus, if a manufacturer decided the product was saleable, the company could produce PHMO spreads at any time. Several North American attendees said they did not expect immediate marketing of PHMO spreads in the United States.

During the question-and-answer session on separation and extraction, the most frequently raised

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Among attendees at gala international evening were (from left) Rich and Pam Wilson, George and Ginny Cavanagh and Dick and Eleanor Baldwin.

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TABLE 1

Oilseed Processing Deficit/Surplus in 2001

Country	1988 Edible oil					2001 Edible oil		
	Population (millions)	Capacity (1,000 MT)	Yield (%)	Domestic Disappearance (1,000 MT)	Per capita (kg/yr)	Population (millions)	Domestic disappearance (1,000 MT)	Surplus (deficit) capacity ^a (1,000 MT)
Africa	609	4,156	34	5,850	9.6	900	8,600	(21,000)
Argentina	32	12,000	26	530	16.5	38	630	9,600
Australia	16	500	25	272	17.0	20	337	200
Brazil	144	25,000	20	2,200	15.2	193	2,950	10,200
Canada	26	3,200	33	640	24.7	30	740	950
China	1,084	20,000	25	6,460	5.96	1,280	7,630	(10,500)
East Europe	136	6,000	34	1,860	13.7	144	1,970	300
EEC-12	325	28,000	34	8,060	24.8	337	8,360	3,000
India	819	20,000	32	4,830	5.9	1,083	6,390	0
Indonesia	175	5,000	40	1,697	9.7	223	4,300	700
Japan	123	9,000	28	1,980	16.0	130	2,080	1,600
Malaysia	17	2,200	40	476	28.0	25	700	400
Mexico	85	3,200	23	8,600	10.1	115	1,160	(1,840)
Mideast	173	1,200	23	2,061	11.9	267	3,180	(300)
Pakistan	115	4,400	16	1,250	10.9	187	2,030	(5,750)
Philippines	60	4,600	60	400	6.7	85	570	1,000
South America	112	1,200	32	1,200	10.7	156	1,660	(4,000)
South Korea	43	1,000	21	404	9.4	61	573	(1,200)
Taiwan	20	2,100	18	384	19.2	25	480	(500)
Thailand	54	700	40	227	4.2	68	285	0
United States	246	42,000	21	7,000	28.5	279	7,940	4,000
USSR	284	12,000	28	3,650	12.9	315	4,060	(2,500)

^a Assumes 34% oil yield in crushing operations.

topic involved the use of expanders, especially when followed by solvent extraction. Use of expanders can reduce oil residual in solvent-extracted meal by 500 ppm. Panel members said maintenance and repair costs on expellers and extruders are lowered because of less wear in expander-solvent extraction operations. One respondent mentioned that for those who might want to use extruders without solvent extractions, there is a new piece of equipment involving the use of a cage screw press in tandem with an extractor that may be of value.

Several questions on *trans* fatty acids were raised during the nutrition discussion, but the conclusion was that problems might occur only in situations of high *trans* intake combined with insufficient essential fatty acid intake, a condition which is not expected to occur in current Western diets. Someone raised the question of what might happen in other countries where ghee is a fat staple, but

a registrant from South Asia noted that ghee intake was not high enough for *trans* content to be a problem and, in any case, sufficient offsetting EFA are provided from invisible fats.

While the plenary sessions, poster sessions, discussion sessions and exhibits provided a "structured" environment for the exchange of information, the conference social events provided ample opportunity for one-to-one conversations. Lunch was served each day in the convention center, and attendees also could converse at a Monday evening reception in Maastricht's town hall, a Wednesday afternoon river cruise through locks on the Maas River, and a Thursday evening gala party that included varying types of music, including a local men's chorus singing in the provincial dialect. Numerous companies sponsored receptions during the week, including an Engelhard event in nearby Valkenberg where registrants could visit the caves created centuries

ago when stone was removed for building materials.

Some firms involved in oilseed processing arranged plant trips to their facilities for conference registrants before or after the meeting. The Engelhard Corporation, a major international supplier of catalysts, invited approximately three dozen North American firms to have a representative participate in a "Commitment to Quality" visit at Engelhard's catalyst manufacturing and research facilities in DeMeern, The Netherlands, before the conference. Westfalia Separator of West Germany invited several Latin American fats and oils processors to visit its facilities after the conference. The Maastricht meeting was the first European-based world conference organized by AOCS with simultaneous translation of presentations into Spanish. Organizers said there was an appreciable increase in registrants from Spanish-speaking nations compared to previous processing world conferences held in Europe.



Yin and Yang of international trade

Dennis B. Sharpe, staff vice president for the American Soybean Association, discusses how politics and economics interact to affect international fats and oils trade in this abridgement of his presentation to the World Conference on Edible Oils and Fats Processing—Basic Principles and Modern Practices. Among the topics discussed are: changes in the industry; general world economic growth; new economic policies in Eastern Europe, Pakistan and Africa; the Uruguay Round of GATT; the effect of "self-sufficiency" policies, and the threat of consumerism to the industry.

Chinese philosophy and religion describe two principles, Yin and Yang. Yin embodies the dark side or negative forces while Yang connotes the bright side or positive forces. The Yin and Yang influence the destiny of creatures and things and so it is with the interaction of economics and politics that affects the destiny of the fats and oils industry and those involved in it.

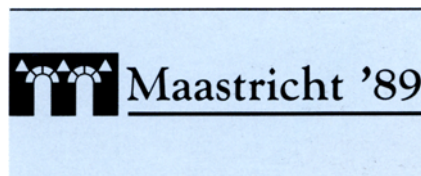
The Yin and Yang of world debt

The world market for fats and oils is far from being saturated (no pun intended). There are differences in consumption statistics depending on the source, but for measuring relative magnitude and direction of change, the U.S. Department of Agriculture's Foreign Agriculture Service (FAS) data series on 11 major vegetable and marine oils probably is one of the most reliable and readily available.

World per capita consumption of the 11 major vegetable and marine oils is only 10.4 kilograms annually, according to FAS data. In India, which in recent years has been the world's largest importer of vegetable oils, per capita consumption is estimated at just under 6 kilograms annually. In China, the most populous country in the world, per capita consumption is estimated at less than 5 kilograms annually.

In the higher income countries of Europe, Japan, and the United States, fats and oils consumption has been growing albeit at a slow rate. An exception is The Netherlands, a country with one of the

highest consumption rates—47 kilograms per person annually. In The Netherlands, consumption of the 11 major fats and oils has declined during the past five years at the



compound annual rate of about 2% per year (Table 1).

By contrast, in the United States the consumption has been increasing during the past five years at more than 2% per year, nearly double the rate of the preceding five-year interval.

TABLE 1

Is the Market for Fats & Oils Saturated? (No Pun Intended)

Country	1989 Consumption per capita (kg)	Compounded growth rate	
		1979-84	1984-89E
The Netherlands	47.2	.58	-2.1
U.S.A.	27.2	1.2	2.3
U.K.	24.0	3.5	2.8
Japan	16.4	2.6	3.1
World	10.4	2.5	2.3
India	5.9	3.1	-1.3
Pakistan	12.5	5.1	5.6
Bangladesh	4.3	8.4	9.8
Nigeria	7.2	-2.7	-2.3
Mexico	10.3	7.4	-2.0
China	4.7	12.2	8.0
U.S.S.R.	14.0	.85	3.1

Source: Foreign Agricultural Service, U.S. Department of Agriculture, 11 Vegetable & Marine Oils, 1989.

While the market may be growing slowly in the higher-income, economically mature countries, the real growth potential lies in the developing countries and the centrally planned or socialist countries. How the Yin and Yang of what is often termed "the World Debt Crises" plays out during the next several years will have a major impact on world fats and oils consumption.

The 1970s were years of commodity price inflation and unprecedented economic growth rates in many of the lesser developed nations. Many nations borrowed heavily on a premise that growth and inflation would continue. Then in the 1980s when petroleum and other commodity prices collapsed, interest rates soared, and suddenly the world was on the brink of international bankruptcy.

Mexico provides a case study on the damage the debt crises has done to potential fats and oils consumption. Prior to the mid-1980s, Mexico's consumption increased at a compound annual rate of more than 7%, implying a doubling of consumption every 10 years. In the

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most recent five years, Mexico's growth trend was reversed with per capita consumption declining at a 2% annual rate.

The Yin, or dark side, of the world debt crises may be on the wane. The Yang of the debt crises, namely repayment or forgiveness of the debt and resumption of more rapid economic growth, may be gaining influence.

Lending more money to debt-laden countries as characterized by the Baker Plan, named after former U.S. Treasurer James Baker, is not the solution. New U.S. Treasurer Nicolas Brady has proposed a plan whereby developing countries will be provided an outright reduction in their debt servicing obligations, primarily through cutting interest rates on their debt. Some U.S. government officials have even advocated swapping debt in return for conservation of the rain forest in Brazil.

The debt crises and resultant slower demand growth contributed to cutthroat competition in world trade for agricultural commodities including vegetable oils. Most businessmen will recognize the worst competitor to have is a competitor on the brink of bankruptcy.

Positive forces are now at work toward resolution of this economic and political issue that has severely affected consumption in major regions of the world. With resolution of the world debt crises, future fats and oils consumption may be expected to get back on a significantly faster growth track than in the recent past. Competition in world trade will remain keen, but a faster-growing market and fewer financial pressures should lessen its ferocity.

The Yin and Yang of ideologies

The Yin and Yang of the conflicting ideologies of Central Planning (Communism) versus Capitalism may be the most important issues involving the economics and politics of world markets. A huge market potential for all kinds of goods and services resides in the major centrally planned economies, such as the Soviet Union and China. While events in China may have

resulted in temporary setbacks, the positive forces of Capitalism that allow private ownership, individual decision-making, price competition, and even profit incentive are gaining more influence in heretofore centrally planned or Communist countries. This is good for the economic vitality of these countries and for the world.

The American Soybean Association has identified the Soviet Union as the most important single

world supply of soybean oil since each metric ton of soybeans processed yields more than 180 kg of oil. If the Soviet potential was realized fully, an additional 2.5 million metric tons of soybean oil would be produced. That is equal to 16% of current world consumption of soybean oil and would be enough oil to allow for a two-thirds increase in Soviet per capita consumption. Clearly, Premier Gorbachev's "perestroika" policies to

Positive forces are now at work toward resolution of this economic and political issue (world debt) . . .

country market in terms of growth potential for oilseed products, namely soybean oil and meal. U.S. and Soviet animal nutritionists indicate it would require 11 million metric tons of soybean meal to raise feed protein content in the U.S.S.R. to U.S. levels and maximize production efficiency. If realized, this soybean meal demand would equate to nearly 14 million metric tons of soybeans, the equivalent of more than 25% of the U.S. soybean crop in a normal year.

The Soviet potential is driven by protein demand, but the Soviets also have a substantial latent demand for vegetable oil. Annual per capita consumption in the U.S.S.R. is only about one-half that of the U.S. If the Soviet protein demand potential is only partially realized over the next 5-10 years, it could substantially alter the price and availability of soybean oil relative to other competing fats and oils. All the Soviet potential most certainly will not accrue solely to soybeans and/or soybean meal. But, because of the soybean's high protein content relative to other oilseeds and favorable characteristics of soybean meal as a protein source, soybeans are likely to capture the largest share of potential Soviet demand.

It follows then, that the Soviet protein demand will increase the

increase the quantity and quality of food available to Soviet citizens could mean the world is moving in the direction of more margarine and less missiles.

The Yin and Yang of self-sufficiency vs comparative advantage

In December 1987 the United States and other members of the General Agreement on Tariffs and Trade (GATT) began the 6th series of Multilateral Trade Negotiations (MTN) aimed at reducing barriers to international trade in goods and services, including agricultural commodities. Begun in Punta del Este, Uruguay, the negotiations are known as the Uruguay Round and are scheduled to be completed in December 1990.

The U.S. has made agricultural trade reform its major focus during the Uruguay Round in an attempt to bring about a major reduction in trade barriers and subsidies. The U.S. objective is to create an international agreement providing for the phase-out of all trade-distorting agricultural trade barriers and subsidies by the end of the century. The goal, as described by one analyst, is a worldwide "subsidy meltdown." The only allowable subsidies under the U.S. proposal would be decoupled income support payments made to farmers that are not linked in any

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way to commodity prices or production.

The U.S. proposal is based on the theory that in the absence of trade-distorting barriers and subsidies, world agricultural trade would increase sharply to the benefit of competitive producers such as those in the United States. No longer would farmers grow crops in response to government subsidies. Rather, farmers would produce in response to market signals. Each country would produce those crops for which it had a comparative advantage.

The principle of comparative advantage is the "Yang" of international economics and trade. In current U.S. business jargon, comparative advantage is a "Win-Win" situation. Simply stated it means each country would produce those products and/or services for which it has the greatest relative economic efficiency. It would export, or trade, its surplus of those domestically produced products and import its other needs from countries that have a relative comparative advantage in the imported products. In theory, consumers in all countries would be better off with comparative advantage.

The "Yin" of economics and world trade is the principle of self-sufficiency. The concept that a nation should not be dependent on other nations for its stable food supply is a powerful emotional and political issue. The socio-political concept of self-sufficiency directly conflicts with the economic principle of comparative advantage. Subsidies, quotas and other trade barriers are promulgated in the name of self-sufficiency. In recent years the influence of Yin (self-sufficiency) has been gaining momentum. The OECD countries comprised of Australia, Canada, the European community, Japan and the United States spent the equivalent of \$157 billion in 1988 on agricultural subsidies, more than double the level of 10 years ago.

Self-sufficiency can have some strange and nasty consequences besides the obvious cost to the world's taxpayer and consumers. We need not look outside our own fats and

oils community to observe some of these strange consequences. For example, U.S. soybean farmers through the American Soybean Association (ASA) are suing their best customer, the European Economic Community (EC). ASA's 301 complaint filed through the GATT seeks damages resulting from EC subsidy programs. These programs are designed to achieve self-sufficiency in oilseed (protein feed) production. By supporting European

farm prices for rapeseed, sunflowers and soybeans at three to four times the world price, and paying their domestic processors the difference between domestic and imported oilseed prices, the EC has tripled its oilseed production since 1981. In terms of self-sufficiency the EC has been a huge success. In 1981 less than 6% of EC protein meal consumption was homegrown. In 1988, self-sufficiency reached 18% as shown in Figure 1. In terms

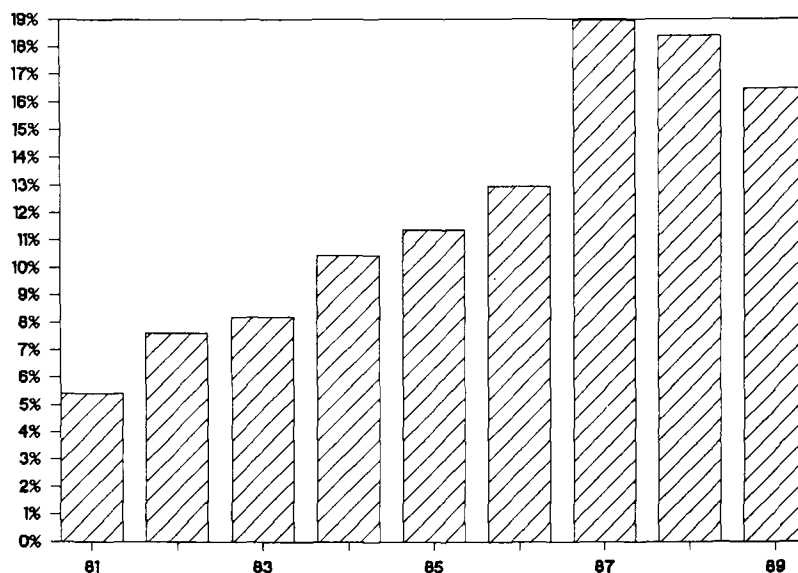


FIG. 1. EC self-sufficiency in protein meal consumption.

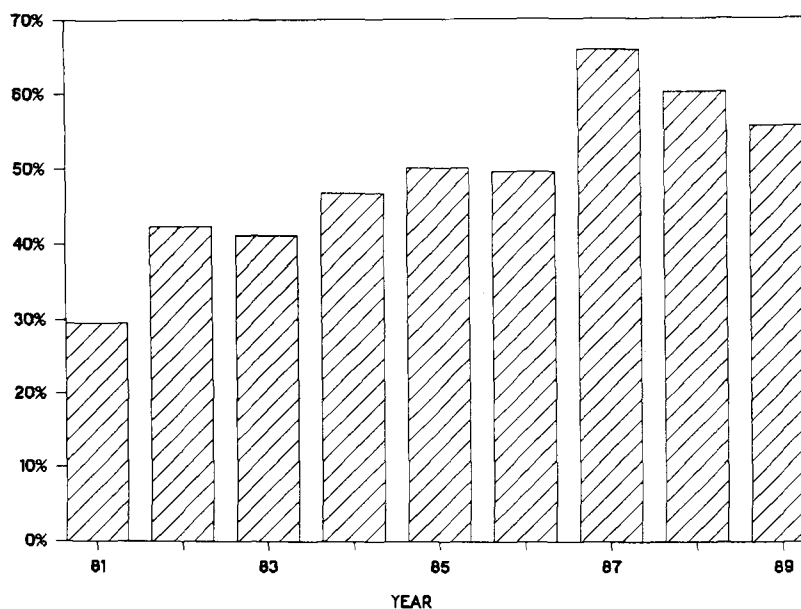


FIG. 2. EC self-sufficiency in vegetable oil consumption.

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of vegetable oil consumption, the EC went from less than 30% self-sufficient in 1981, to almost 60% self-sufficient in 1988 (Fig. 2). In addition to suing the EC through the GATT process, the United States has retaliated with its own vegetable oil export subsidies targeted at EC export markets through its federally funded Export Enhancement Program.

At this juncture, further explanation of the consequences of the EC's self-sufficiency policies for oilseeds and the U.S. retaliatory actions (EEP) becomes even more tenuous and difficult. For example, why was Argentine soybean oil imported into the U.S. when surplus stocks of domestic soybean oil were at record high levels? Suffice it to say that just as comparative advantage may be characterized as a "Win-Win" situation, self-

sufficiency may be characterized as a "Lose-Lose" situation.

The final outcome of the GATT negotiations will have a profound effect on the world fats and oils complex. It is doubtful that a total subsidy meltdown will be achieved. But if negotiators can reach agreement to substantially reduce price distorting subsidies and barriers to trade, then world economic growth, the most fundamental engine driving demand for fats and oils, will shift from the low gear of the 1980s into a higher, more prosperous gear in the 1990s.

The Yin and Yang of consumerism vs productivity

The last Yin and Yang involves a special challenge to the scientists of the world, including members of AOCS. Growing concerns by consumer and public interest groups

threaten the credibility of scientists and the productivity of agriculture. An example of this is a phenomenon called chemophobia, the fear of chemicals, specifically in food and drinking water.

The exaggerated response of the public and news media to the discovery of miniscule amounts of the chemical in a small proportion of the apple juice sold in the U.S. epitomizes consumer chemophobia. Despite assurances by the scientists at the federal Environmental Protection Agency (EPA), sales of apples and apple juice plummeted following the media coverage of the discovery. Fats and oils are primarily consumed as human food. It doesn't take much imagination to conceive a scenario where chemophobia could affect fats and oils consumption.

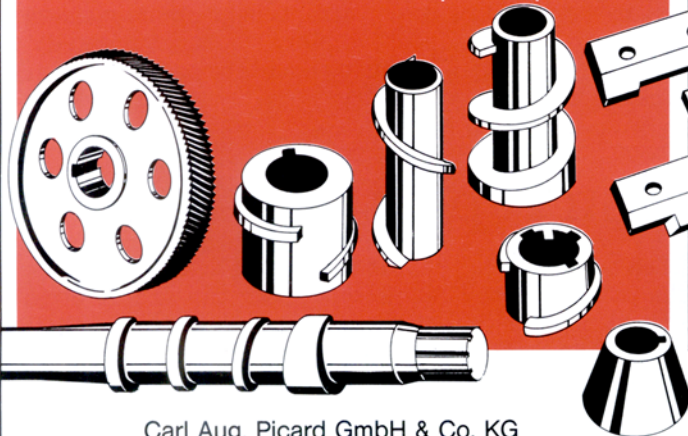
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food safety issue gaining momentum in the U.S. and Europe. The food safety issue impact on agricultural productivity and the future of fats and oils consumption may be illustrated by the issue of growth hormones in livestock production. Porcine somatotropin (PST), a growth hormone genetically engineered by several major corporations, including St. Louis-based Monsanto Company, could lead to a substantial increase in world protein food demand.

According to Kansas State University feeding experiments, swine treated with PST grow faster, use less feed per kg of gain, and produce meat with 50% less fat and 5% to 25% more protein. The catch is to maximize the potential benefits of PST: the percentage of protein in the ration should be increased by 6 to 8 points. For example, a nontreated pig might be fed a ration with 12 to 14% crude protein, whereas a PST-treated pig would be fed a ration of 20% or more crude protein. Assuming that the protein in the ration is supplied almost entirely by corn and 44% soybean meal, one could conclude then the PST-treated pig would consume upward of 30%, perhaps 50%, more soybean meal than the nontreated pig during feeding to slaughter.

Not only does PST result in more protein feed per pig, but the improvement in quality of the meat (less fat, more protein) would make pork more in tune with consumer trends toward a "healthier" diet. In short, PST could result in a shift in consumer preferences favoring increased consumption of pork. There would be a double impact on protein consumption through more pigs consuming more protein per animal unit.

Since the bulk of the increased protein feed demand likely would be supplied by soybeans, farmers and others involved in the soybean industry have a big stake in widespread adoption of the new PST technology by the world pork industry. As observed earlier in the discussion of the Soviet protein demand, processing more soybeans to meet growing protein feed de-

mand also means increased supplies of soybean oil at ratio of 1 kg of soybean oil produced for every 4.4 kg of protein meal. The net result of PST on the fats and oils complex likely would be to foster a competitive advantage for soybean oil in terms of availability and price.

Consumerism rather than science is likely to be the biggest obstacle to the commercialization of PST. The experience with the growth hormone for dairy cows called bovine somatotropin (BST) is not encouraging. This past August, several major U.S. retail food store chains announced they would not accept milk from cows treated with BST. The case for PST may be helped some since, unlike BST, it should have farmer support. In the case of BST, dairy farmers fear that hormone-induced production increases will aggravate an already existing surplus supply condition. The consumer, too, may be more receptive since BST only increases the efficiency of the cow for producing more milk, while PST makes pork a healthier, more nutritious product.

All this notwithstanding, the food safety syndrome is likely to prove a major obstacle to PST. Will food processors and retailers shun PST? Scientists say PST absolutely poses no threat to persons consuming meat from PST-treated swine. It is a naturally occurring protein hormone that is neutralized in the digestive process of the pig. And, it is species specific. PST would only have an effect on pigs.

The challenge to scientists throughout agriculture and the food industry is to effectively and aggressively communicate the posi-

tive aspects of technology-driven productivity rather than taking defensive attitudes toward the negative tide of consumerism that is driven by fear and ignorance. A great American corporation once proudly proclaimed as its slogan—"Better Things for Better Living Through Chemistry." In recent years the company has dropped "Through Chemistry" and simply says "Better Things for Better Living." This is symptomatic of a trend in the industry to refrain from use of the "C" word. It is time to get back to being proud rather than paranoid about our science, our industry and our products.

The American Soybean Association (ASA) recently has launched a positive information and education strategy for domestic soybean oil marketing. This past summer ASA introduced the SoyMark that will be used as the symbol for promoting soybean oil to U.S. consumers as a healthy, nutritious ingredient in many of the foods they eat. To date, more than 20 food manufacturers have adopted the SoyMark for their labels.

In addition, an industrial Soy-Seal trademark has been introduced for use in promoting nonfood uses of soybean oil, such as printing ink. Some 36 companies consisting of printers, newspapers and farm suppliers have signed up to use the seal.

U.S. soybean farmers are proud of their product and they want to show it. It is time scientists, such as members of AOCS, show their pride too and help communicate a positive story about productivity, technology, and the products of our industry.

Exposition report

Fifty companies filled nearly 80 exhibit booths in the exposition accompanying the world conference in Maastricht, providing registrants with access to top technical experts and the latest in equipment and supplies for virtually all phases of fats and oils industrial processing.

If there was a trend among the exhibits, it was the proliferation of products and services aimed at specific markets in the fats and oils industry, especially processing of palm oil (physical refining or fractionation) and related materials. Catalyst and bleaching material suppliers highlighted products tailored

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for fish oil and rapeseed oil. Energy conservation, reducing potential environmental pollution and further automation to reduce personnel costs are prime concerns for many customers, exhibitors said. Worker exposure to chemicals is becoming an issue as well, some exhibitors said, especially as industrial nations implement rules regarding workers' exposure to specific types of materials.

Engineering/plant builders/ processing equipment

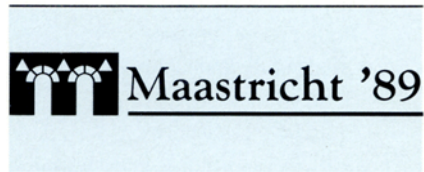
Engineering, plant building and processing equipment firms constituted a majority of exhibitors. From preparation to product formulation, virtually all unit processes could be studied in detail in the exhibit hall. Consolidation which has occurred among oilseed processors also has occurred among equipment manufacturers. The exposition marked the first AOCS meeting for the newly combined De Smet Rosedowns Ltd. organization, which has merged two of the best-known international names in oilseed processing equipment. An elaborate display attracted registrants to learn about the new Sterling Screw Press from the firms, the Compress computer control system for pressing operations and a new extractor incorporating reduced maintenance requirements. This was the first AOCS world conference with the C.M.B. Bernardini organization participating as part of the Ballestra group, a consolidation that occurred before the De Smet Rosedowns merger. Bernardini now can supply complete plants for oilseeds, oils and fat processing as well as the detergent and oleochemical plants with which its name has been linked in the past.

The emphasis was on energy savings at displays by Atlas Industries A/S; Lurgi GmbH; Buhler Brothers Ltd.; Roskamp Division, CPM; and Votator Division, Cherry-Burrell Corporation.

Atlas Industries said its dry condensing vacuum system for vapor removal is among processes attracting attention for energy savings as well as reduced environmental pollution. The system uses

a vapor-trap and de-icing systems with noncondensable gases removed with a mechanical vacuum pumping system. Recent installations at oil processing units have been in Denmark, Germany, Japan and Sweden.

Lurgi representative said the firm's customers' major concerns at present are to increase capacity, modernize their facilities and reduce energy consumption. The net result is that more facilities are looking at improved heat exchanger systems as well as improved process control systems that will permit plants to reduce labor force with-



out sacrificing production. One of Lurgi's latest projects is a palm oil refinery in Indonesia, company representatives said, with a 1000 metric ton per day capacity.

Buhler Brothers, specialists in oilseed preparation for extraction, was telling registrants about how its "popping" system for conditioning soybeans permits high yield of white flake soy protein for use in food products with a relatively high PDI. Buhler says the system requires 20% less energy than conventional hot dehulling systems and permits a similar savings in steam consumption. The new system is being used or is planned for companies in Brazil, Switzerland and Italy. During the next year, Buhler says it plans to further improve its product range by introducing a new seed cracker, a new system for sunflowerseed dehulling and a continuous on-line analyzer system.

Roskamp Div., CPM, was emphasizing its redesigned cracking mill, designed to operate fully automatically, including the roll gap. The entire set-up requires 50% to 60% less energy than previous systems, and incorporates a roll adjustment mechanism using a jack screw, rather than a manual screw, with simultaneous adjustment of

both ends of the roll. The grinders are designed to handle only material that is too large for specifications; material that meets size specifications passes through without being further ground. The net result, Roskamp representatives said, is less dust, no damage to the properly sized material, and less friction in the operating system.

Votator has announced new energy recovery concepts in semi-continuous deodorization and environmental improvements in the design of vacuum systems for deodorization. For continuous margarine production systems, Votator now has a new remelt feature using a scraped surface heat exchanger designed to provide equipment savings and operating simplicity.

The booth for Crown Iron Works Company and its Wurster and Sanger Division provided data on Crown's new Model IV solvent extractor for liquid/solid extrusion of very fine material, permitting continuous extraction of material that previously required batch extraction. A Mexican company will be the first commercial user of the new extractor, while another is in use at the pilot plant facility at Texas A&M University. Crown also provided information on a new canola oil winterization process designed to produce better quality oil as well as to improve yield.

Also announcing a new extractor was H.L.S. Ltd., promoting its new stainless steel shallow bed extractor and a desolventizer/toaster of improved design. The desolventizer/toaster design has been used for a 2,200 ton per day unit in the United States. The unit has less energy consumption and less steam demand as well as providing lower hexane retention, and is especially desirable for rapeseed processing, company representatives said. During the past year, H.L.S. has installed two units that are now operational in China, one is at installation stage in Taiwan and another is under construction in Nigeria.

French Oil Mill Machinery Co. reported continued worldwide interest in its Enhanser Press, an extruder-expander. French will pro-

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vide extraction equipment for a new plant scheduled to be built in Mexico during 1990. In a separate project in Mexico, French converted a 1,000 ton per day soybean plant to a 1,200 ton per day canola facility. Asia, including the Philippines, is among other parts of the world where French reports interest in its extruder. The Enhanser also is now available with a drainage cage for high oil content seeds. Like other extruders, the Enhanser is designed to increase throughput.

Another company promoting use of extruders was Amandus

tem is aimed at least partially at processing palm oil. During the coming year, Krupp expects to introduce the Krupp Hydropress for filtration with pressure of 25 to 120 bar. It will be designed for automated handling of crystallized palm and palm kernel oil suspensions, with direct application in the Statofrac process for producing specialty fats.

Westfalia unveiled its new degumming and refining centrifuge which processes at least 60,000 pounds an hour. The first unit has been installed in Brazil; another is

only physical parameter not affected by other parameters such as density, pressure, temperature, viscosity or conductivity.

Three filtration equipment manufacturers participated in the exposition. Amafilter B.V. reported anticipated increased demand for its equipment for processing sunflowerseed products and rapeseed products in North Africa.

Amafilter showed latest developments in its pressure leaf filter, vacuum filters and other equipment.

Eberhard Hoesch and Sohne's latest filter press utilizes a plate shifting device designed to reduce downtime in filtration operations, thus increasing the volume of material that can be processed through the batch process in a given time. "Dead" time is reduced from 10 minutes to about three minutes, a company representative said, reducing total time for each batch to about 25 minutes from more than 30 minutes. Two units have been contracted for by palm oil plants in Malaysia. Two cod liver oil facilities using the firm's system in Iceland realized a 35% higher throughput of product, Hoesch representatives said.

L.F.C. Lochem B.V. emphasized heel avoidance and heel recovery in filtration systems. Of particular interest was information on use in winterization for sunflowers, rapeseed and corn (maize) products. Lochem also stressed computer control systems for filtration operations.

Carl Aug. Picard GmbH & Co. KG, and Egon Keller GmbH & Co., manufacturers of spare parts for screw presses and similar equipment, displayed hard-faced parts made with new composition materials to reduce friction and thermal wear. Representatives said the new parts had lasted a year in a press that previously had been replacing parts every three months.

Suppliers

For suppliers, the emphasis in the exhibit definitely was on new specialty products—items that are designed for specific tasks or specific products. Engelhard DeMeern

Energy saving devices, extruders featured

Kahl Nachf., whose representatives were busy discussing the firm's annular gap expander that can be used to increase throughput of extraction systems or, for plants whose capacity is adequate to current demand, to reduce production costs without varying plant output. Precision adjustment was among features emphasized by Kahl.

For pre-extraction handling, Sulzer-Escher Wyss GmbH, which introduced its fluidbed technology at the 1982 world conference in The Hague, primarily discussed further improvements on that system, and the use of fluidbed technology for processing low temperature fish meal. The latter technology is installed in Norway.

SKET VEB provides a full line of oilseed processing equipment, but focused attention at the conference on a new, compact dehuller involving separation of hulls and kernels by using a high electrical field.

Refining equipment manufacturers had several new ideas for registrants to consider. Krupp Maschinenteknik GmbH promoted its Statofrac system for production of specialty/confectionery fats by dry crystallization. The sys-

tem is aimed at least partially at processing palm oil. During the coming year, Krupp expects to introduce the Krupp Hydropress for filtration with pressure of 25 to 120 bar. It will be designed for automated handling of crystallized palm and palm kernel oil suspensions, with direct application in the Statofrac process for producing specialty fats.

Extraktionstechnik GmbH featured a low temperature condensation (LTC) system for use at physical refining units as a method to provide better vacuum, to lower steam consumption and to reduce effluent. The firm also highlighted its digital control system (DCS) engineering for extraction and refinery operations. The firm is developing a meal dryer-cooler with closed air circuitry to provide energy self-sufficiency in that process.

For overall refinery operations, Alfa-Laval representatives introduced its Alfa-Yield II loss-monitoring system to conference attendees. The system uses two Coriolis-type flow meters to calculate direct mass of ingoing and outgoing oil. Alfa-Laval representatives noted the system has been field-tested for more than two years. The system measures mass as it is the

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B.V., Mallinckrodt GmbH, and Unichema International were discussing new catalysts designed specifically for rapeseed oil, fish oil, soybean oil or lauric oils.

Engelhard's Nysosel 325 is a new catalyst for highly selective hydrogenation of linolenic to linoleic and oleic, producing as little as possible stearin. Engelhard's Nysosel 222 has improved poison-resistant properties and is designed for use with fish oil and rapeseed. As fish oil is largely a by-product of fish meal, an increasing demand for fish meal will mean a rising demand for materials used in processing fish oils, Engelhard believes.

Activity and selectivity are key factors Mallinckrodt cited in describing uses for its Calsicat E-472D and E-428D catalysts. The E-472D is being promoted for soybean oil and rapeseed oil hydrogenation; E-428D is for use with fish oil, rapeseed oils and lauric oils. Catalyst use is increasing in Eastern Europe, Mallinckrodt representatives said. Increased processing of rapeseed oil in Poland for edible use is increasing catalyst consumption there.

Unichema spotlighted its Pricat 9910 nickel catalyst, designed for increased selectivity, reduced dosage, and increased activity in hydrogenation of fish oil and soybean oil. Unichema literature said filter aids are not needed with the new catalyst, which also permits reduced filtration time—more oil can be processed in a given time period. More product can be processed with smaller filter presses, Unichema representatives said.

Clarion 475, a new activated bleaching earth from American Colloid, is designed for special uses, permitting use of 66% less material to provide the same results as previous products. Higher nickel affinity permits the lower dosage, company literature said, providing "ultra-high efficiency on nickel clean-up in post hydrogenation bleaching."

Like other bleaching earth and catalyst producers, Sud Chemie has been developing specialized products to fit specific needs in the industry. Five months ago, the com-

pany began marketing bleaching earth from a new source in Indonesia which will have new applications as an optimized bleaching clay for niche markets. On the catalyst side, Sud Chemie's G95 series is now available worldwide and is especially designed for "rough" oils, including fish oil.

Laporte emphasized bleaching earths aimed at the rapeseed/canola processing industry as it displayed information on its work on the measurement and removal of phosphorus and chlorophyll from edible oils. The sequential use of

from rosemary, but noted that regulatory approval is needed to permit rosemary's use for its antioxidant properties.

ACI Industries Inc. was introducing its worldwide service of handling and processing spent catalyst. The spent catalyst material is collected worldwide and shipped to Japan for reprocessing to yield nickel oxide. The economic situation, including freight rates, is favorable at present, ACI representatives said. The firm said it has customers in South America, the Mideast, and Southeast Asia as

Catalyst producers aim at rapeseed, canola

specific adsorbents in processing rapeseed/canola was described. The firm said four potential new products are in testing for specialty markets. The first, with high phosphorus/pigment adsorbent capabilities, is expected to be introduced commercially during the first quarter of 1990.

Caffaro S.p.A. of Italy was introducing its Prolit AE bleaching earth aimed at use in processing olive and palm oils. Approximately 7% of Prolit AE has a particle size of more than 40 microns, while 51% is between 10 and 40 microns, and 20% is under 5 microns.

Grace's Trisyl and Trisyl 300 are synthetic silicas for use with bleaching earth to enhance the bleaching process by producing better quality oil. Increased interest from Italy for use in olive oil processing was reported by Grace GmbH representatives at the conference.

Jan Dekker International B.V. produces synthetic and natural antioxidants for all types of food products, but reports food processors are increasingly interested in being able to use antioxidants from "natural" sources for labeling purposes. The firm is working to develop increased use of antioxidants

well as North American and European markets.

Nash's Kinema Ejector System is a sequential vacuum deodorizing system designed to eliminate cooling tower and grease hot wells. The system replaces water treatment. It has been gaining interest among companies concerned with environmental controls, representatives said.

Damman-Croes and Oils and Fats Consulting representatives emphasized the firms' combined expertise in helping build new processing facilities around the world. The organization introduced the first falling film evaporator unit into Southeast Asia for processing palm oil, with other companies following that lead, representatives said. The firm reported increasing interest in Europe in using extruder-expander units to increase extraction plant throughput.

EMI Corporation is supplying the hydrogenation and deodorizing portions for a new confectionery fats plant being built for the Aarhus U.S.A. organization that will use palm kernel oil as a feedstock. The plant is scheduled to open by the end of the year in Port Newark, New Jersey. EMI also recently completed two projects in

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China as well as a corn oil refinery to produce cooking oils for Best Foods. EMI specializes in physical refining systems, edible protein processing, oil refineries and fatty acid production facilities.

Seitz Enzinger Noll Maschinenbau AG was a new exhibitor at AOCS world conferences, displaying information on its equipment for the food industry in cleaning, filling and crating bottled products. The firm has installed two complete bottling plants, handling 10,000 one-liter bottles or 13,000 half-liter bottles per hour, in Vene-

out sample preparation. Perstorp's representative said the U.S. Federal Grain Inspection Service has acquired the units. Production workers can feed samples into the instrument then keyboard instructions, with results automatically transmitted to a remote computer, providing an immediate result to quality control officials.

Bruker Spectrospin N.V. was introducing to U.S. participants its mini-spec NMR spectrometer for rapid analysis of oil and moisture. The system is designed to permit production workers to insert mate-

Rancimat analytical equipment from Metrohm.

Tintometer's new Colorscan unit can provide results in all major color scales, including Hazen, Gardner, and the international CIE scale. The unit's menu-driven program permits the operator to choose which scale should be used, including the full CIE x-y parameters.

Sanki Engineering was one of the unique booths in that the company's production is measured in kilograms per hour, not tons per day. The firm's centrifugal partition chromatograph is used to extract and purify lipids for laboratory and industrial use, with EPA and DHA being the lipids receiving the most interest at present. The system does not use solid packing so there is no loss of material and no oxidation. More than 130 systems are in use in the U.S. and Japan with industrial scale units planned in Japan and Europe.

New automated analytical equipment displayed

zuela for edible oil packaging in plastic bottles.

Still Otto GmbH became a new name in the international fats and oils arena this year when ATT-Verfahrenstechnik GmbH was integrated into Still Otto. The addition of Hermann Stage, principal of the ATT organization, to Still Otto moved the firm, previously known for engineering and construction of coke and coal plants, into the chemical, oleochemical and food-stuff industry.

POS Pilot Plant, a government-industry-academic research facility in Saskatoon, Saskatchewan, Canada, reported increasing volume of contract research with clients from throughout Europe, the U.S. and as far away as China and Pakistan. The facility is equipped to perform research on a bench or pilot scale.

Instrumentation

The emphasis was on increasingly automated analytical instruments that save time and permit production workers to perform routine analytical procedures.

Perstorp Analytical B.V. was displaying Tecator's Infratec whole grain analyzer, which uses near infrared transmittance to determine oil, protein, moisture and fiber with-

rials and key-in commands, thus saving analytical staff time and costs. Bruker was among companies participating in a discussion of a collaborative test to determine how to calibrate analytical instruments made by various companies so that results can be compared accurately.

Oxford Analytical Instruments Ltd. representatives said its NMR 4000 unit for oil and fat content analysis appears to be of increasing interest in Spain and Portugal where concern for employee safety has led companies to look for analytical techniques that do not involve use of solvents. In addition, snack food companies that are being required to label products for specific fat content are interested in the unit as a relatively simple, quick way to provide analysis.

Applikon Dependable Instruments B.V. discussed its new on-line processing analyzers for determining free fatty acids, peroxides and other oil quality control parameters. Units have been installed by Cargill and Unilever, company representatives said. The firm hopes to introduce within the next 12 months a low-cost on-line Applikon process analyzer for determining FFA. Applikon also offers

Oleochemical, soap, detergent equipment

Mazzoni's FAG 09 plant is a falling film distillation system designed to produce a high quality odorless and colorless refined fatty acid. Fatty acid entrainment is avoided by withdrawing refined fatty acid from the still as a liquid side-stream, permitting effluent steam to be cooled as low as 70°C in the upper cooling section. Refined fatty acid yield is 94% by weight, with light ends about 2% and bottom residues and losses 3% and overhead vapors from the dryer and degasifier about 1%, company representatives said.

Impianti Macchine Saponi Affini SRL (I.M.S.A.) was exhibiting the widest available soap stamping machine with multi-cavity capability, which the firm said would permit high production capacity with minimum capital and labor investment. The 650 mm cavity permits stamping of more bars per stroke than does current equipment, thus requiring fewer strokes per minute and resulting in less wear and friction. One unit has been installed in France and another is planned in the United States. I.M.S.A. says

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it hopes during the next year to provide new cutters and reworking systems to further speed production. Even a soap production equipment company finds potential clients at an edible oil conference as edible oil and soap often are produced by the same companies throughout some parts of the world.

Miscellaneous

The American Soybean Association (ASA) and the Palm Oil Research Institute of Malaysia (PORIM) were the only two commodity-oriented associations at the exposition. ASA's representatives from Europe said the organization is putting increasing emphasis on soybean oil identification in consumer products in Europe. Product use gradually is being expanded in England, and in Greece five companies are now using the soy oil sign on their products. Use of soy oil in printing inks has proceeded rapidly in Europe, as it has in the United States, particularly for color inks. Present ratio of soy-based printing inks to petroleum-based product is 40:60, but could be 60:40 within a relatively short time, ASA staffer Roger Leysen said. Increasing emphasis on safety in the workplace among Europeans may

mean petro-based inks will have to carry a toxic symbol, which may mean workers' organizations will seek to expand use of the soy-based inks that will not bear the warning symbol. Leysen said that while soy ink costs more at present, about 20% less ink is required in some applications.

PORIM representatives provided information on all types of uses for palm oil, but were stressing studies emphasizing research on the nutritional properties of palm oil. About a month before the Maastricht meeting, an international conference was held in Kuala Lumpur emphasizing nutritional studies. Among papers presented was one by K.C. Hayes of Brandeis University on a project that fed five diets to three species of monkeys. Hayes concluded that the diets dominated by 12:0 and 14:0 triglycerides promoted increases in total cholesterol more than diets with 16:0 triglycerides.

Callanish Ltd. was the only exhibitor showing a consumer product. The 2.5-year-old Scottish firm produces omega-6 and omega-3 dietary supplement capsules, and has seen its business grow to £4 million. The capsules are produced via a physical process on the Isle of

Lewis, with the product available in British pharmacies within 48 hours of the fish catch. During the coming year, Callanish expects to produce high purity omega-3 and omega-6 fatty acids from marine fish body oils and plant seed oils through a novel nonthermal processing technique. The materials are expected to be of special interest to research, with native *cis* formation and concentration of up to 99% EPA and 99% GLA. Also expected to be introduced is a unique range of triglyceride concentrates with 40% GLA or 40% EPA.

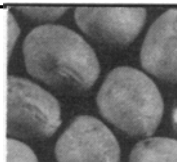
Hewin International Inc. provides market studies involved with fats, oils and related materials on a wide range of topics of interest to industries. Among the newest studies available are reports on the impact of biotechnology to the oils and fats industry, biotechnology in surfactant production, and a report on nitrogen-bearing surfactants in Western Europe, North America and Japan. Future releases will include reports on biotechnology applications on raw materials, processing and end products, fatty amines, waxes, surfactants, agricultural surfactants, detergent builders and others.

Handbook of Soy Oil Processing and Utilization

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