

## HEALTH & NUTRITION

### Fate of cholesterol and omega-3 fatty acids

W.W. Nawar of the University of Massachusetts at Amherst, general chairman for the symposium, spoke on the fate of cholesterol and omega-3 fatty acids during deep-fat frying. Nawar said there are many questions still unanswered. For instance, what happens to cholesterol and omega-3 fatty acids during processing, particularly frying? Are they lost or converted to good or bad products?

His conclusions were that both cholesterol and omega-3 fatty acid can oxidize readily and catastrophically—but not always.

Noting there are at least 60 oxidation products, Nawar pointed out cholesterol oxides are more toxic than cholesterol. Complicating any analysis, he said, are the facts that "analytical methods for cholesterol are very bad, and for cholesterol oxides, they are much worse."

"Fractionation of the many oxides is very complicated, and quantitation is nasty. We have spent two years solely on improving the analysis. And, what you can do with cholesterol in a test tube is completely different from cholesterol in food. In food, we have a complex situation. Some factors

speed up oxidation, others slow it down. Therefore, we cannot generalize what will happen."

Because omega-3 FA are long-chain, "there are many possibilities where it could break down due to oxygen attack and cause many oxides, some toxic and some not," Nawar said. One product that can be formed is malonaldehyde, which can link with chains of peptides and bind with essential fatty acids.

### Medium-chain triglycerides and structured lipids

John Cunningham, also of the University of Massachusetts, spoke on the metabolism of medium-chain triglycerides (MCT) and structured lipids as alternative energy sources for humans.

Despite their high saturation, MCT are liquid at room temperature; they also are highly water-soluble and are neutralized at high pH. Cunningham said MCT "are ideal for certain diseases that result in lipid malabsorption because MCT don't involve pancreatic lipase." Many MCT are commercially available as enteral formulations and as infant formulas for premature infants; the latter include MCT as 40% of the lipid content. Uses for MCT are:

- formulations for premature infants
- formulations for cystic fibrosis patients
- low-fat formulations
- specialized trauma formulations for burn patients

There is a definite advantage to using MCT in such formulations as they are absorbed by the intestinal cells and go directly to the liver, unlike long-chain triglycerides, which go to the tissues. "They act more like carbohydrates than lipids when they get to the liver. They also increase ketonic production, causing an insulin response; fats do not cause such an effect," he said.

However, because they go to the liver preferentially, MCT are not recommended for patients with liver disease. Also, he said, diarrhea and distention result after consuming too many MCT.

Structured lipids are a mixture of MCT and long-chain triglycerides and are used to manipulate calories and prostaglandins. Currently, structured lipids are used for medicinal purposes, particularly offering benefits for cystic fibrosis patients. Also, he said, modified dairy fat can be achieved by using 50% butter oil, 35% MCT and 15% sunflowerseed oil.

## FROM WASHINGTON

### ASA requests panel for trade petition

The American Soybean Association (ASA) has asked the European Economic Community (EEC) to permit the establishment of a panel that would rule on the validity of ASA's trade complaints against the EEC.

ASA filed a Section 301 Petition in December 1987, claiming that the EEC's oilseed and protein crop subsidies are unfair to U.S. soybean exporters. The soybean group claimed the EEC "had nullified and impaired its duty-free tariff bindings on soybeans and soy-

bean meal by offering lucrative subsidies to EEC farmers, processors and feed manufacturers." Those subsidies cost U.S. soybean farmers more than \$1.4 billion in annual sales, according to ASA.

The U.S. Trade Representative's (USTR) office on Jan. 5, 1988, agreed to act on ASA's petition; however, the office's initial consultations with the EEC failed to resolve the issue. The next stage—the establishment of a General Agreement on Tariffs and Trade panel to investigate the charges—requires the concurrence of the EEC, which still had not given approval as of late April. "The EEC has been unable to agree on the

terms of reference (or mandate) and the membership of the panel," according to A. Jane Bradley, associate general counsel in the USTR office.

"GATT consideration of our case could and should have been completed by now were it not for the EEC's foot-dragging. If the EEC does not allow ASA's case to go forward soon, the U.S. will be forced to retaliate against \$1.4 billion in EEC exports to the U.S. on July 5, 1989," ASA President James Lee Adams said.

Under a provision of the 1988 Omnibus Trade Act, the USTR will be required to evaluate actions on

## FROM WASHINGTON

Section 301 complaints 18 months after accepting the petition. The provision would allow the USTR to take unilateral action on ASA's 301 complaint on July 5, 1989, if the EEC continues to prevent the establishment of a panel. Bradley said, "At that time, we'll decide what action is appropriate. We can either act within 30 days or postpone action for six months if progress is being made." Traditionally, retaliatory measures have been in the form of increased duties on goods, but the U.S. also could restrict imports of goods and services or could accept financial compensation from the EEC, Bradley said.

Meanwhile, in April, GATT negotiators in Geneva agreed to negotiate "substantial progressive reductions" in agricultural supports over the long term.

## Dietary guidelines again under review


Members of the Dietary Guidelines Advisory Committee say the U.S. Department of Agriculture and the Department of Health and Human Services' dietary guidelines for Americans need to be revised substantially. The committee, which met in April, formed seven subcommittees to make guideline changes so that information from the National Research Council and Surgeon General's reports on diet and health could be included.

The committee discussed whether the guidelines should be quantified, especially in relation to fat and cholesterol intake, and whether consumers should be advised to keep track of blood pressure and cholesterol levels. Committee member C. Wayne Callaway of George Washington University also noted that the guideline suggesting that people maintain desirable weight emphasizes controlling food intake rather than increasing energy output. The committee is expected to meet again in August.

Meanwhile, a nutrition monitoring bill has been introduced into the U.S. House of Representatives

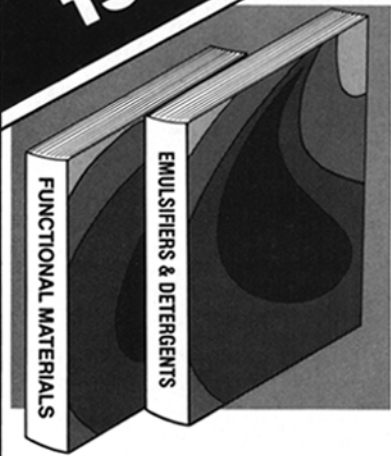
by Texas Democrat Kika de la Garza and Illinois Republican Edward R. Madigan. The Comprehensive National Nutrition Monitoring System Act is similar to legislation that was vetoed by former President Ronald Reagan. The new bill calls for the 10-year assessment

of the nation's eating habits and would focus particularly on the elderly, pregnant women, infants, children and the homeless. Details: *Food Chemical News*, April 10, 1989, pp. 60-62; *Food Institute*, April 1, 1989, pp. 10-11.



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**FROM WASHINGTON**


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## Fat substitutes pose feed problem

The National Renderers Association (NRA) has told the U.S. Food and Drug Administration (FDA) that approval of olestra and other fat substitutes could have an adverse effect on the livestock feeding and rendering industries.

The approval of fat substitutes in french frying and similar food preparation procedures could mean the livestock industry might lose a major source of low-cost feeding fat now used in high-energy feed for poultry, hogs, cattle and sheep, NRA said. The source of much of the fat used as feeding fat comes from fast-food restaurants.

In comments filed with FDA, NRA President Dean Specht con-

tended that even a "reasonable percentage" of olestra introduced into french fryer use "would sharply reduce the calories in feeding fat processed by renderers and make it worthless." He pointed out that there is no practical way to separate olestra from natural fats and oils. The chemical separation techniques available are too expensive for a livestock feed ingredient and would price it out of the market, Specht said. Details: *Food Chemical News*, April 3, 1989, pp. 23-24.

## Firm asks for OK for alternates

Loders Croklaan Inc. has asked the U.S. Food and Drug Administration (FDA) to allow the use of food-

grade stearic acid in the production of cocoa butter substitutes if the agency affirms that cocoa butter substitutes made from safflower and sunflowerseed oil are generally recognized as safe (GRAS). Fuji Oil Ltd. has petitioned for such affirmation.

Loders Croklaan wants FDA to permit "the use of food-grade stearic acid as an alternative to ethyl stearate as a feedstock and the use of acetone as a solvent in the fractional crystallization of 1,2-distearoyl-2-oleine (stet)." The company said it had developed a viable, safe process to produce a 1,3-distearoyl-2-oleine (stet) from food-grade stearic acid that is essentially the same as that produced from sunflowerseed oil. Details: *Food Chemical News*, April 3, 1989, pp. 44-45.

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**SAFETY**


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## Let's provide safe confined-space entry

*In the following article, Harold J. Sandvig explores the hazards of contained-space entry and suggests ways to avoid such hazards. Sandvig, who is vice president and corporate safety director for Cargill Inc., serves as Associate Editor for JAOCS News for Safety and Environmental Issues.*

In the fall of 1986, a captain and his mate died while inspecting a cargo of soybeans on a ship anchored off the coast of Spain. Last June, a seaman collapsed in the hold after being asked to inspect the condition of a cargo of beans as the vessel lay waiting to discharge at a Mediterranean port. A would-be rescuer also died. It didn't end there: two other people died when they attempted a rescue.

Inspecting a hold on a 46,000-ton cargo of soybeans may not sound like a confined-space topic. Or, is it? Each of the holds in these incidents contained 300,000 to 400,000 bushels of soybeans, not unlike the large steel storage bins used by a country grain operation or a soybean facility. We probably

wouldn't consider such large storage bins confined space either. But, why not? What is the definition of confined space?

I define confined space as any space or location with limited openings for entrance and exit which could have limited natural ventilation and an unfavorable air condition not intended for continuous employee occupancy.

A 60,000 deadweight ton (DWT) ocean-going vessel with large open hatches doesn't seem to meet the definition of confined space; neither does a 500,000 or 1 million bushel grain tank. Most of the time, that perception is correct. However, it isn't always. In the case of the four dead seamen, the ship had been enroute a long

time after loading in South America and had been anchored in the port for 24 days. Entrance for inspection was made through a manhole with the hatch closed; there was no forced ventilation of the type common in a large grain storage facility.

As a rule of thumb for safety, entry into a tank, vessel or other confined space without self-contained breathing apparatus (SCBA) is acceptable provided the work environment contains at least 19.5% oxygen. Although the hatches had been open for three to four hours on that ill-fated vessel, the ambient air in the hold was still only 16% oxygen. These people didn't die from toxic chemicals introduced through pesticides, herbicides or grain treatment; they suffocated because of insufficient oxygen, an unrecognized hazard.

Dozens of lives are lost and many more serious injuries occur annually because individuals enter