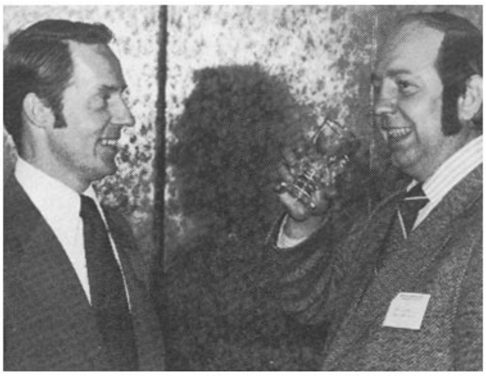
North Central Section's all-day symposium



Symposium photographer Frank Sasevich and Bob Sturms, both of Kraftco Corp.

Seven papers on various subjects were presented recently at the all day symposium sponsored by the North Central Section of AOCS. Approximately 65 members and guests attended the meeting, which was held in Northbrook, Ill.

Mike Chrysam of Kraftco served as program chairman and introduced the speakers.

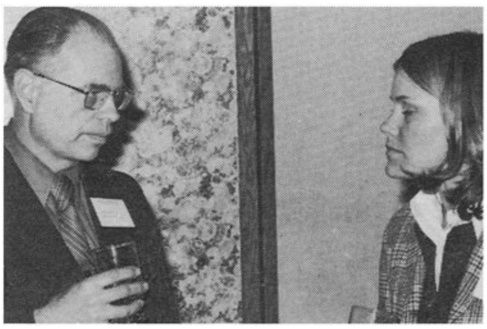
Summaries of six of the papers are published on the following pages. ■

From left in front, Dennis Tucker, Daniel Klaman, and Don McNeil, all of Lauhoff Grain Co. In back, Frank Del Valle, Glidden-Durkee, and Gene Snyder, Kraftco Corp.

Rexal Scholfield, Northern Regional Research Lab., and guest speaker S. Ramachandran, Applied Science Labs.

Guest speaker John J. Jonas, Kraftco Corp., and Lars Wiedermann, Swift and Co.

From left, Joseph Williams, Kraftco Corp., Bob Reiners, CPC International, and R.G. Krishnamurthy, Kraftco Corp.



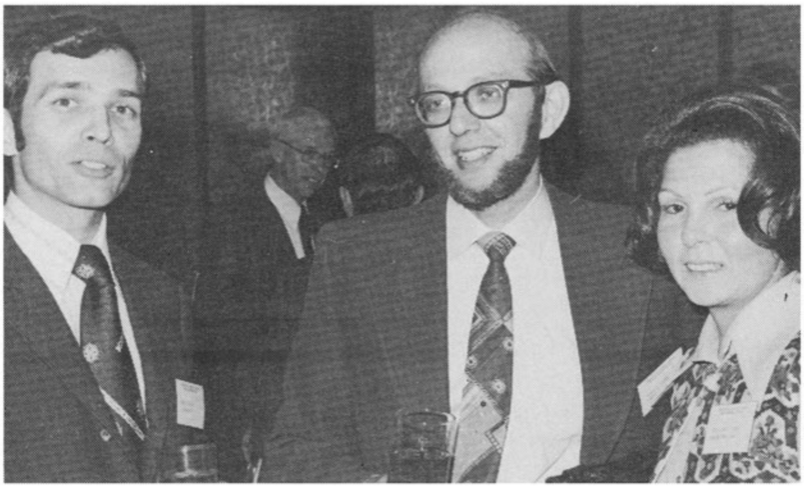
Guest speaker Harold Nielsen, Northern Regional Research Lab., and Nancy Schneider, G.D. Searle.

attracts 65 members and guests

Guest speaker John Teigler, Scholle Corp.

Program chairman Michael Chrysam and North Central Section President Louis Goodman, both of Kraftco Corp.

Guest speaker Edwin Meyer, Central Soya Co.



From left, Daniel Sullivan, Central Soya, guest speaker Gene Snyder, Kraftco Corp., and Mrs. Snyder.

Frank Del Valle, Glidden-Durkee, and V.C. Witte, Swift and Co.

From left, Bob Husch, Interstate Foods, and Bob Regutti, Lawrence Beauregard, and David Erickson, all of Swift and Co.

Summaries of six of seven papers presented on following pages.

The Use of High Pressure Liquid Chromatography in Lipid Analysis

PATRICK PEI, S. RAMACHANDRAN, and R. HENLY, Applied Science Laboratories

Of the many modes of liquid chromatography, reverse phase liquid-liquid partition and argentation silicic acid chromatography have been most often employed for the separation of polyunsaturated fatty acids. Now, with the introduction of high pressure reverse phase liquid chromatography, rapid separation of fatty acids, methyl esters, and triglycerides is accomplished. Various examples of such analysis, done on a chemically bonded reverse phase packing, were shown and discussed. Rapid separation of fatty acids differing in chain length and number of double bonds was analyzed in less than 10 minutes in most cases.

New Developments in Food Packaging

JOHN M. TIEGLER, Scholle Corporation

The Scholle Corp. developed the Bag-in-Box packaging concept some 18 years ago as an inexpensive means for packaging battery electrolyte. It became a highly successful packaging means over the years. Ca. 12 years ago, Scholle offered the Bag-in-Box system to the dairy industry, with the result that over 2000 dairies are using the package world-wide for the bulk packaging of milk and dairy products, virtually eliminating the metal milk can. Recently, this Bag-in-Box package was offered to other large bulk liquid users for products, such as vinegar, drinking water, syrups, wine, ketchup, etc. One area of major interest has been the edible oil field. Liquid oils are now packed primarily in 5 gal tins inside a corrugated box. In developing a bag to hold edible oils, it was necessary to use a combination of Polyethylene and Saranex (which is a barrier film). This barrier film greatly reduces oxygen permeation, product discoloration, and loss of flavor. The box developed for use with this bag is a 500 no. double wall corrugated box. When developing this package, it was noted that Scholle's package would have to be as strong as the package it was designed to replace. The package can be stacked 36/skid then stacked 3 skids high during storage, and can be shipped 2 skids high. The Bag-in-Box package offers numerous advantages to both the processor and the user. Advantages to the processor are: (A) reduced packaging costs, (B) lower filling costs, (C) increased warehouse storage, and (D) lower freight costs. Advantages to the end user are: (A) ease of opening, (B) ease of pouring, and (C) ease of disposing. All in all, the package offers many advantages over present methods of packaging; and Scholle looks forward to making significant advances into the edible oil field within the next year.

A New Polar GC Phase for Lipid Analysis

S. RAMACHANDRAN, Applied Science Laboratories

Two new highly polar liquid phases readily usable up to 250 C for gas chromatography are now commercially available. Marketed under the trade names SILAR-5CP and SILAR-10C, these phases exhibit separation characteristics similar to the polyesters, ethylene glycol adipate, and ethylene glycol succinate, respectively. Up until now, ethylene glycol adipate and ethylene glycol succinate have been the most polar, high temperature phases available, but their high temperature use has been limited to 200 C. The SILAR-5CP and 10C offer a good 50 C advantage over ethylene glycol adipate and ethylene glycol succinate in upper temperature limit. The selectivity of SILAR-5CP and 10C are compared to various polyesters and high temperature silicones by means of McReynolds constants and saturated-unsaturated-polyunsaturated fatty acid methyl ester separations. Practical applications for the SILAR phases, e.g. high speed fatty acid methyl ester analysis, saturated-unsaturated mono- and diglyceride analysis, were presented. Comparison of high temperature separations in areas, such as steroids and pesticides, on the SILAR phases and various silicones also were presented. During recent years, the upper temperature limit for gas chromatography has been increased gradually up to 300 C and higher with relatively nonpolar liquid phases. Selectivity is relatively limited at these temperatures. A fairly wide range of selectivity has been available at 250 C with various silicones, but the upper polarity range has been significantly lower than that available at 200 C. The SILAR-5CP and 10C represent the first breakthrough of 200 C barrier for high polarity phases.

Protein Isolates from Corn Germ and Oats

H.C. NIELSEN and **Y.V. WU**, Northern Regional Research Laboratory,[1]
Peoria, Illinois 61604

Proteins isolated from corn germ and oat groats, not only have a good balance of essential amino acids, but also have solubility, water binding, and emulsion stabilizing properties that indicate a potential for food uses. Germ from a corn dry-milling stream is flaked, deoiled with hexane, and ground to a meal that contains 23% protein (N x 6.25). The protein is solubilized by adding 10 volumes of 0.025 M sodium hydroxide (pH 8.7) and blending vigorously. After the residue is removed by centrifugation and reextracted with 5 volumes of water, the protein is precipitated from the combined extracts by adjusting to isoelectric pH (4.7). Finally, the protein is separated by centrifugation, washed with water, and freeze-dried. Protein yield is 46% protein in the starting material on a laboratory scale but is less on a pilot-plant scale. The isolate contains 85% protein (N x 6.25), has solubility, and emulsion stabilizing properties similar to those of soy isolate, is a light tan, and has a slightly bitter flavor. Its production cost ranges between that of soy isolate and sodium caseinate. Another protein isolate can be made from oat groats from either a normal or a high protein variety. The oat groats are ground to a meal and may or may not be defatted before protein is solubilized by stirring with 6 volumes of 0.025 M sodium hydroxide. Residue and starch are removed separately from the extract by sieving, followed by centrifuging. The entire protein containing extract is neutralized and dried. Starch yield is ca. 50% and protein yield is 70% protein in the starting groats, which contain 17-21% protein (N x 6.25). Oat isolates containing 60-75% protein, 0-18% fat (depending upon whether or not the starting groats were defatted), 3.5-4.5% ash, and negligible amounts of fiber. At present, oat protein isolate has a mild flavor, and its solubility as a function of pH is similar to that of soy isolate, although it is more soluble than soy at acid pH.

[1]ARS, USDA.

Role of Hydrocolloids in Fat-Containing Foods

JOHN J. JONAS, Kraftco Corporation

The role of hydrocolloids in fat containing foods was discussed in the light of basic colloidal and macromolecular chemical concepts. Emulsion based, fat containing fabricated foods use hydrocolloid gums as stabilizers to impart a suitable consistency and texture in commercial products. Storage stability throughout a wide temperature range and gas retention in whipped products also are controlled by hydrocolloids. The hydrocolloids interact with practically all of the ingredients of an emulsion based food item by means of hydrogen bonding, ionic, or van der Waals force. The result of the interaction is usually a complex colloidal particle, an enveloping layer, or a foam lamella. The discussion of these complex interactions requires the study of the colloid chemical behavior of proteins, fats, and emulsifiers, with the available inorganic ions in the presence of the carbohydrate hydrocolloids. Thus, an interdisciplinary approach is necessary to map out the mechanics of this overlapping area of food science. The mechanics of gelation in polysaccharide hydrocolloids systems were reviewed using recent literature. On the basis of this knowledge, the potential interactions between carrageenan and milk are significant for food technological applications, because of the favored organoleptic nature. Finally, the effects of the carrageenan-milk gels upon lipid emulsions were discussed.

Perspectives in Coating Fats

GENE SNYDER, Kraftco Corporation

A confectionery fat, or hard butter, can best be defined in operational terms. The performance characteristics used in such an operational definition include: melting properties, hardness and snap, good initial gloss and gloss retention, minimal tempering requirements, rapid solidification upon cooling, resistance to bloom and dulling, and contraction upon solidification. Because these performance characteristics are basically properties of the solid state of fats, it would seem profitable to pursue tailoring of confectionery fats via multifaceted investigations into the nature of the solid state in fats. The problem of defining some of the performance characteristics were illustrated by the use of various methods to determine melting characteristics (SFI, DTA, and NMR methods; pretreatment of samples). The questions of polymorphism, crystal structure, and crystallinity were examined from the viewpoint of what is definitely known, what is reasonable inference, and what is pure conjecture. In particular, several arguments were made to suggest far lower crystallinity in solid fats than is normally presupposed. Since commercially important hard butters are derived from fats which are a complex mixture of numerous triglycerides, knowledge of how such mixtures interact is of obvious importance. A survey of some selected phase diagrams illustrated the kinds of interaction one can expect and their relevance to the hard butter problem.