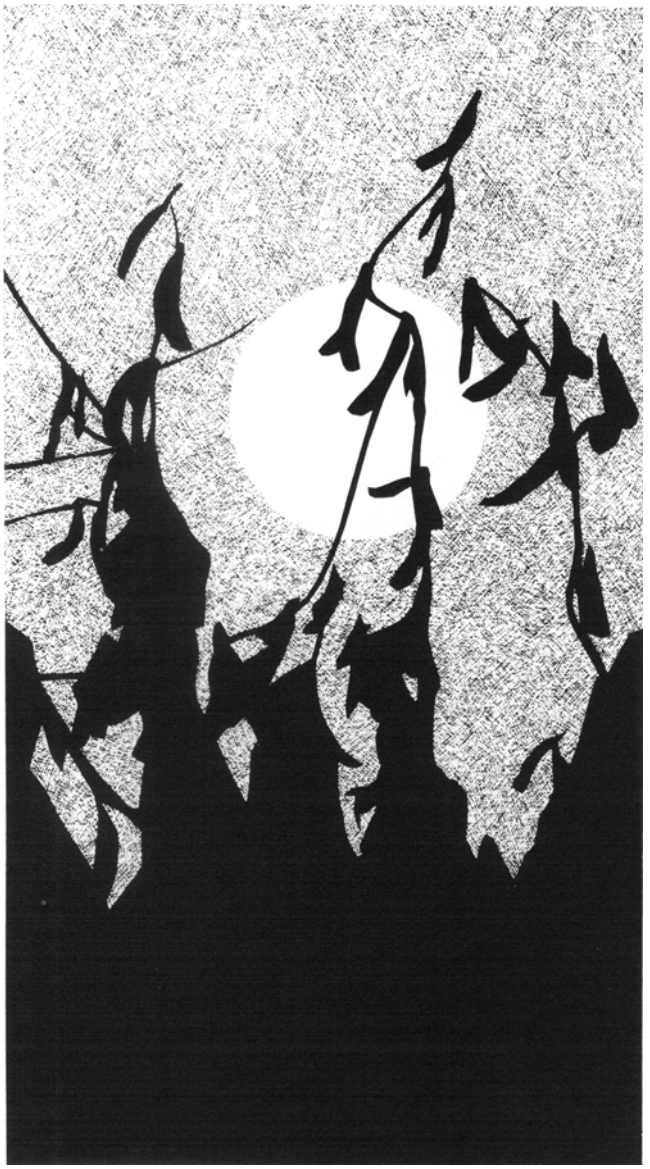

Edible Soy Protein in Moscow, Warsaw

Late last year, the Food Protein Council put together a two-day Edible Soy Protein Seminar for export to Moscow and Warsaw where hundreds of Soviet and Eastern European planners, import agents, scientists, and other officials, could hear U.S. soy protein specialists on the preparation, properties, and uses of soy proteins.

Cooperating in presenting the program Oct. 13-14, 1976, in Moscow and Oct. 18-19, 1976, in Warsaw were the American Soybean Association and the USDA's Foreign Agricultural Service. Approximately 120 Soviet officials from 20 different ministries and agencies attended the Moscow presentation. Approximately 200 to 250 government officials, mostly from Poland, but also from Czechoslovakia, Hungary, Bulgaria, Yugoslavia, Rumania, and East Germany, attended the Warsaw sessions.

Nine substantive talks comprised the formal program, with persons attending invited to meet later with the speakers during informal discussions. The technical talk, "Nutritional Aspects of Soy Protein Products" by Dr. Irvin E. Liener of the University of Minnesota, is printed in this issue of *JAOCS*, beginning on page 00.

Other substantive talks, summarized later in this article, were "Soy Flour and Grits" by Donald W. Quass of Dawson Mills, Dawson, Minnesota; "Textured Soy Protein Products" by Dr. Bernard Link of Cargill, Inc., Minneapolis, Minnesota; "Soy Concentrates and Isolates" by Dr. L.D. Williams, of Central Soya Co., Inc., Chicago; "Isolated Soy Proteins–Functions and Applications" by A. Christopher Edwards of Purina Protein Europe S.A., Brussels; "Soy Protein Applications in Foodservice and Consumer Products" by Robert L. Bartz, of Nabisco Protein Foods International; Randolph, New Jersey; "Bakery Applications for Soy Products" by Dr. Morton S. Cole of Archer Daniels Midland, Decatur, Illinois; "Application in Meat Food Products" by William G. Readdy of Griffith Laboratories, Alsip, Illinois; and "Whipping Applications" by Jaap Van Son of A.E. Staley Europe, Amsterdam.

R.E. Burket of Archer Daniels Midland Co., chairman of the Food Protein Council, opened the seminar with an introductory talk on edible soy protein. His remarks are printed below. After Mr. Burkett's talk, Richard A. Falb, communications director for the American Soybean Association, gave a brief talk on the U.S. soybean industry. His remarks follow those of Mr. Burkett below.

Dr. Liener's paper on the "Nutritional Aspects of Soy Protein Products" was especially interesting in that it was a rather thorough review of the subject. It is printed in its entirety in this issue of the *Journal.*

Donald Quass discussed properties of soy flours and grits. These products all have accepted standards. Typical analyses are shown in Table I.

TABLE I

Soy Flours and Grits

	Full Fat	Low Fat	Defatted	Refatted
Oil, %	21	6	1	16
Protein, %	41	46	52	45
Ash, %	5	5	5	5
Fiber, %	2	3	3	2
Carbohydrate, %	26	34	32	25

These protein materials have somewhat different functional properties depending on methods of preparation and these properties are important considerations in uses of the products in foods.

Bernie Link described the commercial processes for making textured soy protein products from defatted soy flour, soy protein concentrate, or soy protein isolates. When textured soy products are used as an ingredient to extend minced or ground meat products, they contribute to product texture, absorb water and fat to increase cooked yield, maintain nutritional value, increase convenience, and lower food costs. Textured soy products are used both to extend traditional meat foods and for complete analog replacements. To gain rapid consumer acceptance, the textured product must closely simulate the shape, size, color, texture, and flavor of the traditional food it replaces.

Soy protein concentrates and isolates were discussed by L.D. Williams. Concentrates are prepared by aqueous extraction of much of the carbohydrate fraction from soy flour to give about 70% protein concentrate. The isolate containing about 90% protein is made by removal of essentially all of the fiber and the carbohydrate. Both products generally are more bland tasting than flours or grits and have increased functional properties. These properties are poorly understood at the molecular level. Yet, there exists a distinct challenge in learning how to change and manipulate the properties to best advantage in food processing. With a growth in knowledge of the functional properties of concentrates and isolates, and of their role in complex food systems, the utilization of soy proteins will increase and become more valuable in the processing of a broader variety of foods.

The emulsifier and water (or fat) holding characteristics of concentrates and isolates make them particularly adaptable to many food uses.

Use of soy isolate in comminuted meat products was described by A.C. Edwards. In this way, for example, meat that is normally discarded with bones can be recovered, comminuted, and restructured for use in many high class products.

R.L. Bartz talked about the applications of soy proteins in "Foodservice and Consumer Products." Institutional/Foodservice which includes all operations serving foods outside the home accounts for one third of all meals in the U.S. today and is the largest user of edible soy proteins in the U.S. (next to government purchases). Reasons for this are that the soy products provide important protein, functional properties in foods, and cost savings.

Soy proteins have been entering American homes for many years as ingredients in foods, mainly for their protein nutrition and functional benefits of superior moisture holding and binding characteristics. Beyond their traditional use in all types of processed meats, fish or poultry, baked goods, infant foods, snacks, cereals, and confections, soy proteins are also being used in soup bases, sauces, fillings, toppings, breadings and beverages.

Recent development of texturizing technology has been a major step to evolve soy proteins from "ingredients" into "foods" for in-home consumption. Textured soy proteins, extruded-expanded, compacted and spun analogs, produce high protein foods with a meat-like, or chewy bite, and little or no "soy" flavor at very economical costs. New texturizing technologies have provided the breakthroughs to open a vast spectrum of consumer food applications to edible soy proteins.

A packaged soy protein ground-meat extender market was also developed during the meat shortage. The product is sold dry, in individual pouches, or boxes. it is rehydrated with water and blended with ground meat in the home extending it from 50-100%. This product continues to sell reasonably well even with the recent reduced meat prices in the U.S. Soy protein breakfast sausage links, sausage patties, and egg substitute products have also been successfully introduced to consumers. Soy protein is also appearing in many new types of foods, such as frozen soy analog meats, canned "meatless" meats, high protein cereals, breading, fish salad mixes, soy protein snacks, and nut substitutes.

Development is also underway to introduce soy protein in frequently used consumer foods in other world markets. Rice/soy blends, cassava/soy blends, corn/soy blends and soy enriched breads and biscuits are being tested in many areas.

Bakery applications discussed by M.S. Cole included uses of soy flours, concentrates and isolates in bread products, cakes, cookies, and sweet doughs. Soy flours are used to the greatest extent and the properties of the flours depend on their processing conditions. The addition of soy flour to wheat flour significantly improves the nutritional value of bread and other wheat flour based products.

Uses of soy proteins in meats and meat food products were described by W.G. Readdy. Generally, the use of soy flour has found limited acceptance in the direct replacement of meat. The isolates have found wide acceptance throughout the world at levels of 2-5%, primarily in canned meat foods and meat systems with high fat contents. Thermoplastic textured soy flours and textured concentrates have been well-received in coarse minced meat systems when up to 25% of the meat is replaced (8-10% dry soy protein basis). The soy concentrate emulsifiers are widely used in minced, cured sausage products at the 4-8% level to improve visco-elastic properties. Further, various combinations of the concentrate, isolate, and textured soy protein allow the flexibility to engineer a food with desired color, flavor and textural properties.

Use of soy whipping proteins in preparation of such products as nougats, aerated desserts, sponge cakes, and water ices were described by J. Van Son. Soy whipping proteins as a special class of highly sophisticated derivatives from the soy bean are very interesting and promising additives for a great number of food products. The aeration of foods is a very attractive technique, not only for economic reasons, but also in order to obtain products with a very pleasant mouthfeel and taste. ●