SOYA PROTEIN—NUTRITION—Summary of discussion

SESSION VI A—Regulations and Factors Limiting Soya Protein Use in Foods

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Session was cochaired by E.W. Lusas, Texas A & M University, U.S., and Teresa de Buckle, JUNAC, Peru. The panelists were round table speakers Marshall Myers, Uncle Ben's Foods, U.S.; Jose Chavez, Universidad Central de Venezuela; John Vanderveen, FDA, Bureau of Foods, U.S.; and Norman Tape, Agriculture Canada, Canada. The panel discussion focused on some alleged detrimental and beneficial effects of regulations, and other factors relative to uses of soya protein in foods.

One view centered on the theme that government regulations are ambiguous and tend to discourage both capital investment and marketing programs, which are major costs in commercialization of new products containing soya protein. This view claims that confusion has resulted over the differing definitions of nutritional quality developed by FDA and USDA. It was contended that these agencies receive and incorporate input from a wide variety of sources, ranging from individual consumers to large vested economic and political forces. Definitions of nutritional quality are used as a basis for regulations governing food product labels. Product labels have an enormous impact on consumer purchase decisions but uncertainty exists in the U.S. regarding proper labeling of products containing vegetable protein.

The following considerations were proposed regarding why nutritional definitions cause uncertainty: definitions are more art than science; definitions vary with the definer; FDA has jurisdiction over manufacture of vegetable proteins, but USDA regulates their use in meat, poultry, egg and dairy products; the form and extent of adoption of these regulations by the USDA is not clear; the regulations do not pertain to foods covered by existing federal standards, which may allow using significant amounts of vegetable proteins; USDA food standards were not developed on a nutritional basis; and the U.S. consumer is receiving conflicting dietary recommendations from government, health authorities and various consumer groups, which makes future trends in food consumption difficult to predict. Uncertainty could be reduced by using "common sense" when solid nutritional information is not available, better rationalization of nutritional definitions in the light of existing food standards, unified application of regulations, and clear delineation of jurisdiction. This thesis concluded that U.S. food companies will continue to invest their resources in lower risk, less innovative development programs.

In another discussion, it was said that in Venezuela, specific regulations do not exist for the use of either soya protein derivatives in foods or food products that contain such proteins. Before 1970, the use of commercially produced infant formulas, gruels and other foods based on cereals for children had become very popular. Commercial products were usually made from a single cereal flour, usually rice, or a mixture of vegetable flours enriched with vitamins and minerals. In a study done in 1966–70, nutritional deficiencies were found in a substantial number of cereal-based foods intended for infant and child feeding. This prompted the Venezuelan Ministry of Health to issue "Standards for the Composition of Vegetable-Based Food Products for Infant Feeding" and "Standards for Foods Based on Cereals for Children," which were published in 1972 and 1979, respectively. These regulations have resulted in marked improvement in the quality of cereal-based baby foods. A minimum of 16% protein is now required by law if the product is intended for infant feeding, and a minimum of 25% protein is required for the product to be called a "high protein" cereal. Soya protein derivatives, such as soya protein isolates, are among permitted protein sources that meet the requirements.

Studies have also shown that protein quality has improved as a result of the new regulations. The quality standards regulate only identity and composition of this particular group of food products in Venezuela. The regulations do not refer specifically to soya protein-containing foods or to the utilization of soya protein derivatives in cereal foods.

A second group of products intended for Venezuelan children are distributed free by the National Institute of Nutrition. These foods include a biscuit made of wheat and soya flour and a bread known as "arepa" made of ground corn containing 8% soya flour. A third group of commercial soya-based preparations intended as milk substitutes are sold in pharmacies and supermarkets. A fourth group of commercial soya-based preparations are high-protein foods that are registered either as foods or pharmaceutical specialties. In Venezuela, clear-cut regulations do not exist concerning use of soybean proteins either as supplements or ingredients in the manufacture of food products. Among other considerations, the lack of a reliable and effective method of analysis to control addition of soya protein to foods is a serious obstacle in the full-scale implementation of this technology.

Major concerns of regulatory agencies such as FDA are maintenance or improvement of the food supply. Soya protein is recognized as a means to improve the nutritional quality, economics and functional properties of foods. The FDA is concerned about the promotion of alternate food sources. In the 1930s, legislation was aimed at protecting foods from adulteration or debasement, but today the strong forces of consumerism demand quality and safety in the food supply. Manufacturers are encouraged to expose new foods to regulatory agencies early in the development process in order to reveal any food safety complications. Soya fortification must maintain the basic nutrients in the food system, but no requirements are included for technological uses that may be new or novel. The FDA is concerned with protecting consumers from misrepresentation, such as substitute foods which may be deceptive. The FDA insists that the consumer must know when a substitute is being sold.

According to comments by one of the panelists, soya

protein is used very little in Canada. This was attributed to its negative image, and also to conflicting regulatory interests; thus there is little likelihood of the use of soya protein in Canadian dairy products in the near future.

One of the participants indicated that Colombia was discouraging promotion of fabricated infant foods that would replace breast feeding. This was attributed to incomplete nutritional knowledge of infant dietary requirements. However, infant foods could be used after the baby is 4 months old.

Labeling was said to sometimes inhibit the use of soya protein, but this was not considered to be significant. The discussion centered on the nutritional adequacy of vegetable proteins and the merits of a "common sense" approach. One of the participants asked if anyone had demonstrated nutritional deficiency in a vegetarian diet. There was no reply, which prompted a suggestion that the slate should be wiped clean regarding the approach to regulatory controls.

A comment was made that consumers sometimes are skeptical even about vitamin fortification which is looked upon by some as adding chemicals. As a result, manufacturers have been prompted to offer foods with and without added vitamins.

On a global basis, regulations vary widely. Poland has no limitations on the use of soya proteins in meats, according to one participant. A Mexican scientist was successful in bypassing regulations by marketing directly through pediatricians. His oat-soya food mix was used as a supplement or an artificial milk in cases where breastfeeding was not available. He implied that acceptance of the product was speeded up by this procedure.

SESSION VI B—MEETING NUTRITIONAL OBJECTIVES WITH SOYA PROTEINS

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Session was cochaired by R. Bressani, INCAP, Guatemala, and J.J. Rackis, USDA. The panelists were round table speakers Dan Hopkins, Ralston Purina, U.S.; George Bookwalter, USDA; Benjamin Torun, INCAP, Guatemala; David Cook, Mead Johnson, U.S.; Oliver Miller, Loma Linda Foods, U.S.; and Walter Wolf, USDA. The session emphasized how soya proteins can be used to meet nutritional objectives of various users.

In a discussion of soya proteins in mixed protein systems, it was emphasized that animal proteins can be supplemented by introducing isolated soya proteins into the food systems; this increases the total protein available. Nutritional studies have shown that mixtures of soya protein and meat or soya protein and fish are of a biological quality similar to meat or fish protein fed alone. It was also mentioned that, in addition to providing high biological quality, soya proteins are used in food systems to provide functional properties such as texture, emulsification, water binding capacity and suspension in water. Examples of the use of soya proteins for functionality were given, such as emulsified meat systems and dairy food systems.

Another participant showed that soya protein in the form of defatted, toasted flour, flakes or grits could be used to improve both the quality and quantity of cereal-based food mixtures. Two types of formulated foods fortified with soya are included in the Food for Peace Program. Blended Food Supplements meeting nutritional guidelines were developed to satisfy the dietary requirements of preschool children; these include standardized mixtures known as Corn-Soya-Milk, Instant Corn-Soya-Milk, Wheat-Soy Blend and Whey-Soy Drink mix. A second type of formulated foods is Fortified Processed Foods, which are soya-fortified at levels to improve their nutritional value without changing their functional properties. Standardized mixtures of this group include Soy-Fortified Bulgur, Soy-Fortified Bread Wheat Flour, Soy-Fortified Cornmeal, Soy-Fortified Sorghum Grits, and Soy-Fortified Rolled Oats. Fortified Processed Foods are intended for dietary improvement of the general population. It was pointed out that, in addition to improving nutritional quality, soya products also contribute functional properties such as texture and protection from oxidation in cereal-based food systems.

Clinical tests with premature infants showed no differences between soya or milk formulas in growth or nitrogen retention, and there were fewer complications related to the gastrointestinal tract with the soya formula. However, absorption of calcium and phosphorus from soya-based formulas was less than from milk; therefore, these formulas should be supplemented with minerals. It was concluded that soya formulas could be fed to premature infants as therapeutic agents for a limited time. Nevertheless, adequacy of feeding soya-based formulas to full-term infants has been documented by many studies. A recent Chinese feeding experiment with 100 infants on soya-rice-egg mixtures resulted in growth rates similar to those of infants fed human or cow's milk. Soya-based formulas were advantageous for jaundiced infants undergoing phototherapy because they prevented the diarrhea that is common when these patients are fed human or cow's milk.

Although soya protein is used as a food for infants who are allergic to cow's milk or are lactose intolerant, soya protein can also be a primary cause of allergy. Likewise, processing may affect protein quality and other nutritional characteristics. Soya-based foods may require a higher feeding level to meet nutritional needs because digestibility of some soya products is lower than that of many foods of animal origin.

Soya proteins are widely used both by strict vegetarians and by lacto-ovo vegetarians, who use milk and egg products. The major motivations for using soya products are health and economics. The use of soya protein in feeding the elderly is also being studied. It was emphasized that further research is needed to identify the nutritional requirements of the elderly, especially when affected by disease, trauma and drugs.

One participant affirmed that development of food uses for soya protein is closely interrelated with nutritional studies. Several important developments in animal nutrition studies of soya proteins are: the beneficial effects of cooking; the discovery of methionine as the first limiting essential amino acid; the discovery and isolation of trypsin inhibitors; the retarded growth attributed to trypsin inhibitor; the association of raw meal with pancreatic hyper-