SESSION VI E

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All papers in this session were presented in Spanish since the attendance was predominantly Latin American. Bressani of INCAP led the discussion. Moretti emphasized the appropriateness of the "mechanical cow" as a means to produce soybean milk at low cost. Reportedly, there are between 82 and 90 mechanical cows in Brazil, producing soya milk at $0.10 per liter.

Aguilera pointed out that although soybeans are widely used in foods to relieve malnutrition, the impact of these foods in resolving the problem is marginal. Different strategies and products need to be developed to suit local environments. Of other oilseeds, only peanuts are used to some extent in high-protein mixtures. Cottonseed is used sparingly.

Lopez-Hernandez, from Argentina, reported that predigestion of soybeans with papain did not change the protein efficiency ratio (PER) or biological value of the protein. Lactic fermentation *L. acidophilus* and *L. bulgaricus* did reduce oligosaccharides to a nondetectable level. The extent of papain action on the beans was not determined by chemical methods.

Elias stressed that soya products have to perform in indigenous food systems and should not require drastic changes in eating habits. He also advocated the increased use of appropriate technologies such as extrusion.

Camacho told the audience that by adding lye to corn meal and extruding it, the nixtamalization process can be avoided while achieving similar organoleptic and nutritional properties. The program, targeted for the Tarahumaras Indians, was started in 1980; during the period February–November, 1980, 380 tons of enriched corn flour, 12 tons of enriched oat flour and 30 tons of fortified pinole, were produced.

SESSION VI F

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Panelists were N. Scrimshaw, B. Torun, I. Liener, K.K. Carroll, N. Tape, R. Cooper, T. de Buckel, and Chairman E. Lusas, all of whom had been introduced previously as speakers of Plenary Session VI.

Chairman E. Lusas opened the session with a question as to whether disposal of by-products posed problems in the soybean industry such as those found in the dairy industry. It was pointed out that by-products from soya meal or soya flour production can be added directly into feeds, whereas byproducts from the production of concentrates or isolates have perhaps less marketable value and require an economic decision based on product value vs cost of energy to recover.

In reviewing the world hunger program, the question was raised as to whether energy or protein was the most prevailing problem in developing countries. Dr. Scrimshaw pointed out that the 1973 FAO-WHO expert committee recommendations for protein were too low and that this level will be increased by one-third when the committee meets in 1981. Since 1971, protein has been limiting in many countries, and many countries have had to adapt to caloric inputs that were unfavorable. Often, it is difficult to judge whether the deficiencies are caloric or protein, since both physiological and sociological factors come into play.

There was some comment on simple whole soybean processes. Such processes result in a full-fat soya flour, which has an advantageous energy balance in the diet and provides a higher PER than either concentrates or isolates.

Dr. Carroll's paper on the reduction of cholesterol and atherosclerosis with dietary soy proteins was discussed at great length. Based on the author's work, there appears to be a possible advantage in the use of soya proteins over casein, but complete verification of the results is still needed. There are conflicting reports, such as a recent study in the Netherlands, that are completely contradictory. Little is wrong with increasing vegetable proteins in the human diet; hopefully, more populations will do this and establish a good variety of proteins in their diet rather than attempt to completely replace animal proteins in their foods.

One panelist indicated that large amounts of research funds have been allocated by governments for basic studies; and he raised the question of when these will be implemented by industry. In other words, how much studying do we need to carry out before we can start thinking seriously about the implementation of research results—or should applied research be emphasized to a greater degree in order to reduce the waiting period between discovery and applications?

An interesting question was raised about whether we are overly concerned about soybean trypsin inhibitors (TI), since many other plant and animal tissues contain some trypsin inhibitors. It is true that the soybean is not unique in possessing trypsin inhibitors—practically all plant and animal tissues contain different levels and different kinds of these inhibitors; and all share the common property of having inhibiting bovine trypsin. The reason we have become preoccupied with the soybean trypsin inhibitor is probably because the soybean happened to be the first plant material in which TI was isolated, and soybean also happened to be a plant material that became an important feed ingredient.

There is also a relationship between the processing in a commercial plant and the destruction of TI. Therefore, the large number of nutritional studies that have been made on soybean feeds have concentrated on TI inactivation. It is also true that most foods, cereals, legumes, and so on, are all consumed in a cooked form in which the TI have