included in the name of the product.

Meetings between the FDA and USDA are continuing, and the two major issues still unresolved are: the difficulty in naming products, and the requirements pertaining to substitute food status. One participant criticized the substitute concept, because equivalency may never be achieved. Another participant raised the question of procedures to be followed for marketing a new ingredient, which was answered by a description of procedures to be followed when a food material either is generally recognized as safe (GRAS) or is not GRAS. It was emphasized that the FDA should be involved prior to marketing because of possible problems and costs involved in a recall.

Assessment of soya protein nutritional quality included the discussion of extensive methodology that has evolved in this technological area. Procedures include human bioassays, rat bioassays, and chemical, enzymatic and microbiological methods. Rat bioassays were said to be of limited value for predicting the nutritive value of soya protein for humans. Reasonable agreement between estimates of protein nutritional value as obtained in human studies, and as predicted by several different amino acid scores, can be demonstrated. The best agreement is obtained when the reference amino acid pattern is based on estimates of human amino acid requirements. A comment was made that labeling might also include levels of selected essential amino acids contained in a food material along with corresponding % RDA values.

Considerable interest was generated by a discussion on the determination of levels of added soy protein in processed foods. Government regulations in most countries require that the composition of certain foods be defined, which has prompted the development of methods to detect and quantitate soya protein products in foods. One participant described procedures that have this potential, including: a microscopic method to identify the characteristic palisade cells in the soya meal residue after extraction with KOH; microscopic detection after selective staining; immunological techniques; electrophoresis; soya peptide isolation and analysis after autoclaving and trypsin digestion; computer comparison of amino acid patterns; and measurement of the fluorescence at 440 nm. Each of these techniques has limitations, and research is continuing.

The necessity for determining levels of different soya products in food materials prompted lively group participation. Differentiating isolates of gluten or casein was said to be possible with electrophoresis. However, laboratory-to-laboratory variability is a problem, and no attempt had been made to standardize. Infrared methodology was also mentioned as a possible approach. One participant said that thin-layer chromatography was used to measure the stachyose content of mixtures to estimate levels of soya flour. However, different types of soya proteins and processing methods complicate assay procedures. Another participant discussed a detection method that involves tagging isolate with 0.1% titanium dioxide, which is used in some processed meats. Phytic acid and trypsin inhibitors were also mentioned as tracers, but difficulties had been encountered with them. One suggestion was made to consider measurement of meat muscle instead of soya protein, but variability of muscle protein relative to fat complicates this approach. It was mentioned that, in the absence of detection methods, regulatory agencies still maintain record inspection authority.

Quality assurance was discussed and considered a vital part of the food production operation. One participant emphasized the need for the project manager to be aware of current laws concerning good manufacturing practices, labeling, and other aspects of the work to avoid regulatory agency problems. Positive recommendations were made regarding the importance of an adequate data base that is provided by comprehensive final product standards coupled with a complete record system.

SESSION VI D

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In this session, primary concerns were exemplified by discussions on protein-nutrition, safety aspects, measurement of protein quality in animal bioassay with respect to human needs, evaluation of the significance of anti-nutritional factors in soybeans, and formation of deleterious factors during processing. Some of the lively discussions focused on the need for more research to provide recommendations on processing parameters and dietary treatments that may be necessary to produce safe, nutritious soya foods. Probably the most significant conclusion to be drawn is the fact that the continuous changes in processing conditions to improve yield, to reduce cost of production and to modify protein functionality (i.e., solubility, flavor, texture, emulsification properties, etc.) raise new questions concerning optimal destruction of trypsin inhibitors (TI), effects on protein digestibility and mineral availability, and formation of anti-nutritional substances. Two papers described how mineral availability can be affected by the processing of soybeans into flours, concentrates and isolates. In addition, knowledge is available on how to control flatulence and the formation of lysinoalanine through proper choice of processing parameters.

A 300-day rat bioassay demonstrated that residual TI activity in edible grade soya flour, concentrate or isolate did not produce any deleterious effects. Additional ongoing, long-term feeding trials are justified, as evidenced by the comments on whether high-protein, high-fat diets can place added stress on the pancreas. A debate to explain why vitamin B_{12} supplementation stimulated growth of rats during continuous consumption of soya protein products, but did not affect rats fed casein diets, remained unresolved. A relationship between tests based on animal bioassay and comparable nutritional effects in humans, particularly the young and elderly, remains elusive.