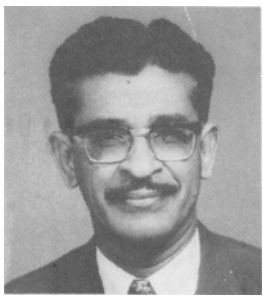
Standards for Protein Based Foods in Developing Countries



K.T. ACHAYA, Executive Director, Protein Foods and Nutrition Development Association of India, Bombay, India

ABSTRACT

Legal specifications in India are issued by the Central Committee for Food Standards and are limited in number. Specifications issued by the Indian Standards Institution (ISI), which are discussed in this paper, are optional but prestigious and much more numerous. Foods based on milk proteins emphasize minimal protein damage, estimated by solubility measurement, and high sanitary quality. The latter is common to all other ISI food specifications as well. Edible oilseed proteins for use as food ingredients are formulated in various types or grades and carry such criteria as protein level, fiber content, and appropriate antinutrient level. Proteins from various sources may enter products such as protein mixes, weaning and toddler foods, biscuits, "vegetable" milks, and offspring of the latter like yogurt, ice cream, and reconstitutable powders. In certain products, protein level may be varied inversely with protein quality. To define the latter, the protein efficiency ratio has been adopted and a working methodology for India evolved through collaborative experimentation. The level of any added vitamins and minerals in these protein foods is such that an expected daily consumption of the food would carry 1/3 the Indian recommended daily allowance. Concentrate protein foods stand in a class apart in their very high levels of the nutrients present. Enriched staples like wheat flours could carry proteins, vitamins, and minerals or omit proteins if found functionally disadvantageous. Codes of practice are being developed by ISI in related fields, such as food advertising, in which one clause enjoins that sound established foods or food practices should not be denigrated; food labeling, in which the problem is to ensure a label meaningful to consumers; and date marking, which could hinge on certain and expected shelf life of the food.

INTRODUCTION

In laying down standard specifications for various protein based foods, India has had to come to terms with many questions which could have a more general relevance to developing countries and indeed even to those more advanced. Most of these standards have been issued quite recently. For the many others which are still in gestation, an indication will be given of the background thinking shaping them.

ORGANIZATIONS CONCERNED WITH STANDARDS

Food standards are issued in India by a number of organizations. Many of the latter are concerned with specific groups of products like cereals, pulses, fruits and vegetables, oilseeds, edible oils, meat, dairy products, and so on. Others cater to the specific requirements of the defense forces or of products for export, and certain standards are designed for regional procurement purposes by the state. Yet other standards for foods are voluntary but may be adopted by manufacturers as a marketing or promotional incentive.

Legal specifications for the entire country are laid down under the Prevention of Food Adulteration Act of 1954. To the Act are appended Rules which lay down limiting specifications for various food products. The formulation of the actual specifications is the responsibility of the Central Committee for Food Standards of the Ministry of Health. Generally, these standards are brief, describing in a paragraph or two the essential requirements of the food, and methodology for the various tests prescribed is not furnished. Both the Act and Rules are at present under thorough study and revision by a committee appointed by Parliament.

The other important standards body, the Indian Standards Institution of ISI, works in numerous areas through various divisional councils. Foods are in the purview of the Agricultural and Food Products Divisional Council (AFDC), which in turn has several committees concerned with such areas as dairy products, dairy equipment, meat and meat products, animal foods, and so on. Protein based foods are primarily the concern of two groups: the Milk and Milk Products Sectional Committee AFDC 34 and its constituent Infant Food Subcommittee AFDC 34:3; and the Nutrition Sectional Committee AFDC 37 with its three subcommittees on Protein-rich Foods AFDC 37:1, Processed Oilseed Flours AFDC 37:2, and Protein Quality Evaluation AFDC 37:3. Representation on these committees is exceptionally wide and includes scientists and technologists, manufacturers, users, and professional associations.

Specifications formulated by ISI are optional but carry considerable prestige. There is a system of ISI certification marks which may be stamped on any product which meets and maintains the relevant standard. IS specifications are issued in the form of booklets; these are quite detailed and always describe in full the methodology for every test or criterion prescribed in the standard.

An elaborate procedure precedes the promulgation of each standard specification. An idea for a standard may originate from felt needs, from internal secretariat or committee suggestion, or from external suggestion by industry, individuals, or government. These suggestions go to the appropriate subcommittee which, if it agrees in principle, requests one of its members or the ISI secretariat to prepare a draft document for consideration by the committee. After scrutiny of the document by the latter and considerable debate, discussion, and occasionally even experimental work, the draft standard is launched into wide circulation for a period of 3 months to a very large number of organizations, both private and government, with a request for specific comments on content, phrasing, methodology, and the like. These comments are compiled by the secretariat and again put up for detailed consideration to the subcommittee, which then draws up a standard and recommends it to the main sectional committee (often holding its meeting the next day) for scrutiny and final approval as an IS specification. Each specification carries the code number, year, and title; for example, there is IS:7021-1973 Protein-rich Food Supplements for Infants and Preschool Children. Any specification issued a second time after revision will bear the year of revision.

PRODUCTS BASED ON MILK PROTEINS

Between 1961 and 1968, six standards were laid down

TABLE I

Status of Indian Standard (IS) Specifications for Protein Based Foods and Related Matters[a]

A. Based on milk proteins	
IS:1165-1975	Milk Powder (Whole and Skim)
IS:1167-1967	Casein (Edible quality)
IS:1547-1968	Infant Milk Foods
IS:1806-1975	Malted Milk Foods
IS:4421-1967	Malted Skimmed Milk Food
B. Protein raw materials other than milk	
IS:4684-1975	Edible Groundnut Flour (Expeller-Pressed)
IS:4875-1975	Edible Groundnut Flour (Solvent-Extracted)
IWC	Edible Groundnut Protein Isolate
IS:7837-1975	Edible Full-Fat Soy Flour
IS:7835-1975	Edible Medium-Fat Soy Flour
IS:7836-1975	Edible Low-Fat Soy Flour
IWC	Edible Soy Protein Isolate
IS:4874-1968	Edible Cottonseed Flour (Expeller-Pressed)
IS:4875-1968	Edible Cottonseed Flour (Solvent-Extracted)
IS:6109-1971	Edible Sesame Flour (Expeller-Pressed)
IS:6108-1971	Edible Sesame Flour (Solvent-Extracted)
DIP	Edible Sunflower Flours
DIP	Edible Coconut Flours
IWC	Leaf Protein Concentrate
C. Blended protein foods	
IS:6387-1971	Vegetable Protein Infant Food with Milk
IS:1656-1969	Processed Cereal Weaning Food
IS:7021-1973	Protein-rich Food Supplements for Infants and Preschool Children
IS:3137-1974	High-Protein Mixes for Use as Food Supplements
IS:7487-1974	Protein-rich Biscuits
DIP	Protein-enriched Bread
DIP	Textured Vegetable Proteins
D. Beverages and related products	
IS:7482-1974	Protein Based Beverages
DIP	Non-Dairy Yogurt
DIP	Non-Dairy Ice Cream
DIP	Non-Dairy Carbonated Beverages
DIP	Non-Dairy Reconstitutable Powders
E. Fortified staples	
TUC	Fortified Wheat Atta
TUC	Paushtik Wheat Atta
TUC	Fortified Wheat Maida
TUC	Paushtik Wheat Maida
F. Tonic or "pharmaceutical" foods	
DIP	Concentrated Nutrient Supplementary Foods
G. Methodology (as separate documents)	
IS:7219-1973	Method for Determination of Protein in Foods and Feeds
IS:7281-1974	Method for Determination of the Protein Efficiency Ratio
H. Related subjects	
IS:5686-1970	Code of Practice for Handling and Storage of Oilseeds
DIP	Code of Practice for Harvesting, Transport, and Storage of Groundnut Kernels to Prevent Aflatoxin Development
DIP	Code of Practice for Groundnut Cake, Flour, and Oil to Control Aflatoxin
IS:7655-1975	Code of Practice for Food Advertising
IS:7688-1975	(Part I) Code of Practice for Labeling of Prepackaged Foods
TUC	Recommendation for Date Marking of Prepackaged Foods

[a]IWC = in wide circulation; DIP = draft in preparation; TUC = topic under consideration.

for products based on milk and its proteins, of which one was later deleted. The code numbers and titles of the existing specifications are shown in Section A of Table I. These standards embody requirements appropriate to the food described. Thus, the standard for milk powder (whole and skim) prescribes minimum limits for total milk solids (96%), fat level, ash, and titrable acidity. The standard for casein (edible quality) calls for a product with at least 90% protein and a quick rate of solubilization. In the Infant Milk Foods standard, the minimum protein is 20% and the minimum of all carbohydrates is 35%, while milk fat can vary between 18 and 28%.

Two basic considerations which run through these specifications are relevant as a general issue. All carry clauses designed to ensure hygienic quality, which is defined in terms of a total bacterial count of 50,000/g, a coliform bacteria count of 10/g, and nil salmonella. Test methods for all these are fully described in appendices to the standards. An identical level of sanitary quality finds a place in every food standard described in this paper, and the point will not, therefore, be mentioned again. A second general feature of all standards based on milk protein is one designed to ensure minimum damage to the protein quality. Since only a single protein source is used, solubility determination serves the purpose. Two methods are described. The solubility index is based on the degree of precipitation which occurs under a specified centrifugal force and the percentage of solubility on the quantity of the product which enters solution in water at 50 C. An Infant Milk Food, for example, should have a solubility of at least 85.0% if roller dried and 98.5% if spray dried.

PROTEIN RAW MATERIALS OTHER THAN MILK

The extending of milk proteins using proteins of vegetable origin, or the blending of vegetable proteins among themselves to achieve a higher total quality through better amino acid balance, will imply a certain quality for the vegetable proteins employed. A great deal of technological work has been done in India on the preparation of proteins of edible quality from the many oilseed sources available. Of these, groundnuts are most important. Edible groundnut flours, both screw-pressed and solvent-extracted, and groundnut protein isolates are all commercially available in India. Upgrading of cottonseed, sesame, coconut, and rape-mustard proteins to edible status has also been studied at the pilot-plant level. The soybean, introduced into India in recent years, is making progress, and so is the technology for its processing. The nutritional value of leaf proteins from many sources is under study.

The standards issued for some vegetable protein products in earlier years have recently been extensively revised, and the specifications currently in operation are shown in Section B of Table I. Protein level, fiber level, and bacteriological quality are common for all. There are separate standards for each class or type of edible protein flour from the same raw material. Groundnut proteins are described in expeller-pressed, solvent-extracted, and isolate terms, and likewise four types of soybean flours are recognized. Only medium-fat and low-fat soy flours are now made in India, and the promulgation of specifications for full-fat flour and protein isolate serves to illustrate the general guiding principle that a standard, by its very existence, can stimulate a desirable development. To serve as a guide both to manufacturers and users alike for what is a new raw material in India, all the four soy protein standards carry a table in which the quality of flour appropriate to specific end-uses is suggested in terms of fat level, fiber level, protein content, protein efficiency ratio, nitrogen solubility index, trypsin-inhibitor activity, and urease activity. Detailed descriptions of analytical procedures for these are provided. Apart from these path finding standards, many others codify existing Indian practice in technical form.

Antinutrients in soy flour have been mentioned. Standards for other oilseed flours carry clauses relating to appropriate antinutrients. All groundnut flour specifications permit a maximum of 60 ppb of aflatoxin. This is higher than the value of 30 ppb permitted by the Protein Advisory Group (PAG) of the U.N. System and represents a compromise between the desideratum of zero aflatoxin and the level which experience has shown can be practically produced at a reasonable cost under the conditions which exist in India. Gossypol levels in cottonseed flour follow the PAG specification of 0.065% free gossypol and 1.10% total gossypol. The two sesame flour specifications ensure that cuticles are removed prior to flour preparation by setting maximum limits for both crude fiber content (5% in expeller-pressed and 6% in solvent-extracted products) and oxalic acid content (0.5% for both grades).

Specifications are in preparation for various grades of edible flours from sunflowers and coconuts. A standard for leaf protein concentrates is in wide circulation after consideration by the Nutrition Sectional Committee.

A Code of Practice for Harvesting, Transport, and Storage of Groundnut Kernels to Prevent Aflatoxin Development is being developed by ISI. This is for the use of farmers; for the use of processors, another document in preparation is A Code of Practice for Groundnut Cake, Flour, and Oil to Control Aflatoxin.

FOODS PERMITTING BLENDED PROTEINS

Skim milk powder, with 36% protein, costs about 5

times as much in India as an edible oilseed protein with about 50% protein. If, for very young children, milk carries the protein of choice, at weaning age a blended protein may be more exigent. This can be done with little loss of nutrient value and with considerable cost reduction.

Foods listed in Section C of Table I have been developed as a result of such reasoning. Thus IS:6387-1971 Vegetable Protein Infant Food with Milk states that the proteins may be derived from "cereals, pulses, or legumes, singly or in combination" and, further, that the "infant food shall contain a minimum of 25% non-fat milk solids"; however, the minimum protein efficiency ratio (PER) specified is 2.4 against a value of 2.5 for casein and 3.0 for milk powder, and 20% minimum protein level.

As the child grows older and accepts solid food, the protein level, as in IS:1656-1969 Processed Cereals Weaning Foods, is reduced to 14.0%. For older children, great flexibility in manufacture is permitted in IS:7021-1973 Protein-rich Food Supplements for Infants and Preschool Children. This codifies the low-cost blended cereal-oilseed-pulse foods which have developed in many parts of the world for use in relief feeding programs, both national and international. The CSM (corn-soy-milk) and WSB (wheat-soy-blend) evolved in the U.S. have their counterparts elsewhere. In India, the generic name for such a supplementary food is Balahar (children's food), of which some 15-25,000 tons are made annually for use in the feeding of identified vulnerable groups like preschool and school children, pregnant women, and nursing mothers from the underprivileged sections of society.

An even wider blend of protein sources characterizes IS:3137-1974 High-Protein Mixes for use as Food Supplements. Foods of this type represent low-cost protein supplements blended with an eye to the reinforcing effect of selected protein sources, which can in turn be combined with cereals to yield foods for actual consumption. In the original specification issued in 1965, the mix specified the use only of groundnuts (at a 70% level) and Bengal gram (*Cicer arietinum*), along with added vitamins and minerals. The current standard permits usage of a variety of both oilseed flours and pulses, blended to yield a minimum 39% protein level and a minimum PER of 1.8 (against 2.5 for casein).

That the quantity of protein must be considered not in absolute terms but in relation to its biological quality is well accepted. Within a certain range, eating more protein of a lower biological quality can compensate for the lack of quality, since more of any limiting amino acids will then be available to the body. The use of this principle has found practical expression in the formulation of the specification for Protein-rich Food Supplements for Infants and Preschool Children, which prescribes that the protein content shall be 15% if the PER is 2.0 but 20% if the PER is 1.75. This permits a certain flexibility in raw material usage and processing, while ensuring that the child's protein needs are met.

Perhaps the most widely used processed foods in many developing countries are bread and biscuits. In India, the annual growth rate for these commodities was 10% during the last decade, for reasons of convenience, acceptable taste, comparatively reasonable cost, and status value. Especially in urban areas, usage of bread and biscuits today penetrates quite low into socioeconomic scale. Fortification of these foods with extra proteins, vitamins, and minerals is therefore not without nutritional justification. Surprisingly, an Indian standard specification for fortified bread is only now in preparation, though the product has long been produced and marketed in a number of cities by two manufacturers, one private and one government, and locally by a few others. IS:7487-1974 for Protein-rich Nutritive Biscuits specifies 13% protein and a PER of 1.8 for protein in the finished biscuit. Since baking in the presence of reducing sugars is known to lower protein quality, the manufacturer will need to exercise care in the choice of ingredients and the processing employed. Apart from protein, addition of vitamins and minerals is also enjoined, the vitamins being A, D, folic acid, thiamin, riboflavin, and nicotinic acid, and the minerals calcium and iron. The level specified for addition of these nutrients to biscuits brings out a general principle which is employed in all standards where vitamin and mineral fortification is required. The Indian Council of Medical Research (ICMR) has laid down the recommended daily allowances (RDA) for all these nutrients; in a few special instances (e.g., for biotin, pyridoxine, or pantothenic acid), where no definite recommendation is made by ICMR for lack of data, the values of international bodies like WHO/FAO or of the U.S. Food and Nutrition Board are consulted. The basis for fortification is that an expected maximum consumption of the food will carry 1/3 the RDA of the child who will consume the product. To give an example, the consumption figure has been taken to be six biscuits; since the wt of these is about 33 g, the nutrient should be added in such quantity that 100 g of the product, or 15 biscuits, will contain the RDA value. For vitamin A, for example, the RDA for a 4- to 6-year old child is 300 μg, and for iron it is about 18 mg. To ensure uniformity, additions of vitamins and minerals are expressed uniformly in terms of 100 g of the food product and not per serving or per portion.

Textured vegetable proteins are just beginning to appear in the Indian market and for use in supplementary feeding programs. Formulation of a standard for generic products of this type has been set in motion by ISI.

BEVERAGES AND RELATED PRODUCTS

Animal milk, in India at any rate, has a venerated place as a food for both children and adults. A milk-like beverage, or a reconstitutable powder from which to generate it by adding water, represents an acceptable way of furnishing proteins and other nutrients to all age groups, often at reasonable cost. The conversion of soybeans to emulsified milky products has long been known in the Far East, though not in India. The Central Food Technological Research Institute located at Mysore has pioneered the use in milk-like forms of groundnut protein isolate. This can be manufactured from groundnuts and used directly or extracted from solvent-extracted groundnut oilcake and used for beverage preparation without isolation. To overcome acceptance problems and simplify nutrient and flavor addition, a blend with animal milk is the product of choice. A flavored product is in commercial production in Bombay, while outputs from the beverage plants in operation in Bangalore, Trivandrum, and Hyderabad are totally used in government welfare feeding programs.

IS:8482-1974 Protein Based Beverages codifies the Indian experience of pasteurized, sterilized, and flavored products. The beverage resembles human milk in its content of fat (1.5% minimum), protein (3.0% minimum), and most vitamins and minerals; for ascorbic acid and iron, higher levels are specified for the beverage to improve on the known low levels of these in breast milk. A wide range of whole oilseeds, oilseed protein concentrates or isolates, milk or milk powder, and amino acids is permitted in such beverage manufacture, and the PER to be achieved is 2.0 against 2.5 for casein.

In India, curds or yogurt made from animal milk is a popular item in the everyday household dietary. From the vegetable-protein beverage, a yogurt can be derived by lactic fermentation. Again, on the analogy of whole and skim milk powders from animal milk, reconstitutable powders from vegetable milks are possible, as are other such analogous products as ice cream and carbonated beverages. All these food products are in advanced stages of development in India, and ISI has undertaken the preparation of appropriate standards.

FORTIFIED STAPLES

A staple food such as rice, which is bought and cooked in the form of grain, can only be fortified with difficulty. Moreover, the extra expense which the technology involves will add to the buying problems of a staple food in a poor country. On the other hand, with a product which is universally powdered before use, such as wheat, fortification is simplified because nutrients like high-protein powders, vitamins, or minerals can simply be blended in during the grinding operation.

Wheat grinding in the large roller flour mills in India gives rise to four products: bran, semolina or rava, atta, which is a somewhat lower-extraction flour, and maida, a slightly higher-extraction flour. Atta is widely used in India for making both unleavened bread, yeast-fermented Western-type bread, and biscuits. Maida goes into Western-style bread, biscuits, and pastry, and into Indian-type sweetmeats. The addition of nutrients to wheat flours would involve both nutrition and function. Addition of proteins, such as groundnut flour, to atta or maida affects the loaf volume of leavened bread, and special techniques of dough preparation and baking are needed. Indian-style chapatis made from protein-fortified atta tend to lose pliability and become brittle, and protein fortification seems to encourage weevil infestation. It can also be argued that Indian diets do not lack protein in relation to calories; raising the protein level without caloric increase will only lead to wasteful burning of protein for energy purposes.

ISI is working on two types of improved atta and maida. One type, to which only vitamins and minerals are added, has tentatively been termed "fortified." The other, termed "paushtik," would have added proteins besides. The expression "paushtik," meaning nutrition or nourishing, already has a legal meaning in the Food Adulteration Rules to describe this very product. The entire matter is under discussion between ISI and the Central Committee for Food Standards, so that any ISI standards which are developed may also be acceptable to the legal authorities.

Less than 10% of all the wheat which is milled goes through the large flour mills. The remainder is bought as grain in small lots by individual householders and taken each time to local grinding mills for reduction to whole wheat meal. This is used in the home for making chapatis and other unleavened wheat breads. Fortification of flours emerging from the large roller flour mills can have at best a limited nutritional impact.

CONCENTRATED NUTRIENT SUPPLEMENTARY FOODS

A number of products with protein levels as high as 30 or 35%, accompanied by very high levels of one or more vitamins and minerals, is appearing in India. These products are not classed as drugs or medicines, are consumed in teaspoon or tablespoon quantities, and, though generally manufactured by pharmaceutical companies, are sold and promoted as nutritive food products. Most are in powder or granulated form. The Nutrition Sectional Committee of ISI is attempting to develop a standard specification to cover concentrated nutrient supplementary foods of this type. Very wide flexibility both in the nature and the level of the nutrients will need to be ensured, while protecting the consumer from any risk of inadvertent overdosage, as could occur, for example, with vitamin A or vitamin D.

METHODOLOGY

Frequent mention has been made of the methodology which accompanies every Indian standard specification. Analytical methods are developed simultaneously with the standard and form a part of it. Sometimes the method may itself be couched as a separate standard document. Accepted analytical techniques are used but, in codification for use in standards, these almost always require modification through the experience of scientists in India.

Two separate analytical documents relevant to protein based food products are listed in Section G of Table I. IS:7219-1973 Protein Determination in Foods and Feeds employs the classical Kjeldahl technique. For conversion of the nitrogen percentage thus determined into protein, a list of conversion factors is appended. Thus, a figure of 5.46 is used for groundnut kernels, oilcakes, or edible flours; 5.30 for cottonseed, sesame, sunflower, and safflower products; 5.71 for soybean products; and 6.38 for milk and milk products.

IS :7481-1974 Method for the Determination of Protein Efficiency Ratio is the protein quality document. It was developed on the basis of existing rat bioassay procedures through collaborative work in six Indian laboratories. Even though the PER is an apparently well-standardized procedure in common use the world over, a number of practical problems surfaced and had to be resolved before the Indian standard specification could be issued. As a reference compound, a protein product made in the country was clearly desirable. On this ground, skimmed milk powder prepared by spray-drying appeared preferable to casein, even though the latter is the standard reference compound elsewhere. Moreover, commercial Indian casein is derived not as in the West from cow's milk, but from buffalo milk. In the event, after collaborative study, both materials were allowed in the IS method, with the experimental PER being corrected to 2.5 for casein and 3.0 for spray-dried skimmed buffalo milk powder. A 10% protein level in the diet (N x 6.38) on an air-dried basis was specified, as is the normal practice. Spillage of dry food turned out to be important, and wetting of the food with warm water, use of spillproof feeding cups, weighing of leftover food, and housing of rats singly in cages with wide-mesh floors, besides storage of prepared food in closed containers to maintain organoleptic quality and prevent contamination, were all embodied in the document. It was found that different strains of 21-day old weanling rats varied quite remarkably in wt (from 20 to 40 g) and likewise in subsequent growth potential; eventually, a wt of 30-35 g for the experimental rats was chosen. Rats grew very poorly in the heat of summer, whatever the food. An animal house temperature of 24 ± 2 C was recommended as far as possible, with a record of temperature being maintained. In calculating the average PER after the experiment, it was required that very low or exceptionally high food consumption (for which wt limits were specified) among the 10 animals over the 4-week period be discarded.

The choice of PER as the criterion of protein quality in protein based food products has been criticized on the grounds that a biological method is slow, expensive, not easy of access to manufacturers, and unsuitable when a quick decision has to be made to vary ingredients for reasons of economy or availability. While recognizing this, the utility of the PER as the best procedure for general applicability could not be overlooked. Recently, it has been the choice even in the U.S. for defining protein quality under the new food labeling requirements. However, a continuous process of scrutiny has been instituted by the ISI committee. Possible alternative laboratory procedures with which to monitor protein quality are suggested, even if these be applicable only to specific foodstuffs in which only a limited range of ingredients is used, and manufacturers of food products are encouraged to evaluate these procedures and report back to the committee. Among possible methods of this kind are the available lysine determination, methionine estimation by colorimetry, dye-binding procedures, and the like.

Methods for determination of most vitamins and minerals in food products have been codified by ISI in the form of appendices or of composite or separate documents.

RELATED STANDARDS

In 1970, ISI issued a Code of Practice for Handling and

Purchase of Oilseeds. This document was applicable to all oilseeds and set out practical suggestions for handling of oilseeds between farm and storage and between storage and market. For storage of oilseeds in bags, detailed instructions are given under such heads as examination, insect or fungal infestation, drying, overheating, stacking of bags, dunnage, inspection, and issue. This is followed by instructions for storage and issue of oilseeds in bulk. Recognizing the great nutritional and economic importance to India of the quality of groundnuts, which account for half the total oilseed production in the country, the Nutrition Sectional Committee has started work on two other codes of practice. One will deal with the harvesting, transport, and storage of groundnut kernels to prevent aflatoxin development and will be geared to the use of farmers. The other, meant for the instruction of processors, will deal with the treatment of groundnut cake, flour, and oil to control aflatoxin.

Three other related matters may be mentioned, all of which fall in the purview of the ISI Panel on Food Labeling and Advertising, constituted under the Food Hygiene, Sampling, and Analysis Sectional Committee AFDC:36. The Code of Practice for Food Advertising brings up various considerations common to many countries, both developing and highly industrialized. Indeed, the Indian standard has drawn heavily on the International Code of Advertising Practice (1966) compiled by the International Chamber of Commerce and the Labeling of Food Regulations 1970 of the United Kingdom. As in these documents, rules of conduct are laid down in the Indian Specification to ensure that food advertising is socially responsible, decent, honest, and not false or misleading. Three injunctions will bear mention. One is that, if a specific nutrient claim is made, it will be supported by quantitative analytical backing. A second is that advertising for no food should make a general claim regarding one or more vitamins or minerals unless a normal consumption of that food will provide at least 1/3 of the RDA for that nutrient as laid down by the ICMR. This extends the principle described earlier for nutrient fortification of processed protein foods. The third exhortation, particularly relevant to developing countries, is that "unless adequately justified, no food advertisement should adversely comment on good natural foods like milk or sound nutritional practices like breast feeding, either directly or indirectly, even by implication."

The first part of a standard entitled Code of Practice for Labeling of Prepackaged Foods has been issued. These documents also aim to ensure descriptive accuracy in relation to both quality and quantity, and one part will deal with nutritional labeling. In regard to five vitamins (A, C, B1, B2, and niacin) and two minerals (calcium and iron), declaration is likely to be compulsory of the quantity of the vitamin or mineral present in a serving of the food relative to the RDA. For six other listed vitamins, declaration is optional. How meaningful such expression would be to the consumer is a moot point.

Attempts are also being made by the Panel on Food Labeling and Advertising to draw up a Recommendation for Date Marking of Prepackaged Foods. Simply marking a date of manufacture, which has been compulsory in India since October 1975, would hardly help the consumer. Since certain foods are more perishable than others and variations in climate, transport, nature of packaging, and storage can all influence storage life, unequivocal marking of single expiry dates is hardly possible. One approach being considered is to suggest a minimum and maximum shelf life, expressed as a label declaration in the following terms:

Consume preferably before:
Do not consume after:

Another possibility is a label statement that the food is normally expected to maintain its life for a period of so many months from the date of manufacture if stored in a cool, dry place (or under refrigeration, where applicable). This document, after preliminary consideration by the relevant panel, has been referred to a few leading experts for their views.