NUTRITION LABELING

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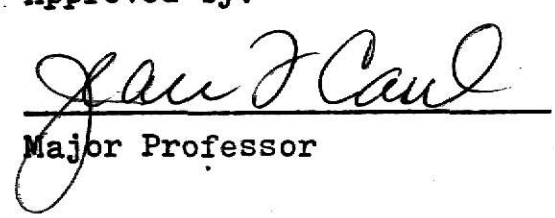

Major Professor

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INTRODUCTION

In the mid and late 1960's there were indications that the diets of many Americans were nutritionally inadequate (Breeling, 1971). Several interrelated factors focused attention on the need for an improved system of communicating nutrition education and information. These factors included the consumerism movement, widespread concern for the nutritional status of the U.S. population, consumers' difficulty in identifying the nutritional quality of an increasing number of processed and formulated foods, and increasing consumers' skepticism of the nutritional quality of the total food supply (Bauman, 1971; and Johnson, 1974). In addition, greater affluence, desire for leisure time and a greater number of working women have contributed to changing eating patterns. The traditional three meals a day food plan has been altered to increased snacking, mini-meals and meals eaten away from home. Although the modern supermarket today contains thousands of food items, the consumer does not know the nutritive value of many of the foods (Call, 1972).

The Ten-State Nutrition Survey of 1968-70 (Schaefer, 1969; and U.S. Department of Health, Education and Welfare, 1972) and the White House Conference on Food, Nutrition and Health of 1969 (Final Report, 1970) concluded that the diets consumed by many Americans, especially those of low socio-economic and minority groups, are inadequate in several

important nutrients. These nutrients include iron, vitamins A and C, thiamin, riboflavin and protein (Anon., 1971; and Hegsted, 1973). The White House Conference strongly recommended that steps be taken to assure the nutritive quality of processed foods and that food labels be used to help consumers select a nutritious diet.

As a consequence, the Food and Drug Administration (FDA), because of its authority to enforce food laws, assumed leadership in the development of what now is known as nutrition labeling. This report gives an overview of this new development.

PURPOSE OF NUTRITION LABELING

According to an official of the FDA, nutrition labeling regulations were developed to provide maximum assistance to both consumers and manufacturers and to provide a mechanism by which more information can be provided to consumers (Johnson, 1974). The regulations also were designed "to assure that the nutritional quality of the foods for sale remain as high as possible and to stimulate manufacturers to put more effort into nutrition."

Nutrition labeling of food has several specific purposes (Babcock and Murphy, 1973; Bauman, 1971; and Hegsted, 1973):

1. to help people select balanced diets;
2. to serve to identify the nutritional qualities of food products;
3. to encourage the production of nutritious foods;
4. to stimulate nutrition education;
5. to improve confidence in the food industry; and
6. to satisfy the consumers' right to know.

The mere presence of labels listing nutritive content calls attention to the fact that foods supply a variety of nutrients and choices can be made with the nutritive content in mind. Johnson (1974) stated that "labeling is a tool that can and should be used to bring about the nutritional improvement of the foods we buy and thus, the improvement of the nutritional quality of the American diet."

DEVELOPMENT OF NUTRITION LABELING

Prior to the federal regulations, some companies (General Foods Corp., General Mills Inc., The Quaker Oats Co. and The Pillsbury Co.) designed their own nutrition policies. One example is The Quaker Oats Co. whose nutrition policy was designed to ensure that the company contribute to sound nutrition for all persons and was based on four principles: (1) maximum freedom of choice within legal requirements for

health, safety and honesty; (2) accurate and complete label information for nutrients supplied in significant amounts; (3) product advertising that will communicate nutritional information when possible; and (4) emphasis on improving nutrition education (Nesheim, 1971).

Following recommendations of the White House Conference, the FDA conferred with nutrition experts, educators and representatives of government, industry and consumer groups to develop an easy-to-understand system of nutrition labeling which consumers could use to select foods to meet daily nutritional requirements (Babcock, 1971; Cooke, 1971; and Ross, 1974). Several studies were conducted and nutrition rating systems proposed to determine the most effective method of nutrition labeling (Babcock, 1971; Babcock and Murphy, 1973; Lachance, 1972; Norman, 1975; and Ross, 1974).

The FDA commissioned the Consumer Research Institute (CRI) to conduct a large consumer survey to determine if consumers' food purchasing habits might be changed by a type of nutrition labeling (Grant, 1972). This study indicated that nutrition information was used by the consumers and their purchasing patterns changed when nutrient information was provided on products. Consumers' attitudes toward nutrition and their knowledge of nutrition improved because of nutrition labeling.

Another study was conducted by the CRI to learn nutritionists' thoughts on nutrient labeling. Recommendations were: food labels should contain nutrient information; a specified minimum level of nutrient should be present before listing; and top priority should be given to the listing of calories, protein, fat, vitamins A, C and D, calcium and iron (Call and Hayes, 1970; and Ross, 1974). A joint task group representing the United States Department of Agriculture (USDA), state universities and land grant colleges stated that effective nutrition labeling could have a significant nutritional impact on health (Lachance, 1972).

Three alternative systems were devised by the FDA for consumer testing. These were a mathematical or numerical approach (Fig. 1), in which the nutrients per serving were listed as % of U.S. Recommended Daily Allowances (U.S. RDA)*; a symbolic or pictorial approach (Fig. 2), in which units, such as circles, were used to represent the amounts of eight important nutrients present; and a descriptive approach (Fig. 3), in which the important nutrients present were described as an excellent, major or fair source of the particular nutrient(s) (Bauman, 1971; Cooke, 1971; Grant, 1972; Lachance, 1972; Ross, 1974; and Tolley, 1972).

* U.S. RDA is explained later, page 13.

One cup provides

Protein	17 grams
Carbohydrate	37 grams
Fat	25 grams

Calories per cup, 440

Approximate percentage of the recommended daily nutrient allowances provided by one cup:

Nutrient	Adult Percentages
Protein	30%
Vitamin A	30%
Thiamin	10%
Niacin	20%
Riboflavin	20%
Iron	20%

Fig. 1--Mathematical or numerical approach

Nutritional Guidelines and the Labeling of Foods. 1971. J. Amer. Diet. Assoc. 59:99.

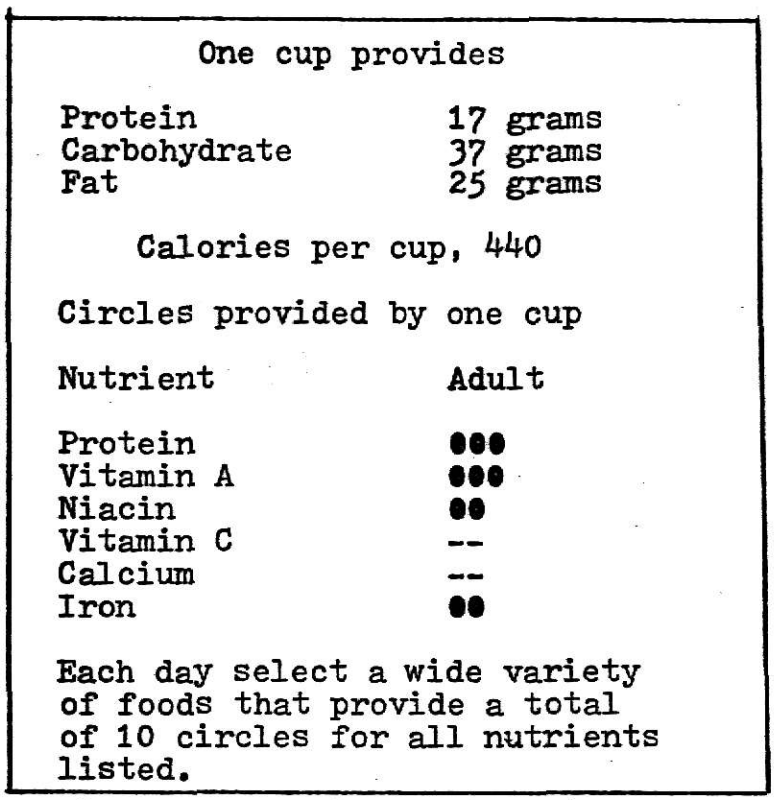

Fig. 2--Symbolic or pictorial approach

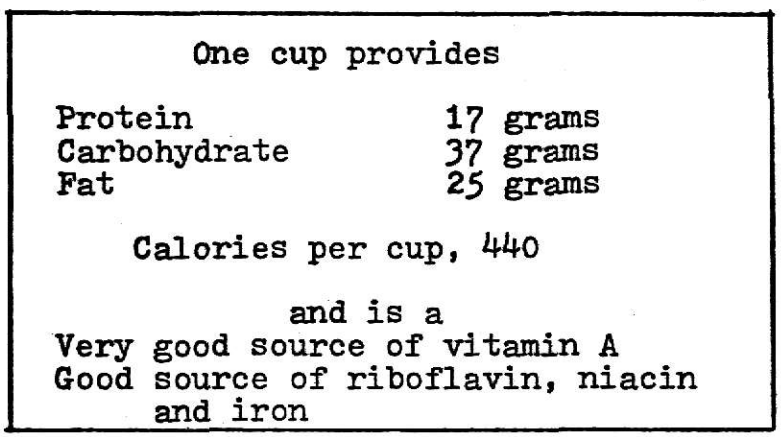

Fig. 3--Descriptive approach

Nutritional Guidelines and the Labeling of Foods. 1971. J. Amer. Diet. Assoc. 59:99.

Consumer testing showed the mathematical approach was the preferred form (Klinger, 1974; Lachance, 1972; and Ross, 1974). Consumer testing indicated that consumer use of the new labeling increased with extended exposure to the system (White, 1973). This suggested that the consumer was not familiar with the type of information the label contained and that some program of consumer education and instruction in their use was in order.

NUTRITION LABELING INFORMATION

The Federal Register (1973) and the Code of Federal Regulations (1975) provide three new regulations for implementing nutrition labeling: (1) Food labeling; information panel; (2) Food; nutrition labeling; and (3) Labeling of foods in relation to fat, fatty acid, and cholesterol content.

1.8d Food labeling; information panel

This regulation prescribes for all packaged foods that a mandatory information panel be located, if possible, to the immediate right of the principal display panel. All legally required product information, such as net weight, ingredient declaration and manufacturer's or distributor's name and address, must appear either on the principal

display panel or on the information panel. A petition may be made for alternate means of disseminating information to the public in cases where the container size is unsuitable for the placement of the information panel as required (Code of Federal Regulations, 1975).

1.17 Food; nutrition labeling

Nutrition labeling for foods is voluntary except under the following conditions: (1) when a nutrient is added to a food product as in the replacement of nutrient losses during processing (nutrition restoration or fortification) and/or (2) where any nutrition claim or information, other than sodium content, is made on a label or in advertising for a food. In these instances, full nutrition labeling is mandatory. Solicitation of requests for nutrition information by a statement "For nutrition information write to..." on the label does not subject the label or the labeling to the nutrition labeling requirements (Code of Federal Regulations, 1975). Fresh fruits and vegetables are exempt from nutrition labeling regulations pending labeling requirements specific to these products (Federal Register, Feb. 26, 1975).

Any reference to protein, fat, carbohydrate, calories, vitamins or minerals makes full nutrition labeling

mandatory. Thus, products usually marketed as enriched or fortified (enriched bread, fortified milk, fortified fruit juices and diet foods) must have nutrition labeling. A standardized food containing added nutrient(s), as enriched flour, and included in another food as a component may be declared in the ingredient statement by its standardized name, without complying to nutrition labeling. The sodium content of a food may be declared without requiring full nutrient content disclosure. When sodium is declared, the information is placed on the label immediately following the statement on fat content (and fatty acid and/or cholesterol) (Code of Federal Regulations, 1975).

Standard nutrition label format. The nutrition label format has been standardized to include these items in the following order (Fig. 4) (Code of Federal Regulations, 1975):

1. serving size;
2. servings per container;
3. calorie content per serving expressed to the nearest 2-calorie increment up to and including 20 calories, 5-calorie increment above 20 calories and up to and including 50 calories, and 10-calorie increment above 50 calories;

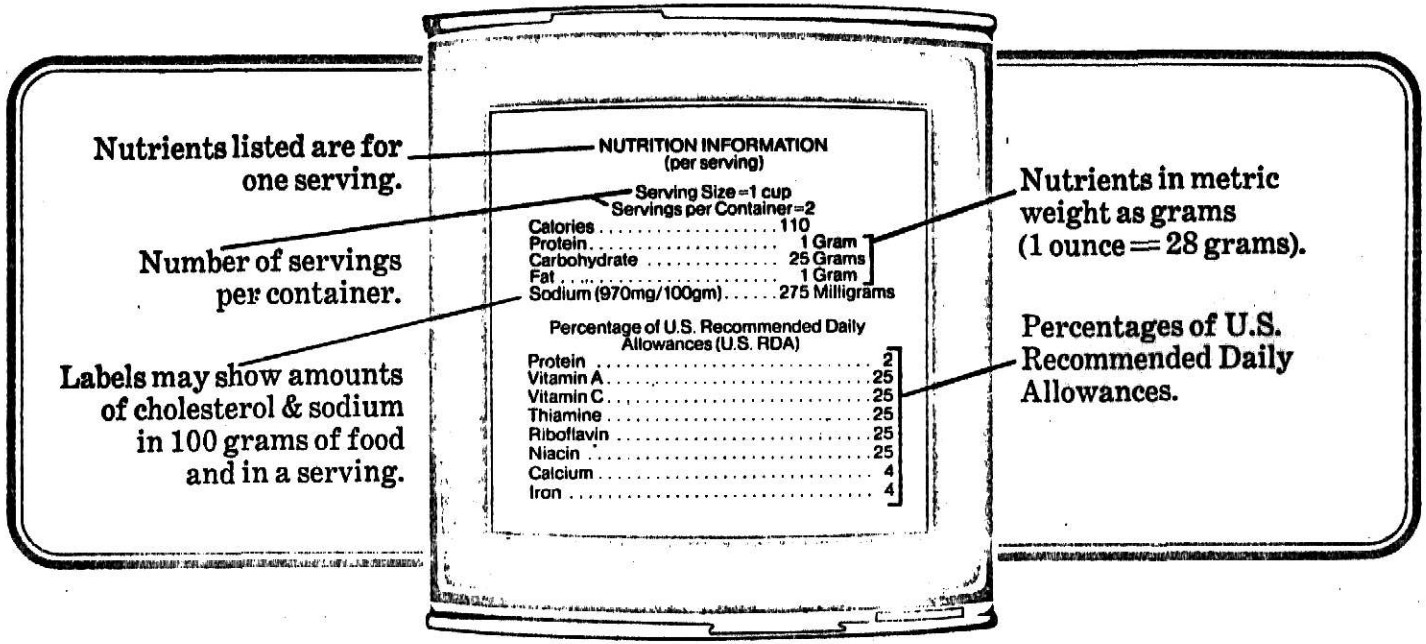

Fig. 4--Nutrition labeling format

Read the Label, Set a Better Table. 1975. U.S. Department of Health, Education and Welfare, (FDA) 75-4001.

4. grams of protein in a serving expressed to the nearest gram;
5. grams of carbohydrate in a serving expressed to the nearest gram; and
6. grams of fat in a serving expressed to the nearest gram.

The following eight mandatory nutrients are expressed as percentages per serving of the U.S. RDA--protein, vitamin A, vitamin C, thiamin, riboflavin, niacin, calcium and iron. The following optional nutrients may be listed and must be listed when they are added to a food--vitamin D, vitamin E, vitamin B_6, folic acid, vitamin B_{12}, phosphorus, iodine, magnesium, zinc, copper, biotin and pantothenic acid.

Nutrition information per serving. The declaration of nutrition information on the label follows the heading of "Nutrition Information Per Serving." A label statement regarding a serving (portion) is in terms of a convenient unit of measure that is easily identified and understood. The term "serving" means that reasonable quantity of food suited for consumption as part of a meal by an adult male engaged in light physical activity. The term "portion" means the amount of food customarily used only as an ingredient in the preparation of a meal component (Code of Federal Regulations, 1975). This leaves to processors the decision of how much this is for each product and how

to list it in uniform and easily understandable terms on the label. The FDA and some nutritionists are concerned that serving sizes on some products may be artificially high, making those foods appear to be richer in nutrients than similar foods with smaller servings (Anon., 1974).

If a food is commonly combined with another ingredient before eating and directions for such combinations are provided (ready-to-eat cereals, dry and with milk; cake mixes, dry mix and finished product), a second column of figures may be used in the required format to list the nutrient contents for the final combination. The type and quantity of the other ingredient(s) to be added by the consumer are specified (Code of Federal Regulations, 1975).

Percentages of U.S. RDA. The U.S. RDA's for food nutrients have been derived by the FDA from the "Recommended Dietary Allowances," published by the Food and Nutrition Board, National Academy of Sciences, National Research Council and replace the 1941 FDA Minimum Daily Requirements (MDR). The U.S. RDA's represent an ample amount of nutrients needed every day by healthy people (Table 1). Many adults need only two-thirds to three-quarters of the U.S. RDA for several nutrients and children, only about half (Anon., 1974; and Beloian, 1973).

All percentages of the U.S. RDA are expressed as follows:

1. 2% increments up to and including the 10% level;

Table 1--U.S. Recommended Daily Allowances (U.S. RDA) For Essential Nutrients

	Infants (0-12 mo.)	Children under 4 yrs.	Adults and children 4 or more yrs.	Pregnant-lactating women
Nutrients which must be declared on the label (when nutrition labeling is required)				
Protein, "low quality protein" (g)	0	0	0	0
Protein, "high quality protein" (g)	20	45	45	45
Protein, "proteins in general" (g)	28	65	65	65
Vitamin A (IU)	1500	2500	5000	8000
Vitamin C (ascorbic acid), (mg)	35	40	60	60
Thiamin (vitamin B_1), (mg)	0.5	0.7	1.5	1.7
Riboflavin (vitamin B_2), (mg)	0.6	0.8	1.7	2
Niacin (mg)	8	9	20	20
Calcium (g)	0.6	0.8	1	1.3
Iron (mg)	15	10	18	18
Nutrients which may be declared on the label				
Vitamin D (IU)	400	400	400	400
Vitamin E (IU)	5	10	30	30
Vitamin B_6 (mg)	0.4	0.7	2	2.5
Folic Acid (Folacin), (mg)	0.1	0.2	0.4	0.8
Vitamin B_{12} (mcg)	2	3	6	8
Phosphorus (g)	0.5	0.8	1	1.3
Iodine (mcg)	45	70	150	150
Magnesium (mg)	70	200	400	450
Zinc (mg)	5	8	15	15
Copper (mg)	0.6	1	2	2
Biotin (mg)	0.05	0.15	0.3	0.3
Pantothenic Acid (mg)	3	5	10	10

FDA Consumer Memo, DHEW Publication No. (FDA) 74-2010, March, 1974.

2. 5% increments above 10% and up to and including the 50% level; and
3. 10% increments above the 50% level.

Nutrients present in amounts less than 2% of the U.S. RDA may be indicated by a zero, or an asterisk referring to another asterisk placed at the bottom of the list and followed by the statement "contains less than 2 percent of the U.S. RDA of this (these) nutrient (nutrients)" (Code of Federal Regulations, 1975).

Protein, expressed as % U.S. RDA, is based on the protein efficiency ratio (PER), a measure of protein quality. The PER is determined under standardized conditions by comparing body weight gain of young animals with the amount of protein consumed. The greater the weight gain per given unit of protein, the better quality the protein.

Casein, the major high quality milk protein, is designated as the dividing point between high and low quality protein. If the PER of the total protein in the product is equal to or greater than that of casein, the U.S. RDA of the protein in a food product is 45 grams, and 65 grams if the PER of the total protein is less than that of casein. Total protein with a PER less than 20% of the PER of casein is not stated on the label in terms of percentage U.S. RDA. The statement of protein content in grams per serving is modified by the statement "not a significant

source of protein" immediately adjacent to the protein content statement (Code of Federal Regulations, 1975).

1.18 Labeling of foods in relation to fat, fatty acid, and cholesterol content

When fatty acid composition is stated, this information is placed on the label following the statement of fat content. When cholesterol content is declared, this follows the statement on fat content (or fatty acids, if stated) (Fig. 5). This provision is voluntary but a claim or declaration of cholesterol and/or fat composition initiates full nutrition labeling (Code of Federal Regulations, 1975).

Cholesterol content is stated to the nearest 5 mg increment per serving and per 100 g of the food. Claims or information on the fat content cannot be made unless the food contains 10% or more fat on a dry weight basis and not less than 2 grams of fat in an average serving. The total fat content is expressed in terms of the percentage of the total calories in the food provided by fat with the heading "Percent of calories from fat." The amount of fatty acids, calculated as triglycerides, is stated in grams per serving to the nearest gram in the following two categories: (1) cis, cis-methylene--interrupted polyunsaturated fatty acids, stated as "Polyunsaturated"; and (2) the sum of lauric,

NUTRITION INFORMATION

(Per Serving)
Serving Size=8 Oz.
Servings Per Container=1

Calories	560	Fat (percent of Calories 53%)	33 Grams
Protein	23 Grams	Polyunsaturated*	2 Grams
Carbohydrate	43 Grams	Saturated*	9 Grams
		Cholesterol* (20 mg/100 g)	40 Milligrams
		Sodium (365 mg/100 g)	830 Milligrams

PERCENTAGE OF U.S. RECOMMENDED DAILY ALLOWANCES (U.S. RDA)

Protein	35	Riboflavin	15
Vitamin A	35	Niacin	25
Vitamin C	10	Calcium	2
Thiamin	15	Iron	25

* Information on fat and cholesterol content is provided for individuals who, on the advice of a physician, are modifying their total dietary intake of fat and cholesterol.

Fig. 5--Nutrition information panel for a frozen dinner.

Nutrition Labels: A Great Leap Forward. 1973. U.S. Department of Health, Education and Welfare, (FDA) 72-2012.

myristic, palmitic and stearic acids, stated as "Saturated." When cholesterol and/or fatty acid is declared on the label the following statement is displayed: "Information on fat (and/or cholesterol) content is provided for individuals who, on the advice of a physician, are modifying their total dietary intake of fat and/or cholesterol" (Code of Federal Regulations, 1975).

RESTRICTIONS

FDA restrictions

No claim can be made that a food is a significant source of a nutrient unless that nutrient is present in the food at a level at least equal to 10% of the U.S. RDA in a serving or that a food is nutritionally superior to another food unless it contains at least 10% more of the U.S. RDA of the claimed nutrient per serving. A food labeled under the nutrition labeling regulation must not represent, suggest or imply the (Code of Federal Regulations, 1975):

1. a food is adequate to cure or prevent diseases;
2. a balanced diet of ordinary foods cannot supply adequate nutrition;
3. soil and plant growth conditions are responsible for dietary inadequacies;
4. processing of foods is responsible for dietary

inadequacies;

5. food has dietary properties when such properties are of no significant value or need in human nutrition; and
6. synthetic vitamins are inferior to naturally occurring vitamins.

FTC restrictions

The Federal Trade Commission's Trade Regulation Rule focuses on four types of advertisement (Hoefer, 1975):

1. ads with emphatic claims referring to a specific nutrient are not allowed unless a serving of the food provides at least 35% of the U.S. RDA for that nutrient;
2. ads making general nourishment claims that a food is a valuable or significant source of nutrition will be permitted only when at least four nutrients, one must be protein, are present in levels of at least 10% of the U.S. RDA per 100 calories, and a serving of the food provides at least 10% of the U.S. RDA of one of the nutrients regardless of calories;
3. ads with claims for foods intended to be combined with other foods, such as meat extenders or supplements, must clearly disclose that the

products's nutritional value is derived at least in part from combining it with another food; and

4. ads comparing competitive brands are not allowed if a serving of the food to which the advertised product was compared is significantly superior (10% or more U.S. RDA) in more than two nutrients. The nutrients compared have to be present at the 10% level.

EXEMPTIONS FROM NUTRITION LABELING

Moore and Wendt (1973) list certain foods which are subject to other labeling regulations or requirements and are exempted from the nutrition labeling regulations. These include:

1. Infant, baby and junior foods;
2. Dietary supplements;
3. Foods used exclusively under medical supervision;
4. Iodized salt;
5. Foods containing nutrients for technological purposes only;
6. Foods in which the source of "added nutrients" is an enriched product which has a standard of identity, e.g., enriched flour;
7. Bulk-shipped foods that are to be ingredients of

manufactured food; and

8. Foods supplied to institutional food services.

COMPLIANCE DETERMINATION

Two classes of nutrients are defined for purposes of compliance:

Class I. Added nutrients in fortified or fabricated foods; and

Class II. Naturally occurring (indigenous) nutrients. Compliance with nutrient label claims for both classes is evaluated by analyzing a composite formed from 12 retail units chosen from different cases randomly selected from a production lot (Code of Federal Regulations, 1975). Roberts (1974) and O'Brien (1974) state that the composite value is considered to be the same as the average of a sample of 12 containers. For Class I, compliance requires that the nutrient content of the composite be at least equal to the declared amount of that nutrient. For Class II, the nutrient content of the composite must be at least equal to 80% of the declared amount (Code of Federal Regulations, 1975).

A food with nutrition labeling is misbranded unless the nutrient content of the composite is no greater than 120% of the declared value for any of the following nutrients: calories, carbohydrates, fat, saturated fat, cholesterol

and sodium. Reasonable excesses of a vitamin, mineral or protein over labeled amounts are acceptable. Reasonable deficiencies of calories or fat under labeled amounts are also acceptable (Code of Federal Regulations, 1975).

Analytical methods

The analytical procedures used for assessing compliance are those of the Association of Official Analytical Chemists (AOAC), or if such do not exist, FDA approved methods. Use of calculations from a standard food composition table is not acceptable (Ross, 1974). Compliance with requirements is maintained by each organization through its quality control system and is verified through laboratory analysis (O'Brien, 1974).

Albanese (1970), Association of Vitamin Chemists, Inc. (1966), Peters (1974) and Passwater (1974) give principles and procedures on the different automated methods useful for nutrient analysis. Peters (1974) reported that automated analytical systems can increase quantity and quality of tests while keeping total expenses at a minimum. The Appendix cites page references for the official AOAC methods available for nutrient analysis.

Caloric content is determined by the Atwater method as described by Merrill and Watt (1955). Caloric content may be calculated on the basis of 4, 4 and 9 calories per

gram for protein, carbohydrate and fat respectively, unless the use of these values gives a caloric value more than 20% greater than the caloric value obtained by the Atwater method. Protein content is calculated on the basis of the factor of 6.25 times the nitrogen content of the food except when the official procedure for a specific food requires a different factor (Code of Federal Regulations, 1975).

Fat and saturated fatty acids are analyzed by the AOAC methods or other reliable and appropriate methods. The determination of cis, cis-methylene interrupted polyunsaturated fatty acids will follow the Canadian Food and Drug Directorate Method FA-59 for these fatty acids (Code of Federal Regulations, 1975). Sheppard (1973) and Sheppard et al. (1974) provided methods for fat, fatty acid and cholesterol analysis for FDA's Division of Nutrition.

Nutrient Variability

Despite current progress, some resistance to nutrition labeling still exists. This resistance is caused to some extent by lack of understanding of the compliance requirements. One complaint is that nutritional levels are too variable to permit accurate labeling and that acquisition of nutrient data is too expensive (Roberts, 1975).

Variability is specifically considered in the regulations for both added (Class I) and naturally occurring

(Class II) nutrients. Allowances for variability applicable to either Class I or II nutrients include basing compliance checks on the average nutrient level in 12 samples of a composite rather than on individual units and the use of increment systems for listing percentages of the U.S. RDA's. Allowance is also made for the variability inherent in the analytical methods (Roberts, 1974; and Roberts, 1975). Roberts (1975) stated that "the statistically based compliance rules are designed to allow flexability within the confines of good manufacturing practice while assuring the consumer that the nutrient levels claimed are present."

With these compliance provisions, nutrient testing need not be extensive (Roberts, 1975). Running complete nutrient profiles for products that contain significant amounts of only a few nutrients is a waste of time and money. Testing to determine whether 17 or 18% of the U.S. RDA is more representative of the product is also an unnecessary waste since the 15% U.S. RDA labeling increment would have to be used.

Plant inspection

O'Brien (1974) states that labels used for nutrition labeling have to be approved by the FDA and before approval is given, a plant must have a quality control system. Such

a system has to provide controls and information necessary to assure that label claims are accurate. The minimum acceptable system has to include records on methods used to maintain uniformity of raw ingredients, formulation data, handling and processing records and provisions for chemical analysis of the finished product as a means of determining the accuracy of label claims.

The food processor, not the FDA, has primary responsibility for the safety, wholesomeness and nutritional quality of food. FDA's task is to monitor industry to determine whether it is meeting its responsibilities and to motivate compliance. The FDA utilizes a number of techniques to determine how industry accepts its responsibility. These include: establishment inspection, which may vary from the Hazard Analysis and Critical Control Point (HAACP) to a less comprehensive inspection; sample collection and analysis of products in process and of finished products; and surveillance to identify new problems and to quantify the extent and significance of known problems that may be associated with processing (Angelotti, 1975; and Harkins, 1974).

Nutrition labeling in industry

Since nutrition labeling is voluntary (except when required because of fortification or nutritional claims) a

decision has to be made whether to label and if so what food products to label. The Bakery Mix Marketing Division of the Pillsbury Agri-Products recommends some precautions to take when using nutrition labeling. These are:

1. acquiring first hand knowledge of the nutrition labeling requirements;
2. determining what label changes will be necessary to comply with information panel requirements;
3. examining both current labels for nutrition claims and current formulas for added nutrients which could invoke mandatory nutrition labeling; and
4. formulating a plan for implementing mandatory nutrition labeling, or if this is not technically feasible, changing current claims or formulas to avoid mandatory labeling.

Background investigation is needed to ascertain the nutrients that are of interest in nutrition labeling and the nutrients to analyze. The potential sources of variation are also considered. The next step is to determine the analytical method to use, considering the following factors:

1. accuracy--correct answer is obtained;
2. precision--repeatability;
3. sensitivity--results obtained at low enough level;
4. timely--procedure done in a reasonable amount

of time; and

5. inexpensive--least reasonable cost.

The last step is to use a realistic planning and evaluation program (Munson, 1975).

USE OF NUTRITION LABELING BY CONSUMERS

A main purpose of nutrition labeling is to help consumers choose nutritious diets. The consumer can do this in several ways: (1) compare labels to select foods that round out the needed nutrients; (2) use the nutrition labels to help count calories; (3) consumers on a special diet recommended by their physician can use nutrition labels to avoid restricted foods; and (4) read labels on new foods for the nutrients they supply. Money can also be saved by reading the labels to compare the cost per serving of similar foods; to get the most out of the food dollar; and to find less-costly substitutes for more expensive foods (Norman, 1975; and White, 1973).

"Nutrition labeling cannot succeed completely without substantial strides in nutrition education" (Roberts, 1975). To quote FDA Commissioner Schmidt "...our current program for relabeling foods with nutritional information has necessarily meant a re-education of essentially everyone involved within food marketing, and must eventually involve

education of the entire public. Otherwise, the full potential of the program will not be realized. We are trying to take on this massive effort" (Roberts, 1975).

SUMMARY

The nutrition labeling regulations detail when and how food labels are to provide information about the nutritional content of a food. When a food label contains nutrition information, it must provide all of the following information under the heading "nutrition information" in this standard format: serving size; servings per container; caloric content; protein content; carbohydrate content; fat content; and percentage of U.S. RDA's on a per serving basis of protein and seven nutritionally essential vitamins and minerals--vitamin A, vitamin C, thiamin, riboflavin, niacin, calcium and iron. Twelve other vitamins and minerals may be listed at the processor's option, if present at a declarable level.

Nutrition labeling for most foods is voluntary on the part of the processor. But if a nutrient is added to any product, or if a nutritional claim is made for the food in labeling or in an advertisement, the label must bear all of the required nutrition labeling information.

The labeling for cholesterol and fats is intended to

help consumers who are following low cholesterol, or fat-modified diets to select appropriate foods. It requires listing of the cholesterol content in both milligrams per 100 grams and milligrams per serving; total fat content as a percentage of the total number of calories; and the grams of polyunsaturated and saturated fats in each serving.

Nutrition labeling is a tool that can be exploited for educational purposes. It communicates caloric information and constitutes a means of product by product comparison of nutrient values. It offers the necessary clues for selecting combinations of foods that provide all known key nutrients and thus facilitates planning of balanced meals.

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APPENDIX

OFFICIAL AOAC METHODS FOR NUTRIENT ANALYSIS

Protein

1. Kjeldahl Method
   AOAC, 12th Ed. (1975), pages 15-16
   2.049-2.050

2. Dye Binding Method
   AOAC, 12th Ed. (1975), pages 256-257
   16.037-16.041

Vitamin A

1. Vitamin A in Margarine
   AOAC, 12th Ed. (1975), pages 816-818
   43.001-43.007

2. Vitamin A in Mixed Feeds, Premixes and Foods
   AOAC, 12th Ed. (1975), pages 818-821
   43.008-43.013

Ascorbic Acid (Vitamin C)

1. 2, 6-Dichloroindophenol Method
   AOAC, 12th Ed. (1975), pages 829-830
   43.051-43.055

2. Microfluorometric Method
   AOAC, 12th Ed. (1975), pages 830-831
   43.056-43.062

Thiamin (Vitamin B_1)

1. Fluorometric Method
   AOAC, 12th Ed. (1975), pages 823-824
   43.024-43.030

2. Rapid Fluorometric Method
   AOAC, 12th Ed. (1975), pages 824-825
   43.031-43.034

3. Thiamin in Bread
   AOAC, 12th Ed. (1975), pages 825-826
   43.035-43.038

Riboflavin (Vitamin B_2)

1. Microbiological Method
   AOAC, 12th Ed. (1975), pages 846-847
   a. Titrimetric 43.140-43.143
   b. Turbidimetric 43.144-43.147

2. Fluorometric Method
   AOAC, 12th Ed. (1975), pages 826-827
   43.039-43.042

Niacin (nicotinic acid) and Niacinamide (nicotinamide)

1. Microbiological Method
   AOAC, 12th Ed. (1975), pages 844-845
   a. Titrimetric 43.121-43.125
   b. Turbidimetric 43.126-43.129

2. Chemical Method
   AOAC, 12th Ed. (1975), pages 827-829
   43.044-43.046

Calcium

1. Atomic Absorption Spectrophotometric Method
   AOAC, 12th Ed. (1975), pages 22-23
   2.096-2.100

2. Emission Spectrographic Method
   AOAC, 12th Ed. (1975), page 941
   49.001-49.003

3. Bread, Cereal Foods
   AOAC, 12th Ed. (1975), page 224
   14.014-14.016

4. Vegetable Products, Canned
   AOAC, 12th Ed. (1975), page 662
   36.051-36.054

Iron

1. Atomic Absorption Spectrophotometric Method
   AOAC, 12th Ed. (1975), pages 22-23
   2.096-2.100

2. Chemical Method
   AOAC, 12th Ed. (1975), pages 223-224
   14.011-14.014

3. Emission Spectrographic Method
AOAC, 12th Ed. (1975), page 941
49.001-49.003

Vitamin D

1. Biological Vitamin Assay
AOAC, 12th Ed. (1975), pages 851-856
43.166-43.179

Vitamin E (alpha tocopherol)

1. Chemical Method
AOAC, 12th Ed. (1975), pages 831-837
43.063-43.077

Vitamin B_6

1. Microbiological Method
AOAC, 12th Ed. (1975), pages 849-851
43.159-43.164

Folic Acid (Folacin)

1. Microbiological Method
AOAC, 12th Ed. (1975), pages 843-844
   a. Titrimetric 43.113-43.117
   b. Turbidimetric 43.118-43.120

Vitamin B_{12}

1. Microbiological Method
AOAC, 12th Ed. (1975), pages 842-843
   a. Titrimetric 43.105-43.109
   b. Turbidimetric 43.110-43.112

Phosphorus

1. Egg and Egg Products
AOAC, 12th Ed. (1975), page 296
17.023-17.024

2. Cereal Foods
AOAC, 12th Ed. (1975), page 224
14.015-14.016

3. Emission Spectrographic Method
AOAC, 12th Ed. (1975), page 941
49.001-49.003

4. Microchemical Method
AOAC, 12th Ed. (1975), page 930
47.031-47.033

Iodine

1. Microchemical Method
a. Carius Combustion Method
AOAC, 12th Ed. (1975), pages 922-923
47.003-47.006
b. Oxygen Flask Combination Method
AOAC, 12th Ed. (1975), pages 923-924
47.007-47.008

Magnesium

1. Atomic Absorption Spectrophotometric Method
AOAC, 12th Ed. (1975), pages 22-23
2.096-2.100

2. Emission Spectrographic Method
AOAC. 12th Ed. (1975), page 941
49.001-49.003

Zinc

1. Colorimetric Method
AOAC, 12th Ed. (1975), pages 459-460
25.136-25.142

2. Atomic Absorption Spectrophotometric Method
AOAC 12th Ed. (1975), pages 460-461
25.143-25.147

3. Emission Spectrographic Method
AOAC, 12th Ed. (1975), page 941
49.001-49.003

Copper

1. International Union of Pure and Applied Chemistry Carbamate Method
AOAC, 12th Ed. (1975), pages 434-435
25.035-25.040

2. Atomic Absorption Spectrophotometric Method
AOAC, 12th Ed. (1975), pages 435-436
25.041-25.045

3. Emission Spectrographic Method
   AOAC, 12th Ed. (1975), page 941
   49.001-49.003

Biotin

No standard AOAC method

Pantothenic Acid

1. Microbiological Method
   AOAC, 12th Ed. (1975), pages 845-846
   a. Titrimetric 43.131-43.134
   b. Turbidimetric 43.135-43.138

NUTRITION LABELING

by

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AN ABSTRACT OF A MASTER'S REPORT

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ABSTRACT

The White House Conference on Food, Nutrition and Health in 1969 concluded that the current labeling of foods was inadequate and that more emphasis should be placed on increased nutrition information in food labeling. In response to the White House Conference and following two years of study, the Food and Drug Administration (FDA) published proposed regulations for nutrition labeling. Final regulations are published in Title 21 of the Code of Federal Regulations, 1975. The purpose of nutrition labeling is to help consumers be aware of and select nutritious foods for balanced diets.

Nutrition labeling is voluntary except whan a manufacturer adds any nutrient to the food or makes some nutritional claim for it on the label or in advertising. The nutrition information panel lists in a standardized format the quantities of calories, protein, carbohydrate and fat a predefined serving of that food will provide. It also shows the percentages of the U.S. Recommended Daily Allowances (U.S. RDA) of protein and seven essential vitamins and minerals. The U.S. RDA replaces the previously used concept of Minimum Daily Requirements (MDR). The panel can also display the per-serving percentages of the U.S. RDA for 12 other vitamins and minerals and under specified conditions how much saturated and unsaturated fat, cholesterol and

sodium the food contains.

Some specific kinds of foods either are subject to special labeling requirements or are exempt from nutrition labeling requirements. The regulation also restricts health and medical claims and will consider foods misbranded if their labels violate the restrictions.

Any product which carries nutrition information is subject to FDA laboratory analyses for all nutrients claimed to be in the food. Regulations also prescribe analytical methods to use for analyses. Protein quality as well as quantity is considered in the labeling regulations. Of the other nutrients, the quantity and not the quality is considered. Two classes of nutrients are defined for purposes of compliance: added nutrients in fortified or fabricated foods; and naturally occurring (indigenous) nutrients. FDA's analytical values for a composite sample from 12 packages of the product must equal or exceed label claims for essential nutrients in Class I foods and for essential nutrients in Class II foods, the analytical values must exceed 80% of the label claim.

Labels to be used for nutrition labeling must be approved by the FDA and before approval is given, the processing plant must have a quality control system. The food processor has primary responsibility for the nutritional quality of the food, and can decide whether

or not to use nutritional labeling.

Nutrition labeling is for the consumer to use. With educational programs designed to help the consumer, nutrition labeling should be an important way for consumers to select nutritious meals.