USDA Nutrient Data Update

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Last fall, I assumed a new and challenging role as Technical Advisor to the Director, Nutrition Monitoring Division. My responsibilities include recommending new areas for food composition research; recommending changes; pointing out trends; looking at perceptions about foods; food groups, and nutrients relative to the data bases; and promoting industry cooperation. Meanwhile, ongoing research in the Nutrient Data Research Branch continues to assure currency and accuracy of the data.

Monitoring Data Bases

The emphasis today is monitoring key foods-- those foods that provide the largest amounts of a specific nutrient in American diets according to current food consumption surveys. For carotene, vitamin A, ascorbic acid, calcium, cholesterol, vitamin B-12, and sodium, between 30 and 91 foods provide at least 80 percent of each of these nutrients. For the other nutrients listed from around 100 to 200 foods account for 80 percent of the nutrient consumed.

Key Foods Monitoring

Nutrient	No. of Foods[1]
Carotene	30
Vitamin A	54
Ascorbic Acid	60
Calcium	61
Cholesterol	62
Vitamin B_{12}	79
Sodium	91

[1]Contributing 80 percent of total nutrient consumed as shown by 1987-88 Nationwide Surveys.

Key Foods Monitoring

Nutrient	No. of Foods[1]
Alpha tocopherol	103
Copper	121
Dietary fiber	125
Folate	126
Potassium	161
Thiamin, riboflavin, niacin, vitamin B_6	155-185
Iron, magnesium, phosphorus	178-227

[1]Contributing 80 percent of total nutrient consumed as shown by 1987-88 Nationwide Surveys.

"Key" Foods for Calcium Monitoring

Food	% calcium[1] provided	calcium (mg per 100 g)
Milk, whole	23.2	119
Milk, lowfat, 2%	12.7	122
Cheese, American proc.	6.1	616
Cheese, cheddar	3.3	721
Milk, skim	3.0	123
Bread, white	2.9	116
Total	**51.2**	

[1]Based on 1987-88 NFCS.

In addition to key foods, extramural contracts include analyses for proximates, vitamins, minerals, and lipids (including geometric isomers, cholesterol, and plant sterols) in ethnic and geographic-specific foods and verification of some important retention and yield factors. Data are also being generated on dietary fiber and sugar content.

The Primary Data Set (PDS) is being modified to include individual fatty acids. Data are being reviewed before release.

New Foods Data

Reduced-fat and lowfat foods are appearing in the supermarkets in ever-increasing numbers. Whether baked products, salad dressings, margarine-like spreads, frozen desserts, frostings, crackers, cookies, puddings, candies, sausages, luncheon meats, or dairy items such as cheese and cream products, the proportion of the usual ingredients has been changed. Some of these types of reduced-fat, lowfat, no fat items were analyzed on two small contracts. Some of the data are being reported here.

These and other foods are reduced in fat by the use of ingredient modifiers that duplicate the sensory properties of fat. Various soluble-fiber materials are used, such as guar gum, xanthan gum, carboxymethylcellulose (CMC), locust bean gum, carrageenan; starches such as rice, potato, and modified cornstarch; and alpha-cellulose, cellulose gel, or cellulose gum which hold added water. Polydextrose and tapioca dextrin also ingredients that help duplicate textural properties in products such as frozen desserts, puddings, frostings, and salad dressings.

PUBLICATIONS

The following publications were released since last year's meeting:

Publications

- **1991 Supplement to AH-8**
- **AH-8-18 Baked Products**
- **AH-8-10 Pork Products (revised)**
- **Provisional Table on Selenium Content**

AH-8 1991 Supplement
AH-8-18 Baked Products
AH-8-10 (rev.) Pork Products
Provisional Table on Selenium

The long-awaited AH-8-18, Baked Products, which includes over 400 items; the 1991 Supplement to AH-8; the revised AH-8-10 Pork Products, with new fresh pork data; and a provisional table on selenium were released.

A new "red book," AH-699 designed to replace the 1963 edition of AH-8 will soon be published. This publication will contain over 2,000 foods in 100-gram edible portion measures including all nutrients reported in AH-8 except individual fatty acids and amino acids. The branch is also working on revising AH-456, "Nutritive Value of American Foods in Common Units," which is expected to be available in 1994. A trans fatty acid provisional table is also nearing completion.

Nutrient Data Bank Bulletin Board

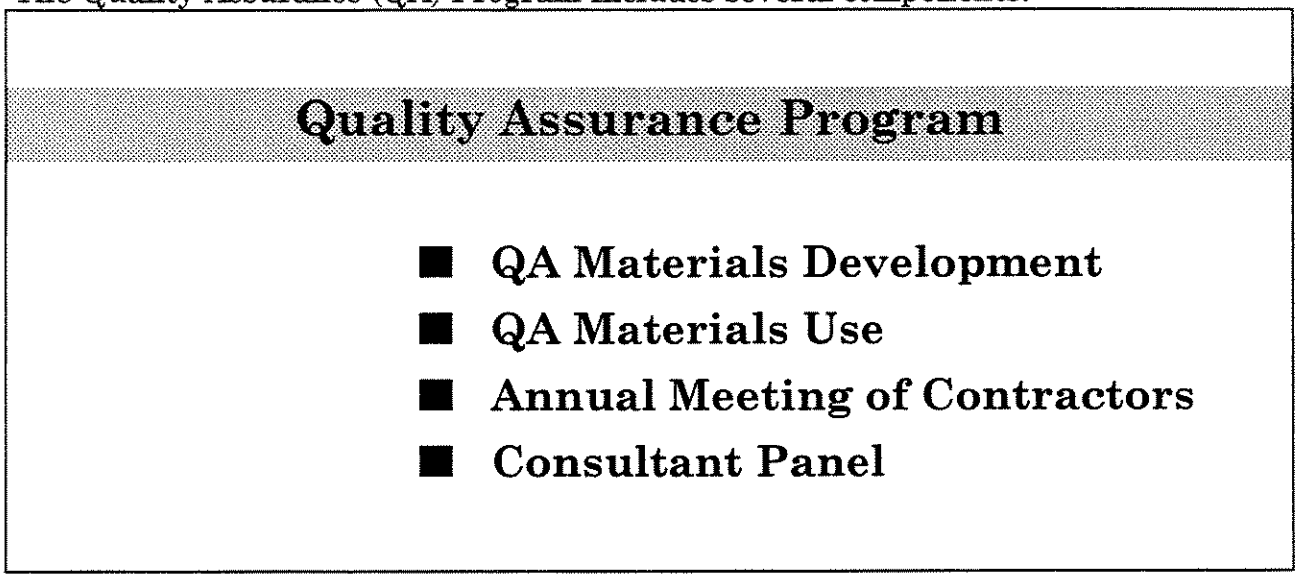
The Nutrient Data Bank Bulletin Board continues to increase in popularity and has become more utilitarian because of its link with Internet. The provisional tables on vitamins D and K and selenium; the three supplements to AH-8; and the handbook sections on Baked Products and Snacks and Sweets have been very popular. Many individuals have been anxious for data to appear on the Bulletin Board before the published manuscript is available.

Nutrient Data Bank Upgrade

An important component in the whole process for the Branch is upgrading the National Nutrient Data Bank System (NNDBS), beginning this year with anticipated completion in about 3 years. The new system will be designed to expedite and enhance the Branch's work by providing easy updating of data for AH-8 and other food tables, as well as the Survey Nutrient Data Bases, and to help avoid the kinds of delays we've had in the past. The system will help the branch achieve its long-range goals of providing quality, current food composition data.

Quality Assurance Program

The Quality Assurance (QA) Program includes several components:



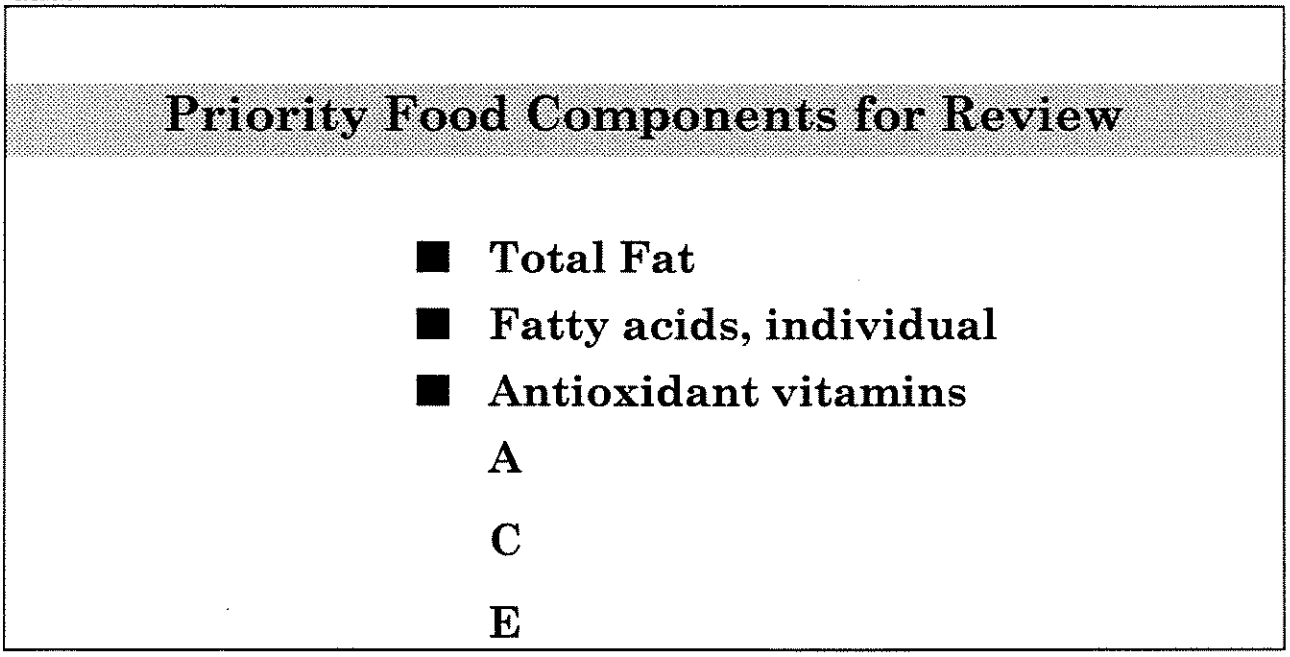
QA Materials development (under contract or with NCL)
Use of QA Materials
Annual Meeting of Contractors
Consultant Panel

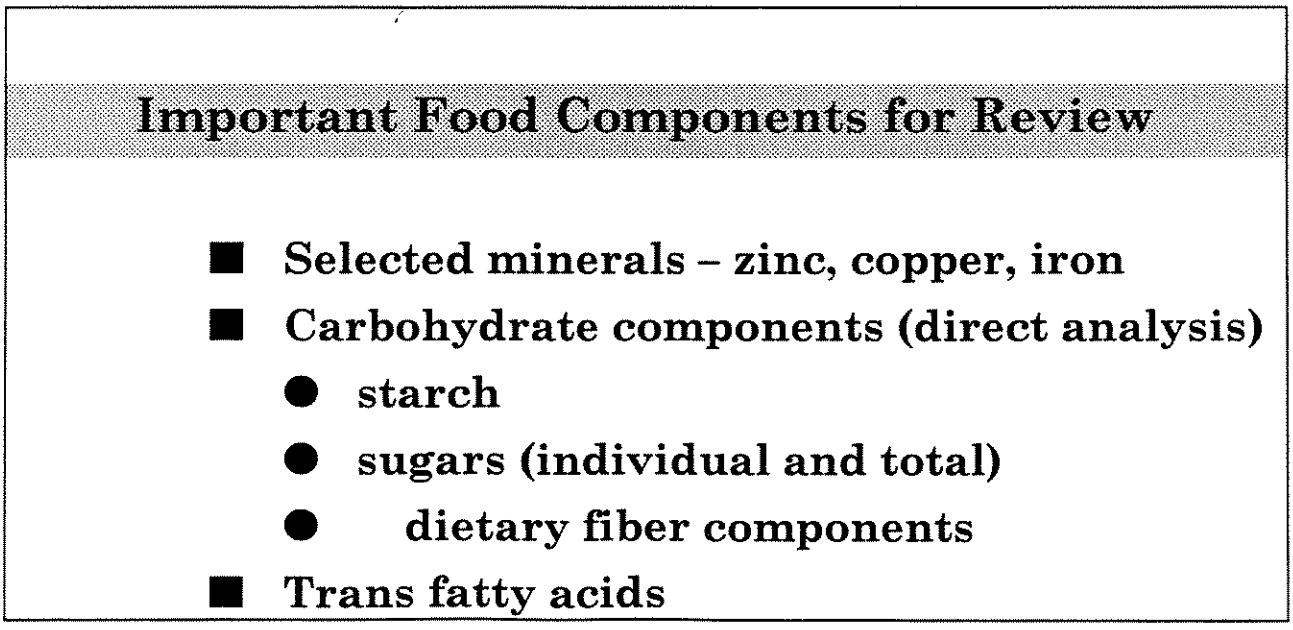
A three-member NDRB panel decides on appropriate reference materials for screening prospective contractors and for monitoring their performance during the course of the contract. Reference material development is carried out under a small contract and is often conducted in consultation with ARS personnel. Reference materials are used for screening prospective contractors, for improving performance where some weakness in accuracy exits, and for evaluating performance during the course of the contract period. USDA/HNIS contractors meet annually at the time of the IFT annual meeting to discuss problems in sample preparation, analytical methods, report writing, and other matters.

A vital part of quality assurance is the three-member Consultant Panel, initiated in 1991. They are often called upon during the year to advise, review, and evaluate proposals, manuscripts, and plans of work. Consultant panel members are selected from industry, academia, and government and have expertise in analytical methods, data base management, and data base building. They are consulted regularly on issues relating to their areas of expertise.

Keeping Current

The scientific literature continues to focus on health issues relating to total fat content, degree of unsaturation, individual fatty acids, and the antioxidant vitamins A (especially beta-carotene), C, and E. Also important are other components such as zinc, copper, and iron; individual carbohydrates by direct analysis, starch, sugars, and dietary fiber components; and trans fatty acids.





Perceptions about food are important for accuracy in surveys. One example would be identification of some types of bread. In general, wheat bread (about 30 percent whole wheat flour) and whole wheat bread (100 percent whole wheat flour) are often confused. These breads differ considerably in mineral content.

Comparison of Two Breads in Mineral Element Content

Mineral Element	Whole Wheat Bread[1]	Wheat Bread[2]
	(mg per 100 grams)	
Calcium	72	105
Magnesium	86	46
Phosphorus	229	150
Potassium	252	201
Zinc	1.94	1.04
Copper	0.284	0.212
Manganese	2.324	1.024

[1]Made with 100 percent whole wheat flour.

[2]Made with approximately 30 percent whole wheat flour, 70 percent white flour.

Values for real mayonnaise and the reduced-calorie and fat-free, cholesterol-free types are shown here. Differences in fat content are reflected in the differences in calorie values.

Selected Food Components in Mayonnaise and Mayonnaise-Type Dressings

Food Components	Mayonnaise	Mayonnaise-Type Dressings	
		Reduced Calorie	Fat-Free Cholesterol-Free
Water (%)	15.3	56.0	80.7
Fat (%)	79.4	29.7	0.3
Protein (%)	1.1	0.5	0.2
Carbohydrate (%)	2.7	12.0	16.5
Calories (/100 g)	717	334	70
Cholesterol (mg/100 g)	59	45	0

Data for American cheese, cheese food, cheese spread, and cheese products are presented here. One observes the dramatic differences in composition. However, these products are the same color, are individually wrapped and, in general, are similar in appearance.

Selected Food Components in Cheese and Cheese Products[1]

Food Components	Cheese	Cheese Food	Cheese Spread	Cheese Product
Water (%)	39.2	43.2	47.6	57.1
Fat (%)	31.2	24.6	21.2	5.0
Protein (%)	22.2	19.6	16.4	14.5
Carbohydrate (%)	1.6	7.3	8.7	9.5
Calories (/100 g)	375	328	290	143
Cholesterol (mg/100 g)	94	64	55	45

[1]American process type

Industry reports that American cheese constitutes about 10 percent of the market; cheese food, 60 percent; cheese spread, 10 percent; and cheese product, 20 percent. The cheese product first appeared on the market in 1990. Fast-food establishments and restaurants most often use cheese food because it melts more easily than the cheese. Unless nutritionists are able to obtain specific information on these differences, a weighted value for American cheese products should be used for surveys. As shown by earlier survey results, American cheese is one of the major contributors of protein, fat, cholesterol, calcium, phosphorus, and zinc.

Let us compare fat content of wild and farmed fish. Catfish is essentially all farm-raised. The data show the farm-raised to be more than 2-1/2 times the fat content. Effects of feeding practices are also reflected in the fatty acid profiles.

Comparison of Selected Food Components in Catfish[1]

Food Components	Wild	Farmed
Water (%)	80.36	75.38
Fat (%)	2.82	7.59
Protein (%)	16.38	15.55
Calories (/100 g)	95	135
Cholesterol (mg/100 g)	58	47

[1]Raw

Wild rainbow trout are essentially only available by recreational fishing. Aquaculture of rainbow trout began in 1928, the pioneer for the industry.

Comparison of Selected Food Components in Rainbow Trout[1]

Food Components	Wild	Farmed
Water (%)	71.87	72.73
Fat (%)	3.46	5.40
Protein (%)	20.48	20.87
Calories (/100 g)	119	138
Cholesterol (mg/100 g)	59	59

[1]Raw

Atlantic salmon is increasing in popularity and production today and is about 95 percent farm raised. As early as 1988, about 30 percent of the Atlantic salmon was produced by aquaculture and imported from Norway, and now, Maine. Note the differences in fat content between the farm-raised and the wild forms.

Comparison of Selected Food Components in Atlantic Salmon[1]

Food Components	Wild	Farmed
Water (%)	68.50	68.90
Fat (%)	6.34	10.85
Protein (%)	19.34	19.90
Calories (/100 g)	142	183
Cholesterol (mg/100 g)	55	59

[1]Raw

Another changing area is improvement of functional qualities in foods by adding vitamin C as sodium erythorbate or as sodium ascorbate in processing luncheon meats, frozen fruits, fruit desserts, fruit-flavored punches and ades, and selected wheat flours, to name a few uses. The vitamin C is not present for fortification, but significant amounts can remain after storage or food preparation. The vitamin C present in these foods must be accounted for especially in epidemiological studies when knowing the level of the nutrient accurately may be crucial for interpretation of results. The major producers of U.S. luncheon meats (75 percent of market) recently switched from sodium ascorbate to sodium erythorbate, which has no vitamin C activity.

The Future

In accordance with the Ten Year Comprehensive Plan for the Nutrition Monitoring and Related Research Program, addition of nutrients to the data bases will be prioritized. Need for and availability of data will have a marked effect on this activity.

The data base for vitamin E as alpha tocopherol equivalents will be reviewed and updated based on a significant amount of new data. Data on individual carotenoids will be adapted to the PDS as NDRB staff time permits.

Future expansion of the data base on carbohydrate components will provide valuable information that may be helpful in interpreting glycemic response-- an area of special interest for the study of diabetes control.

A Memorandum of Understanding between HNIS and ARS was recently prepared and will promote more collaboration in several research areas. Development and distribution of reference materials, and Laboratory Performance Evaluation (LPE) are areas that need the expertise of the NCL staff and the experience of the nutritionists in NDRB. The LPE will provide continuing performance evaluation of analytical laboratories that may conduct nutrient analyses for food composition research for NDRB.