

Update from the Nutrient Data Research Branch

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As we celebrate the first century of published food composition data we focus on important issues for the future of tables and nutrient data bases -- that is, data in the standard reference and survey data bases and in published tables. Our focus continues to be on quality and currency of the data. Regular monitoring to verify or strengthen published data is paramount. Our role also is to look at "new" nutrients and to expand our current data bases in content for the general population as well as for ethnic and multicultural subgroups in the population.

Monitoring and Expanding Databases

The emphasis in the NDRB is on nutrients in key foods -- those foods that provide the largest amounts of a specific nutrient in American diets according to current food consumption surveys. (Table 1) For carotene, vitamin A, ascorbic acid, calcium, cholesterol, vitamin B-12, and sodium, between 30 and 91 foods provide at least 80% of each of these nutrients. For the other nutrients listed we have to monitor, from over 100 to over 200 foods.

In addition to monitoring of key foods, this year's extramural contracts include analyses for proximates, vitamins, minerals, and lipids (including geometric isomers and plant sterols) in ethnic and geography-specific foods and verification of some important retention and yield factors. Key foods already analyzed include canned tuna, ice creams, American and Cheddar cheeses, fresh milks, potatoes, dinner rolls, potato chips, ground turkey, frozen orange juice concentrate, brewed coffee and chicken breast. Foods recently added to the AH-8 supplements and data bases include radicchio, baby vegetables, arugula, and some ethnic foods such as goat cheese, Mexican cheeses, salsas, and several spices.

HNIS is supporting analyses of vitamin K in foods in order to develop a data base and expand information on vitamin K, which has been in great demand. James Sadowski of Tufts University reported on some of his recent work on vitamin K at this meeting. Also, Ronald Eitenmiller, of the University of Georgia described results of analyses of individual tocopherols and tocotrienols in foods, research also supported by our extramural contracts program. Because of recent research on cardiovascular disease, we may need to report vitamin E content of foods by individual tocopherols and tocotrienols rather than by alpha-tocopherol equivalents. We propose to add individual tocopherols and tocotrienols to the National Nutrient Data base within the next few years.

Update from the Nutrient Data Research Branch

Quality Assurance

The Quality Assurance (QA) Program of the Branch involves several aspects.

- Check samples
- Demonstration samples
- Monitoring samples
- QA materials development
- Annual meeting of contractors
- Consultant panel

A 3-member panel of NDRB staff decide on appropriate reference materials for screening prospective contractors and for monitoring their performance during the course of the work. Reference material development is often in consultation with ARS personnel. "Check samples" are used for screening prospective contractors; "demonstration" samples for improving performance on a nutrient where some weakness in accuracy exists; and "monitoring" samples for evaluating performance during the course of the contract period. QA materials development is carried out for us under a small contract. USDA/HNIS contractors---present, past, and future--meet annually at the time of the IFT meeting to discuss problems in sample preparation, analytical methods, report writing, and other matters. Another part of quality assurance is the work of the 3-member NDRB Consultant Panel, which was initiated in 1991. They are called upon several times 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 meet with NDRB QA panel and other staff members annually.

New Publications

This summer and fall we expect the following publications to be released.

- AH-8 - 1991 Supplement
- AH8-18 Baked Products
- AH8-10 Pork Products (revised)
- AH-8 New "Red Book"
- AH-456 (revised)

First, the long-awaited AH-8-18, Baked Products section, which includes over 400 items; the 1991 Supplement to AH-8; the revised AH 8-10 Pork Products, with all new fresh pork data and unrevised cured pork items. For our centennial year we are developing a new "red book" to replace the 1963 edition of AH-8. This new publication will contain over 2000 foods in 100-gram edible portion measures including all nutrients reported in AH 8 except individual fatty acids and amino acids. We're also working on revising AH-456, "Nutritive Value of American Foods

Update from the Nutrient Data Research Branch

in Common Units" which will be available in 1993, and AH-102, "Food Yields Summarized by Different Stages of Preparation."

Nutrient Data Bank Bulletin Board (NDBBB)

The Nutrient Data Bank Bulletin Board is increasing in popularity and has become more utilitarian because it is now linked into Internet sponsored by the National Science Foundation. The NDBBB was demonstrated at our booth in the exhibit area. It now includes the following:

- Fresh pork data
- Vitamin K data
- AH-8 - 1991 Supplement
- AH-8 - 1990 Supplement
- 1987-88 Survey Data Base
- Vitamin D data
- AH-8-19, Snacks and Sweets

The provisional tables on vitamins D and K, the last two supplements to AH 8, the fresh pork data and the AH-8-19, Snacks and Sweets section have been very popular. Many individuals are anxious for data to appear on the Bulletin Board before the published manuscript is available. The Baked Products section AH8-18 should be on the NDBBB this summer.

Status of New Foods Data

Reduced fat or lowfat foods, relatively new on the market, are appearing in the supermarkets in ever increasing numbers. Whether baked products, salad dressings, margarine-like spreads, frozen desserts, frostings, crackers, puddings, candies, sausages, luncheon meats, or dairy items such as cheese and cream products, the proportion of usual ingredients has been changed. A number of these different types of reduced-fat, low fat, no fat items are being analyzed for us on two small contracts and early results are just coming in. These and other foods of this type are reduced in fat primarily by the use of ingredient modifiers that duplicate sensory properties of fat. Various soluble fiber materials are used, such as guar gum, xanthan gum, carboxymethylcellulose, locust bean gum, carrageenan; starches such as rice, potato, and modified corn starch; and alpha cellulose, cellulose gel or cellulose gum which hold added water. Polydextrose, tapioca dextrin, and Simplesser are also ingredients that help duplicate textural properties in products such as frozen desserts, puddings, frostings, and salad dressings. The next four slides present some early results of analyses of lowfat foods compared to the regular product.

Vanilla frosting is "light" because it contains one-fourth the fat of the regular frosting given in AH-8-19 (table 2). Carbohydrate is considerably higher in the

Update from the Nutrient Data Research Branch

reduced fat product, reflecting the added gums and rice starch. Minerals reported here are similar.

The reduced-fat chocolate pudding snacks are nearly 7 percentage points higher in water and contain less than one fourth of the fat (table 3). The B vitamins--riboflavin, folate, and vitamin B-6 are somewhat lower in the reduced-fat form. The minerals calcium and magnesium tend to be lower in the reduced-fat form.

Vanilla frozen dessert at 1 percent fat is dramatically reduced from the 4.3 percent fat of ice milk and the 11.0 percent fat of customary ice cream (table 4). Several added gums make this reduction in fat possible. The minerals reported here--calcium, iron, magnesium, and sodium are similar for the three products.

A comparison of processed cheese forms is interesting (table 5). American processed cheese, cheese food and cheese spread are often compared in water and fat contents, reported in AH-8-1. Many individuals think these cheeses look alike and thus are alike. Reviewing the values for the cheese product which was recently analyzed also revealed a decrease in fat with a concomitant increase in water and carbohydrate. The minerals in the slide show no real pattern which may be a reflection of the various gums and stabilizers used as well as the normal variation between the samples.

Looking Ahead

Where are we going?

The Ten Year Plan for National Nutrition Monitoring and Related Research was discussed. This legislation has an important influence on our program plans. The addition of food components to the Survey Data Base and other data bases is being prioritized. Current needs for food composition go beyond nutrients and include non-nutrients as well. For HNIS, components being considered are:

- Individual fatty acids
- Caffeine
- Selenium
- Soluble & insoluble fiber
- Total sugars
- Individual carotenoids
- Individual tocopherols and tocotrienols
- Individual amino acids

We will be working with NCHS, ARS, and others to formalize these plans with their input and recommendations. NCHS is one of the major Federal users of

Update from the Nutrient Data Research Branch

the survey nutrient database since it is used for NHANES III. Per the 10 year plan, other agencies have input to the priorities including FDA.

Ongoing plans in food composition include:

- adding new foods, especially reduced fat and reduced sugar items
- encouraging greater industry participation in sharing data
- expanding brand name descriptors

An important component in the whole process for NDRB 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 our 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 delays we have experienced in the past. The system will help us achieve our long-range goals of providing new, quality, and current food composition data.

Table 1
Key Foods Monitoring

| <u>Nutrient</u> | <u>No. of foods to make 80% contribution</u> |
|--|--|
| Carotene | 30 |
| Vitamin A | 54 |
| Ascorbic Acid | 60 |
| Calcium | 61 |
| Cholesterol | 62 |
| Vitamin B-12 | 79 |
| Sodium | 91 |
| 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 |

Update from the Nutrient Data Research Branch

Table 2
Vanilla Frosting, ready to serve

| <u>Nutrient/Units</u> | <u>Regular</u> | <u>Reduced fat</u> |
|-----------------------|----------------|--------------------|
| Water % | 13.2 | 14.1 |
| Fat % | 16.8 | 4.1 |
| Carbohydrate% | 69.4 | 81.1 |
| Calcium mg/ 100g | 3 | 4 |
| Iron mg/ 100g | .11 | .14 |
| Magnesium mg/ 100g | 1 | 1 |
| Sodium mg/ 100g | 90 | 131 |

Table 3
Chocolate Pudding Snacks, ready to serve

| <u>Nutrient/Units</u> | <u>Regular</u> | <u>Reduced fat</u> |
|-----------------------|----------------|--------------------|
| Water % | 69.3 | 76.4 |
| Fat % | 4.0 | .7 |
| Riboflavin mg/100g | .155 | .096 |
| Folate mcg/100g | 3.0 | .7 |
| Vitamin B6 mg/100g | .028 | .014 |
| Calcium mg/100g | 90 | 68 |
| Iron mg/100g | .51 | 1.36 |
| Magnesium mg/100g | 21 | 18 |
| Sodium mg/100g | 129 | 144 |

Update from the Nutrient Data Research Branch

Table 4
Frozen Desserts, vanilla

| <u>Nutrient/units</u> | <u>Ice Cream</u> | <u>Ice Milk</u> | <u>Frozen Dessert</u> |
|-----------------------|------------------|-----------------|-----------------------|
| Water % | 61.0 | 68.2 | 63.7 |
| Fat % | 11.0 | 4.3 | 1.0 |
| Calcium mg/100g | 128 | 139 | 135 |
| Iron mg/100g | .29 | .10 | .08 |
| Magnesium mg/100g | 14 | 15 | 14 |
| Sodium mg/100g | 80 | 85 | 88 |

Table 5
Comparison of American Type Process Cheeses

| <u>Nutrient</u> <u>units</u> | <u>Cheese</u> | <u>Cheese</u> <u>Food</u> | <u>Cheese</u> <u>Spread</u> | <u>Cheese</u> <u>Product</u> |
|---------------------------------|---------------|------------------------------|--------------------------------|---------------------------------|
| Water% | 39.2 | 43.2 | 47.6 | 57.1 |
| Fat % | 31.2 | 24.6 | 21.2 | 5.0 |
| Carbohydrate % | 1.6 | 7.3 | 8.7 | 9.5 |
| Calcium mg/100g | 616 | 574 | 562 | 602 |
| Iron mg/100g | .39 | .84 | .33 | .28 |
| Magnesium mg/100g | 22 | 31 | 29 | 30 |
| Sodium mg/100g | 1430 | 1189 | 1345 | 1189 |