SELECTING OR DEVELOPING A NUTRIENT DATA BASE TO MEET THE REQUIREMENTS OF YOUR APPLICATION

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Selecting or developing a nutrient data base and associated software for a particular situation deserves careful consideration of special needs. The intended use of a system is an important factor when appraising alternative options. The purpose of this paper is to identify some areas that deserve attention and to acquaint potential users with some resources that may be useful prior to and during this decision process.

Several sources of information can be used to become familiar with the types of applications that are feasible and the software products available in the marketplace. Some sources of information are:

1. Vendor materials
2. Software directories
3. Nutrient data bank conference proceedings
4. Professional literature

On the attached sheets, references are provided for some of these types of materials. The Nutrient Data Bank Directory prepared for this conference contains information for 108 software products. With the expanding marketplace, comparative information is needed to identify those products that satisfy requirements. A bibliography compiled by Hoover (1985) provides citations to the professional literature relating to the use of computers in nutrition, dietetics, and foodservice management. Each citation is coded to indicate the content of the reference. A copy of the set of codes used in the most recent edition of the bibliography is attached.

After becoming familiar with the many options that exist, a user is ready to assess the needs of a particular situation. Some factors for consideration are:

1. Setting and target audiences
2. Long-term plans
3. Amount of use
4. Comprehensiveness required
5. Interfacing requirements

The results from this analysis will be useful in determining specifications for either selecting a commercial software product or developing a custom application.

In a recent article, Frank and Pelican (1986) enumerated several primary considerations to guide the selection process. They recommended using the following criteria:

1. Validity of data base
2. Soundness of programs
3. Complete, understandable documentation
4. Output clarity
5. Soundness of developer's credentials

Evaluation of nutrient data base software applications or products both in terms of these criteria and the needs of a particular situation helps a user to make a suitable selection.

A tool has been developed by Hoover and Perloff to appraise the capabilities of a nutrient data base system. The monograph entitled *Model for Review of Nutrient Data Base System Capabilities* includes the following components: a questionnaire, five computing tasks, instructions and worksheets, and an interpretation guide. The aspects that can be reviewed with the computing tasks are:

1. Updating a data base
2. Calculating nutrients for a recipe
3. Reporting of baseline data for 100 gram quantities
4. Reporting nutrients for various portion sizes

5. Dietary record computation

The interpretation guide provides data from USDA sources for comparison with the results from each of the computing tasks.

Calculation methodologies provide one way to estimate nutrient profiles for foods as consumed when laboratory analyses are not available. Any one of a variety of methods may be used in a software product to estimate the nutrients for mixed dishes. Summaries of four methods have been compiled by Powers (1986) and are attached for reference. These methods vary in data requirements, complexity, and suitability for given situations.

Assessment of nutrient analysis applications involves consideration of a number of factors. An assessment checklist is attached to encourage evaluation in a number of areas such as maintenance and support, the contents of the data base, software characteristics, hardware configuration and suitability for needs.

A sound assessment made by an informed user improves the possibility of selecting a nutrient data base system that meets a user's requirements. In addition to the acquisition or development process, users need to recognize ongoing responsibilities for assuring the integrity and usefulness of a system.

ASSESSMENT CHECKLIST

1. Maintenance and support
   - Quality control for updating
   - Policies and procedures
   - Documentation
   - Qualifications of staff
   - Vendor support
   - Custom services

2. Contents of data base
   - Primary data source
   - Additions to primary data
   - Nutrients included
   - Foods included
   - Missing values
   - Mixed dishes

3. Software characteristics
   - Compatibility with hardware
   - Interfacing options
   - Speed and response time
   - Storage of dietary records
   - Storage of analysis results
   - Features of software
   - Database maintenance
   - Data entry options
   - Analysis options
   - Comparisons with standards
   - Presentation of results
   - Dietary guidance
   - Custom features

4. Hardware configuration
   - Number of users
   - Printer speed and output quality
   - Data storage requirements
   - Suitability to setting

5. Suitability for needs
   - Accurate outputs
   - Adequate for intended use
   - Integrates with existing applications
   - Cost-effective

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METHODS FOR CALCULATING NUTRIENT COMPOSITION OF RECIPES

Retention Factor Method*

Step 1. Convert each ingredient amount to a gram weight.
Step 2. Compute the edible-portion weight for each ingredient.
Step 3. Calculate the value for each nutrient per ingredient before cooking adjustments.
Step 4. Apply nutrient retention factors.
Step 5. Compute the total uncooked gram weight of the recipe.
Step 6. Calculate the value of each nutrient for the total recipe.
Step 7. Adjust kilocalories and fat components to reflect fat change.
Step 8. Compute the cooked weight of the recipe.
Step 9. Compute the yield percentage.
Step 10. Calculate the value for each nutrient per 100 gram portion.

* Modeled to reflect the method employed by the U.S. Department of Agriculture for the Nationwide Food Consumption Survey.

Simplified Retention Factor Method*

Step 1. Convert each ingredient amount to a gram weight.
Step 2 Calculate the edible-portion weight of each ingredient.
Step 3. Calculate the total raw weight of the recipe.
Step 4. Convert each ingredient weight to a 100 gram unit.
Step 5. Calculate the value for each nutrient per ingredient.
Step 6. Apply a nutrient retention factor to the values for Vitamin A, thiamin, riboflavin and Vitamin C.
Step 7. Compute the value of each nutrient for the total recipe.
Step 8. Adjust kilocalories to reflect fat change.
Step 9. Compute the value for each nutrient per portion.

* Modeled to reflect the Nutrient Standard Menu Planning System method developed by the U.S. Department of Agriculture for the school lunch program.

Yield Factor Method*

Step 1. Compute the total cooked weight of the recipe and the consumable weight for each ingredient by multiplying the weight of each ingredient by yield factors.
Step 2. Convert each ingredient weight into the number of 100 gram units.
Step 3. Calculate the value for each nutrient per ingredient.
Step 4. Calculate the value for each nutrient per edible portion.
Step 5. Calculate the weight per portion served.

* Modeled to reflect the method employed by the University of Missouri - Columbia Hospital.

Summing Method

Step 1. Convert each ingredient amount to a gram weight.
Step 2. Compute the total weight of the recipe.
Step 3. Compute the number of 100 gram units.
Step 4. Calculate the value of each nutrient per ingredient.
Step 5. Compute the total value of each nutrient for the recipe.
Step 6. Compute the value for each nutrient per portion.
Step 7. Compute the value for each nutrient per 100 gram portion.

CAUTION: The summing method may result in poor estimates of nutrient values if ingredient weights and nutrient profiles do not reflect the *as served* form of the foods.

Source: Powers, P. Recipe Calculations--New Research in Methodologies. Proceedings of the 11th National Nutrient Data Bank Conference, University of Georgia, Athens, 1986.