An Integrated Relational Database System and the Dietary Supplement Ingredient Database Release (DSID-1)

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Office of Dietary Supplements, NIH
Dietary Supplement Ingredient Database (DSID)

A database supported by chemical analysis for key DS ingredients of public health importance

Funded by:
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Collaborators:
Office of Dietary Supplements, NIH
National Cancer Institute, NIH
National Center for Health Statistics, CDC
Food Composition and Methods Development Lab, BHNRC, ARS
National Institute of Standards and Technology
Food and Drug Administration
Why Develop a DSID?

- Over 50% of people surveyed in U.S. report taking a dietary supplement

- NHANES monitors U.S. diet and provides information for research on diet-health relationships

- Estimates of total nutrient intake from food plus dietary supplements can provide more accurate assessments of total intake
Goals for DSID

- Develop reliable estimates of nutrients and other bioactive components in dietary supplement products

- Release and maintain a publicly available online dietary supplement database
1. Laboratory Pilot Study

- Investigate the status of methods of analysis and identify labs qualified to analyze nutrients in dietary supplements


2. Caffeine Study

- Assess caffeine content of commonly purchased products containing caffeine ingredients


DSID Studies
3. Common Level (CL) Pilot Study
   - Assess content and variability per nutrient in adult MVMs chosen from most common labeled levels for 22 vitamins and minerals.

4. Adult MVM Study
   - Assess content and variability in representative adult MVMs. Data for 18 nutrients released in DSID-1.
Current Configuration – Individual NDL Databases for Dietary Supplements

- Lab and method pilot study
- Caffeine study
- Common level pilot study
- Adult MVM study
- Children’s MVM study
- N-3 study
Future Configuration – NDL Database for Dietary Supplements
Dietary Supplement Ingredient System (DSIS)

Integrated system with a relational database structure:

- Data acquisition
- Data evaluation
- Statistical data analysis
- Data compilation and storage
- Both structured and flexible reports
- Dissemination of information
Dietary Supplement Ingredient Database
Flow of Information and products

Potential Sources of Data

- Analytical Data
- Other Databases
- Industry data
- Literature data

Dietary Supplement Ingredient Database System

DSID-1 release (adult MVMs)

Other DSID releases
DSIS Development

Progress to date:

- Identified and prioritized functional requirements
- Developed database model (relational tables) draft
- Migrated data from 2 studies
- Reviewed and tested model
Next steps:
- Optimize data model
- Complete data migration
- Develop ‘front-end’ features, including forms, queries, and reports
- Conduct QA and system tests

First Product:
- DSID-1 Release – Adult MVMs
Adult MVM* Study

Commonly Reported Products
• Multiple surveys used to identify 35 top products (55% of market share)
• Products purchased nationally from all market channels (n ≤ 6 lots)

Lower Market Share Products
• NHANES 2003-04 used to identify 80 lower market share products
• Products purchased nationally from all market channels (n ≤ 3 lots)

*Adult MVM defined as containing 3 or more vitamins
Adult MVM Sampling

Multiple channels sampled:

- **Mass Merchandisers** (Wal-mart, grocery stores, drug stores, warehouse stores)
- **Natural/Health Food Stores** (Whole Foods, Organic Markets)
- **Nutrition Stores** (Vitamin Shoppe, GNC)
- **Multi-level Marketers** (Amway, Herbalife)
- **Direct Marketers** (Internet, catalogs, infomercials)
- **Health Practitioners** (Doctors, Health clubs)
## Vitamins and Minerals Analyzed in Adult MVMs

<table>
<thead>
<tr>
<th>Vitamins</th>
<th>Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folic Acid</td>
<td>Calcium</td>
</tr>
<tr>
<td>Alpha-tocopherol</td>
<td>Chromium</td>
</tr>
<tr>
<td>Beta-carotene</td>
<td>Copper</td>
</tr>
<tr>
<td>Retinol</td>
<td>Iron</td>
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<tr>
<td>Riboflavin</td>
<td>Magnesium</td>
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<tr>
<td>Thiamin</td>
<td>Manganese</td>
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<tr>
<td>Niacin</td>
<td>Phosphorus</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>Potassium</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>Selenium</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Iodine</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Zinc</td>
</tr>
</tbody>
</table>
Nutrient Data Evaluation for DSID-1

- Laboratory results reviewed for QC (NIST SRM 3280)
- Results analyzed by regression per nutrient (n=18)
- Data weighted by market share
- Mean % difference from label and SE calculated
- Data for 4 additional nutrients being evaluated for later release (vitamin D, chromium, beta carotene, retinol)
DSID First Release: DSID-1

- Provides analytically-based estimates of nutrient values in adult MVMs
- Data files include:
  1) Predicted values and SEs for 18 individual nutrients at a range of labeled levels for adult MVMs
  2) Links between nutrient estimates and NHANES files

Publicly accessible on National Library of Medicine website, April 20:

//dietarysupplementdatabase.usda.nih.gov
Welcome to the Dietary Supplement Ingredient Database (DSID) home page!

The Nutrient Data Laboratory (NDL), Beltsville Human Nutrition Research Center (BHNRC), part of the USDA Agricultural Research Service, working with the Office of Dietary Supplements, NIH, and other federal agencies, has developed a Dietary Supplement Ingredient Database (DSID) to estimate levels of ingredients in dietary supplement products.

This first data release of the DSID (DSID-1) provides access to information on analyzed levels of nutrients in adult multivitamin/minerals (MVMs) used in the U.S. These estimates were derived from analytical data generated for a representative set of adult MVM products collected from various U.S. locations.

At this time, the DSID is intended primarily for research applications. For each of eighteen nutrients, product data were grouped by nutrient levels rather than by product names. Statistical regression analyses were used to estimate mean percent differences from label and variability at specific nutrient levels for each of the eight vitamins and ten minerals analyzed. These data are appropriate for conducting population studies of nutrient intake, rather than for assessing individual products.

The main features of DSID include data files, a research summary, and an adult MVM calculator. Regression equations are available for researchers with expertise to calculate multi-nutrient estimates of adult MVM supplement composition. A user-friendly calculator which uses the regression equations is also available as a research tool for those who want to obtain estimates of specific nutrient levels listed on the Supplement Facts labels of a limited number of adult MVMs. These estimates can be saved to build a small database for later use. Since over half of American report taking a dietary supplement, the estimates in the DSID will improve assessment of total nutrient intake from foods and supplements.

For more information, you can access DSID research manuscripts and presentations by using the left navigation bar.
DSID-1 Features

- Table of regression equations
- Excel spreadsheets of database tables
- Downloadable MS Access database
- Documentation of analytical studies, statistical approaches and research applications
- Adult MVM Calculator
Monitoring Studies

- Planned for each product type
- Ingredient monitoring based on analytical levels and variability from initial studies
- Plans will be adjusted for regulatory and/or marketplace changes
Current and Future Studies

- Children’s MVMs
- Omega-3 (n-3) Fatty Acid Products
- Prenatal MVMs
- Calcium and Vitamin D Supplements
Summary

- DSID information about supplement ingredients complements data in USDA food composition databases

- Total nutrient estimates using data from adult MVM dietary supplements plus food will be used for more accurate assessment of total intake
More about DSID-1 during EB

Tuesday, April 21, Convention Center Room 343, Minisymposium 10:30-12:30

11:15 a.m. “First release of the Dietary Supplement Ingredient Database: Nutrient estimates and methodology for 18 vitamins and minerals in adult multivitamin/minerals”

Check out the DSID-1 web site at ODS booth #1401, starting April 20

//dietarysupplementdatabase.usda.nih.gov

OR //dsid.usda.nih.gov