Integrating Foods and Dietary Supplements into a Single Composition Table

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Overview

• Cancer Research Center of Hawai`i
• Previous Databases
• Advantages of the new database
• Challenges of the new database
• Significance
Objective

To develop a single table to track nutrient and non-nutrient composition of foods and dietary supplements
Cancer Research Center of Hawai`i

• Diet and Cancer

• Multiethnic Cohort Study
  – Hawaii & Los Angeles
  – 215,000 participants
  – Self-Administered Quantitative Questionnaire
    • Food Frequency
    • Supplement Use
Previous Databases

Food Composition Table

– 2372 Foods
  • Ethnic foods
  • 840 recipes included
– 120 nutrients
  • Isoflavonoids
  • Flavonoids
  • Conjugated linoleic acid
  • Glycemic load
Previous Databases

Supplement Composition Table

- 3303 dietary supplements, includes:
  - 2100 multivitamin & multimineral products
  - 335 single nutrient products
  - 218 herbal/non-nutrient products

- 120 nutrients

- 91 non-nutrients and herbs
  - Glucosamine
  - Spirulina
What are the advantages of combining these two tables?
Advantages

• Eliminates the need to distinguish between a supplement and a food
Advantages

• Facilitates analysis of total nutrient intake

• Eases analysis of added nutrients vs. non-added nutrients
Advantages

• Provides the ability to create recipes for
  – Foods with added vitamins, minerals, herbal products and/or food extracts
  – Supplements which are combinations of multiple tablets or ingredients
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  – Foods with added vitamins, minerals, herbal products and/or food extracts
  – Supplements which are combinations of multiple tablets or ingredients
Minute Maid Orange Juice “Kids +”

Ingredients: Water, Concentrated Orange Juice, less than 2% of: Tricalcium Phosphate and Calcium Lactate, Vitamin E, Beta Carotene, Vitamin D3.

Nutrition Facts
Serving Size 8 fl oz (240 mL)
Servings Per Container 8

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>Calories 110</th>
<th>Calories from Fat 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fat 0g</td>
<td>0%</td>
<td>Not a significant source of protein</td>
</tr>
<tr>
<td>Saturated Fat 0g</td>
<td>0%</td>
<td>Calcium 35%</td>
</tr>
<tr>
<td>Cholesterol 0 mg</td>
<td>0%</td>
<td>Vitamin E 20%</td>
</tr>
<tr>
<td>Sodium 20 mg</td>
<td>1%</td>
<td>Thiamin (Vitamin B1) 10%</td>
</tr>
<tr>
<td>Potassium 450 mg</td>
<td>13%</td>
<td>Niacin 2%</td>
</tr>
<tr>
<td>Total Carbohydrate 27g</td>
<td>9%</td>
<td>Folate 15%</td>
</tr>
<tr>
<td>Sugars 24g</td>
<td></td>
<td>Magnesium 6%</td>
</tr>
</tbody>
</table>

Per 1 cup serving:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange Juice</td>
<td>240 g</td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>350 mg</td>
<td></td>
</tr>
<tr>
<td>Beta Carotene</td>
<td>1000 IU</td>
<td></td>
</tr>
<tr>
<td>Vitamin E</td>
<td>6 IU</td>
<td></td>
</tr>
<tr>
<td>Vitamin D</td>
<td>100 IU</td>
<td></td>
</tr>
</tbody>
</table>

Not a significant source of dietary fiber and iron.
Advantages

• Provides the ability to create recipes for
  – Foods with added vitamins, minerals, herbal products and/or food extracts
  – Supplements which are combinations of multiple tablets or ingredients
### Optimal Vitamin Packs

Each Packet Contains:

<table>
<thead>
<tr>
<th>Count</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Caplet</td>
<td>Vitamin C</td>
</tr>
<tr>
<td>1 Caplet</td>
<td>Multivitamin</td>
</tr>
<tr>
<td>2 Caplets</td>
<td>Calcium &amp; Magnesium</td>
</tr>
<tr>
<td>1 Caplet</td>
<td>Multimineral</td>
</tr>
<tr>
<td>1 Softgel</td>
<td>Vitamin E</td>
</tr>
</tbody>
</table>
Advantages

- Permits quantification of nutrient intake from herbal supplements and food extracts often used as supplements (e.g., cranberry fruit, ginger, ginseng)
### Supplement Facts

<table>
<thead>
<tr>
<th>Serving Size: 4 capsules</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amount per serving</strong></td>
</tr>
<tr>
<td>Calories</td>
</tr>
<tr>
<td>Total Carbohydrate</td>
</tr>
<tr>
<td>Dietary Fiber</td>
</tr>
<tr>
<td>Cranberry (fruit)</td>
</tr>
</tbody>
</table>

### Cranberry, dried

(per 1.7 grams)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong></td>
<td>5.2 kcal</td>
<td></td>
</tr>
<tr>
<td><strong>Carbohydrate</strong></td>
<td>1.40 g</td>
<td></td>
</tr>
<tr>
<td><strong>Fiber</strong></td>
<td>0.10 g</td>
<td></td>
</tr>
<tr>
<td><strong>Potassium</strong></td>
<td>0.68 mg</td>
<td></td>
</tr>
<tr>
<td><strong>Phosphorous</strong></td>
<td>0.14 mg</td>
<td></td>
</tr>
</tbody>
</table>

Source: USDA Standard Reference 16-1
What are the challenges of combining these two tables?
Challenges

• Differing units used for nutrients in foods and supplements
  – Vitamin A: mg RAE vs. IU
Challenges

• Recipes
  – Foods quantified per 100 grams
  – Supplements quantified per dose
  – Varying types of supplements
    (e.g., pill, powder, liquid)
  – Multiple forms of supplement used in a single product
    (e.g., Tricalcium Phosphate and Calcium Lactate)
Challenges

• Limited by supplement information provided by manufacturer

• Amounts of some supplement components not available
  – Proprietary blends in supplements
  – Binary indicators used
<table>
<thead>
<tr>
<th>Proprietary Blend of:</th>
<th>Amount Per Capsule</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grape Skin Extract</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Grape Seed Extract</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Proteases (Bromelain, Fungal)</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Ginkgo Biloba Extract (Leaves)</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Bilberry Extract (Berry)</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Quercetin Powder</td>
<td></td>
<td>†</td>
</tr>
</tbody>
</table>

† Daily Value not established.

Other ingredients: Gelatin (capsule), Rice Flour.
Challenges

Keeping abreast of product availability

– Supplement Composition Table
  • 67% currently available
  • 33% discontinued (e.g., formula change, product no longer available)

– Foods
Significance

• Combining the food composition table and the supplement composition table increases the quality of both databases, allowing better estimations of total dietary intake
Acknowledgements

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  Maj Earle
  Yun Oh Jung