Considerations For Selecting A Dietary Assessment System

Phyllis J. Stumbo
General Clinical Research Center
University of Iowa
Iowa City, IA

What is a Dietary Assessment System?

- **Food Records – food eaten is recorded by subject**
- **Food Recalls – interview on past intake**
- **Food Frequency Questionnaire – List of foods designed to query about past intake**

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- **Food Records – food eaten is recorded by subject**
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Factors Not Considered

- Standardizing intake methodology
- Estimating portion size
- Strategies for infants, children, men, women, ethnic foods, language

National Nutrient Databank Conference

Interest in primarily in the database

- **Software interface between the database and user**

Uses: **assessing intake, composition of, menus, recipes, restaurant and cafeteria food.**

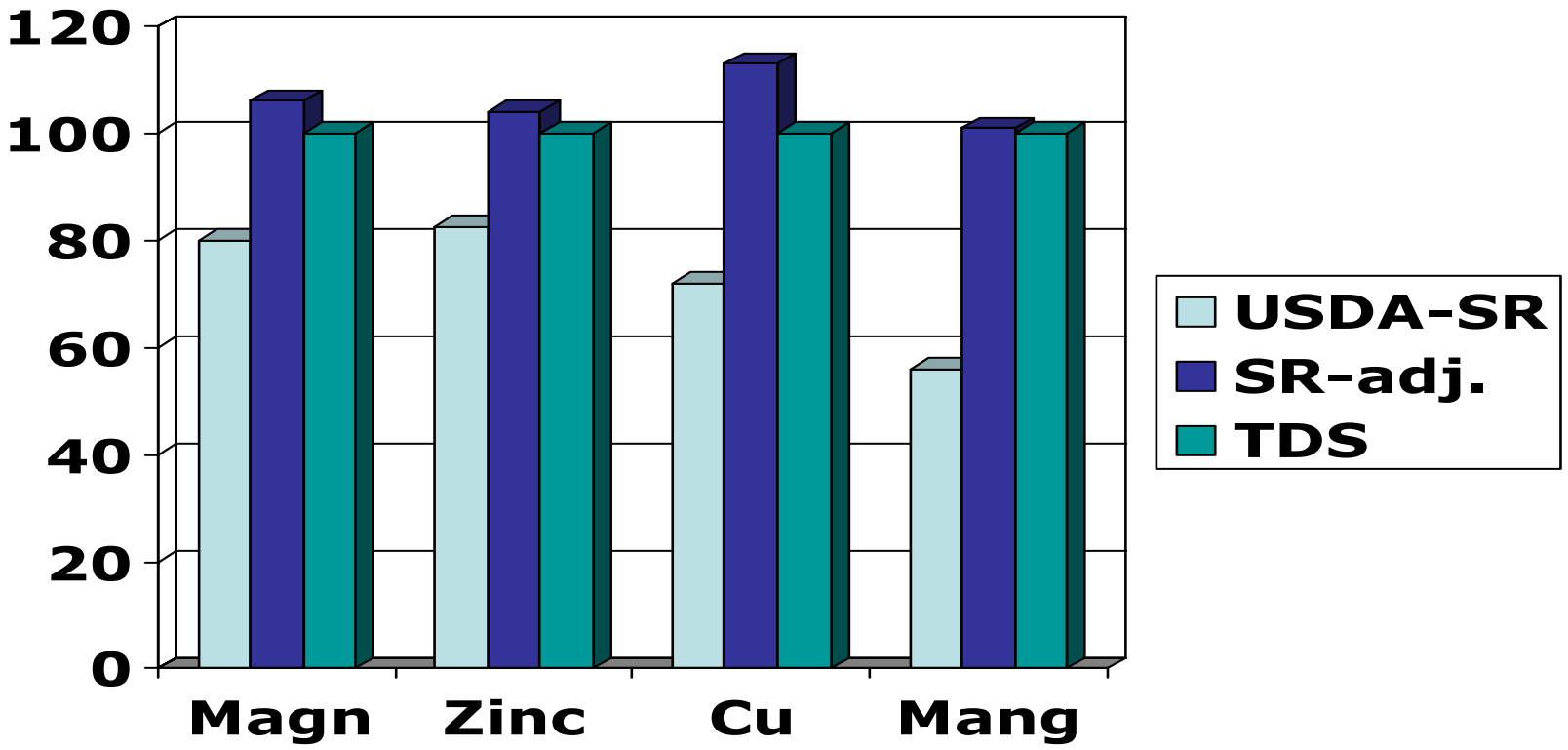
Factors to be considered

1) Database
2) Search
3) Result (output or report)
4) Cost

Completeness of data

Nutrient	% With Values	
	SR	Survey
Carb, pro, fat, energy, fiber, water	100	100
Alcohol	0.6	100
Ash	99.6	N/A
Saturated fatty acids (sum of 5)	96.9	100
Polyunsaturated fatty acids (sum of 7)	93.9	100
Cholesterol	98.9	100
Phytosterol	9.7	N/A
Fatty acids (19 better known compounds)	68.7	100
Fatty Acids (6 less known, i.e., margaric)	1.5	N/A
Vitamin D	4.9	N/A

Pennington, 1990



FNDDS feature: "not further specified"

- **When food like potatoes is reported but cooking method omitted**
- **When food like milk is reported but fat content omitted**
- **When food like sandwich is reported but kind is not specified**

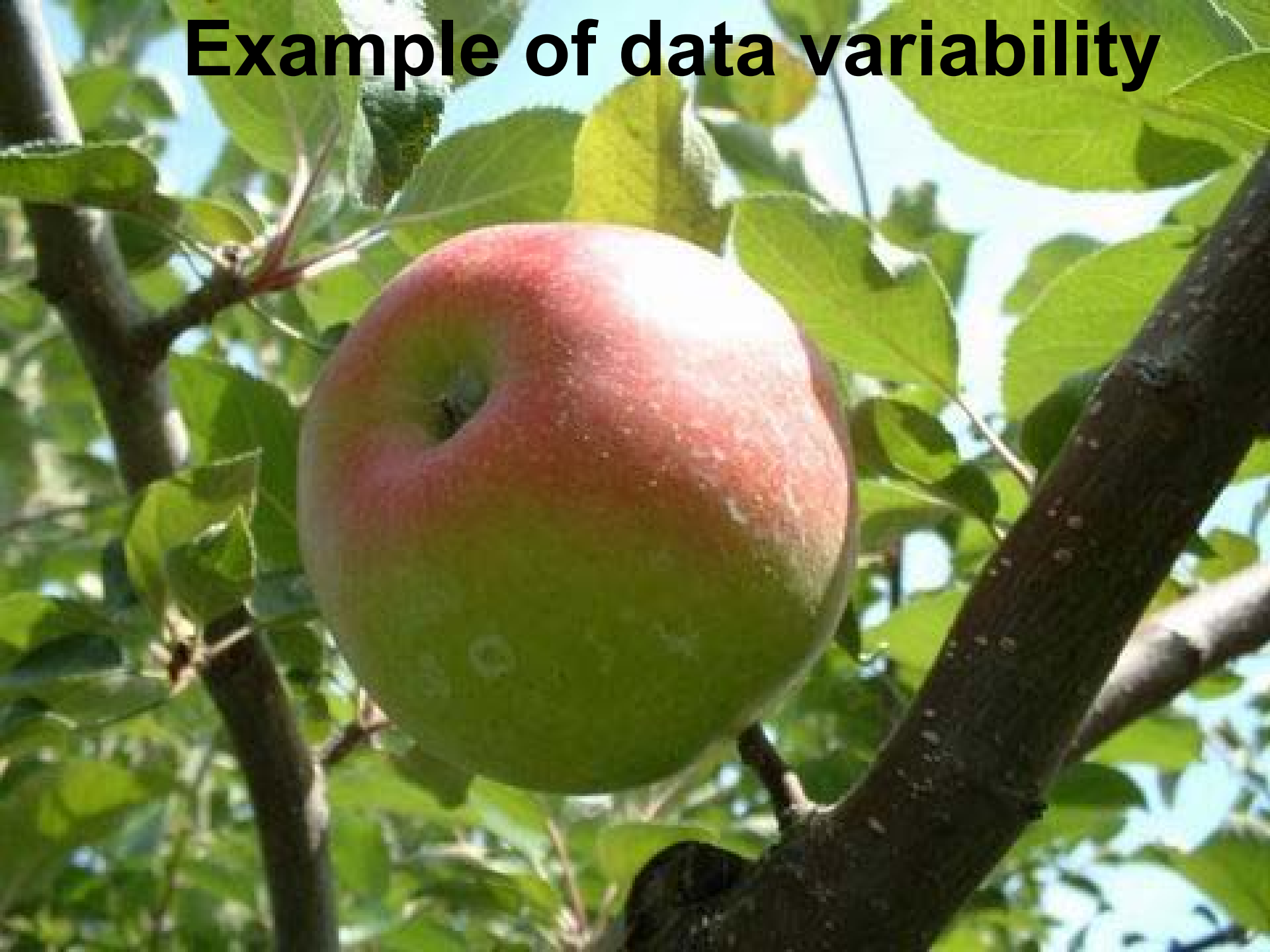
MOST
Important Software Feature

- **Accuracy**

What dietitians mean is:

- **“Does the program data match foods in prepared in my kitchen?”**
- **“Does the program data match foods my clients eat?”**

Example of data variability



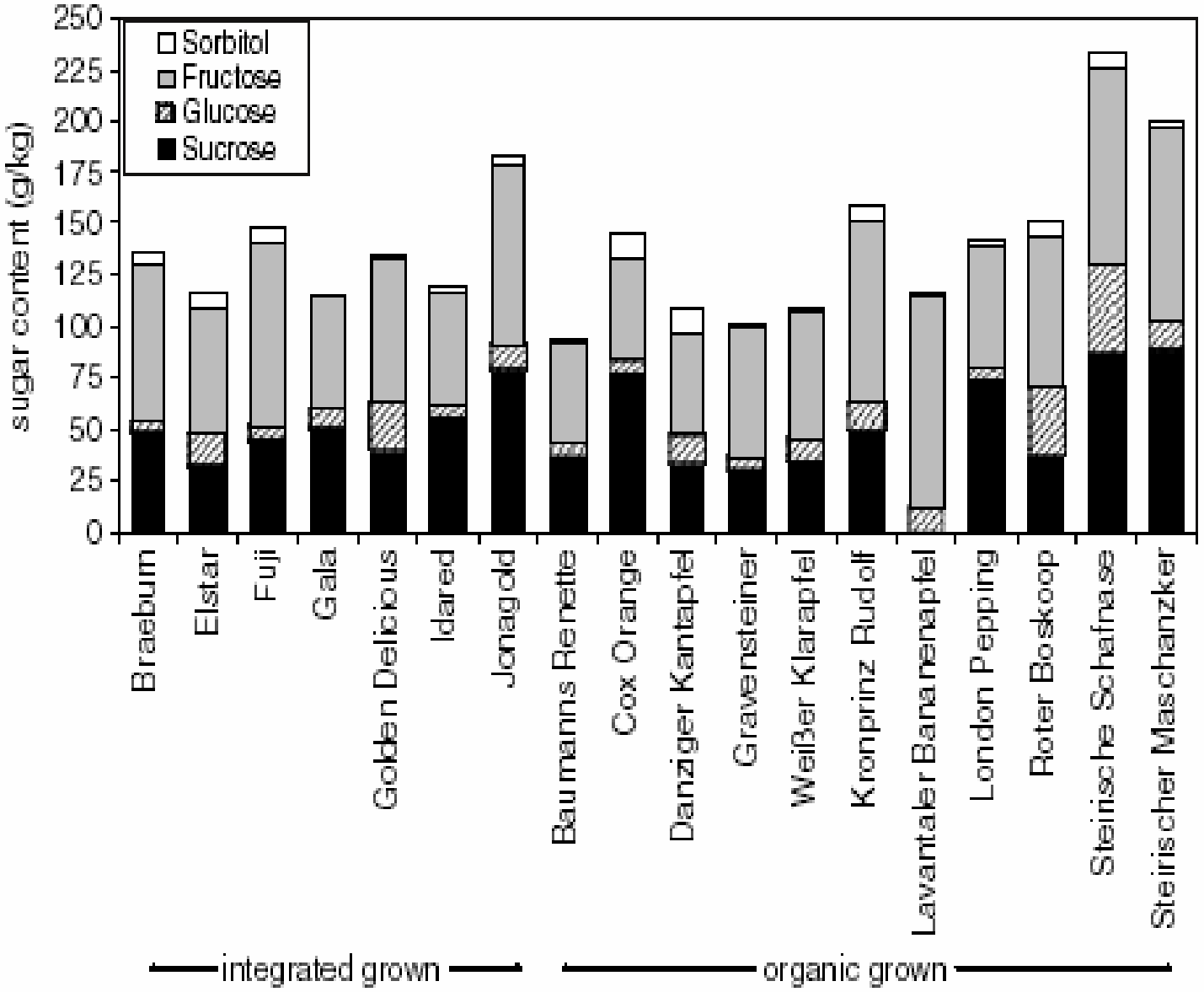


Figure 1 Proportion of sugar components of integrated and organically grown cultivars.

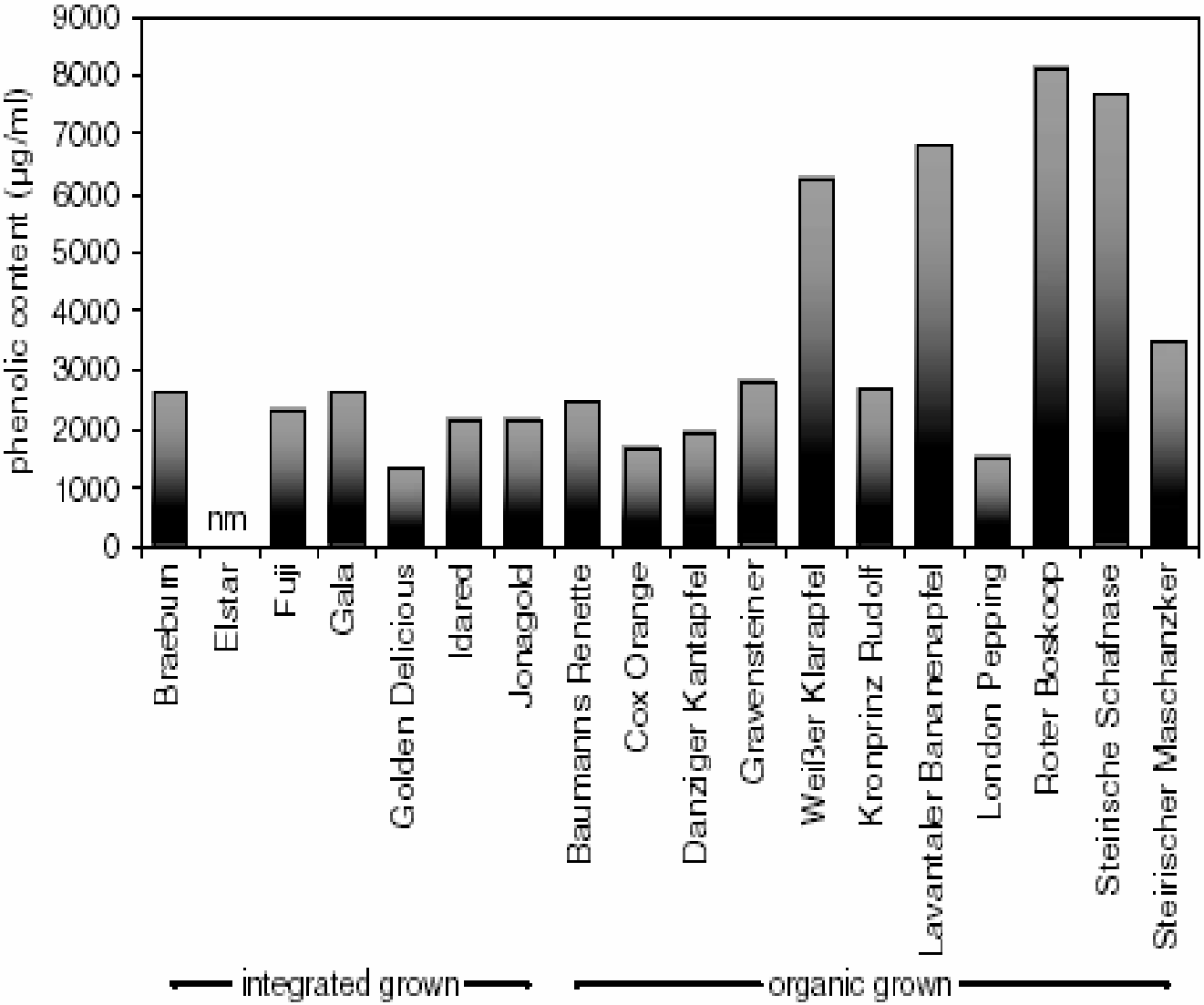
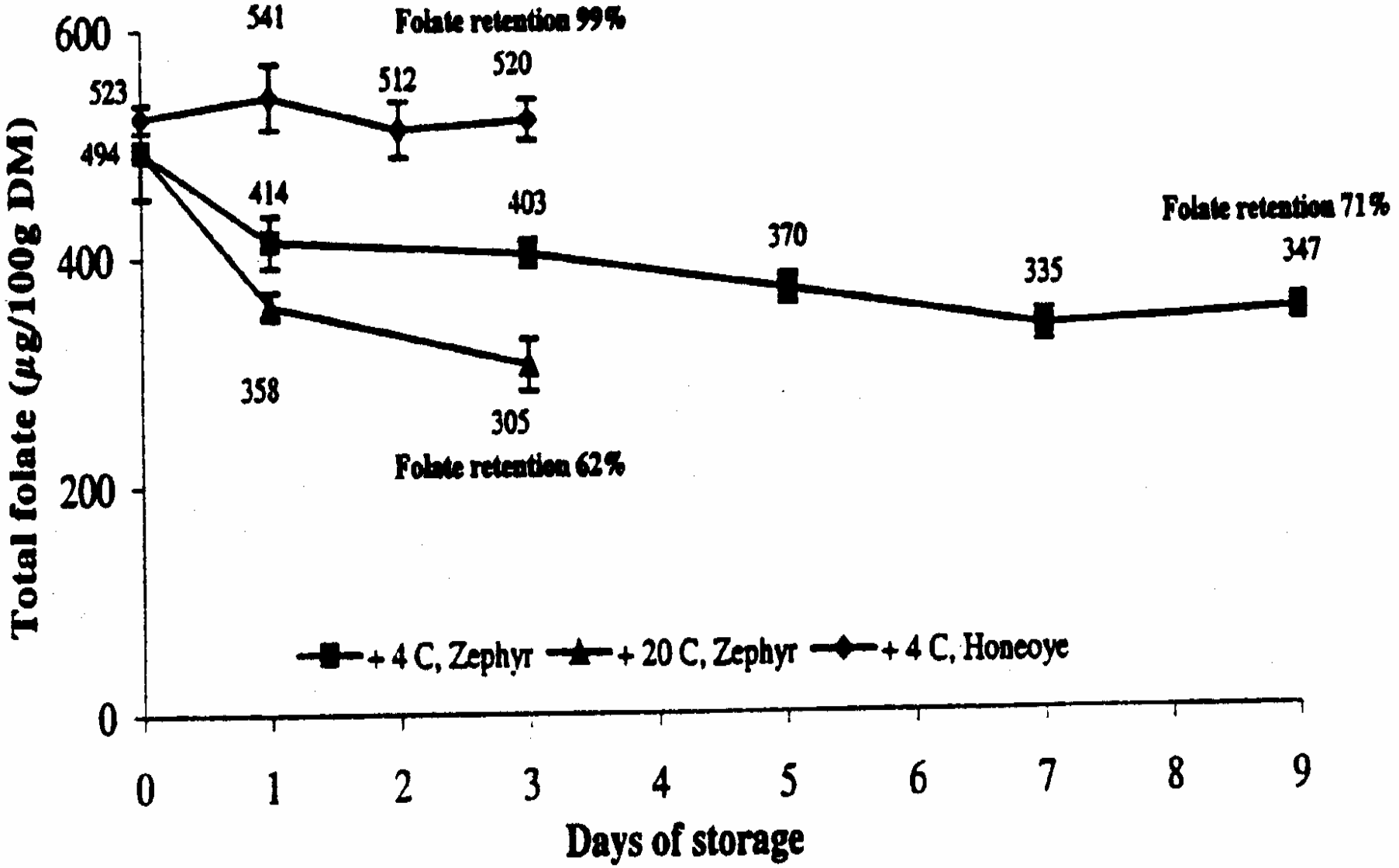


Figure 2 Phenolic content of integrated and organically grown cultivars, nm = not measured owing to unavailable material.


600
400
200
0
Total folate (µg/100g DM)
541
Folate retention 99%
523
494
512
520
414
403
370
335
347
Folate retention 71%
358
305
Folate retention 62%
+ 4 C, Zephyr
+ 20 C, Zephyr
+ 4 C, Honeoye
0
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9
Days of storage


ALFIE PACKERS, INC.
UNIVERSITY
OF IOWA

Free Resources for developing a dietary assessment system

- **USDA SR – 7000 foods, 147 nutrients, analyzed values, public domain**
- **USDA FNDDS (Built from SR), fewer nutrients but no missing values, defaults when some intake data is missing**
- **Manufacturer's analytical or calculated data**

With Software Not-So-Free

On-Line – (Pyramid Tracker, NAT) – still free

Government development for research:

NDS-R (U of Minnesota) ~ $8000
Fias ~$4000
ProNutra ~ $3500

Sample of independently developed products:

- **ESHA ~ $500-600**
- **Nutritionist Pro ~ $500-600**
- **Nutribase - $500-600 (EZ ~ $60)**
- **Many others: Computrition, CBORD, DMF (Iowa)**

- **Database is important BUT you can't judge a database solely by the number of foods it contains.**

- **Search strategy can "make" or "break" the software application**

Example: at lunch you ate a tomato

- **Searching the whole SR for tomato yields 145 foods**

Search SR19 “vegetable” section for “tomato” yields 73 entries

- **Babyfood, dinner, macaroni and tomato and beef, junior**
- **Babyfood, dinner, macaroni and tomato and beef, strained**
- **Babyfood, dinner, macaroni, beef and tomato sauce, toddler**
- **Babyfood, dinner, spaghetti and tomato and meat, junior**
- **Babyfood, dinner, spaghetti and tomato and meat, toddler**
- **Babyfood, ravioli, cheese filled, with tomato sauce**
- **Oil, vegetable, tomatoseed**
- **Salad dressing, bacon and tomato**
- **Sauce, HUNT'S, Traditional Tomato Spaghetti Sauce**
- **Sauce, tomato chili sauce, bottled, no salt, low sodium**
- **Sauce, tomato chili sauce, bottled, with salt**
- **Soup, LIPTON, CUP-A-SOUP TOMATO, Mix, Dry**
- **Soup, PROGRESSO HEALTHY CLASSICS TOMATO GARDEN, canned, ready-**
- **to-serve**
- **Soup, tomato beef with noodle, canned, condensed, commercial**
- **Soup, tomato beef with noodle, canned, prepared with equal volume water, commercial**

Search SR 19 “vegetable section” for “tomatoes” – 14 entries

- ***Tomatoes, crushed, canned***
- ***Tomatoes, green, raw***
- ***Tomatoes, orange, raw***
- ***Tomatoes, red, ripe, canned, packed in tomato juice***
- ***Tomatoes, red, ripe, canned, packed in tomato juice, no salt added***
- ***Tomatoes, red, ripe, canned, stewed***
- ***Tomatoes, red, ripe, canned, with green chilies***
- ***Tomatoes, red, ripe, cooked***
- ***Tomatoes, red, ripe, cooked, stewed***
- ***Tomatoes, red, ripe, cooked, with salt***
- ***Tomatoes, red, ripe, raw, year round average***
- ***Tomatoes, sun-dried***
- ***Tomatoes, sun-dried, packed in oil, drained***
- ***Tomatoes, yellow, raw***

From SR 19 search for “tomatoes” in “vegetable” section – 14 entries

- ***Tomatoes, crushed, canned***
- ***Tomatoes, green, raw***
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- ***Tomatoes, yellow, raw***

“eLog” (prototype)

Searching a custom “common foods” database for “tomatoes”

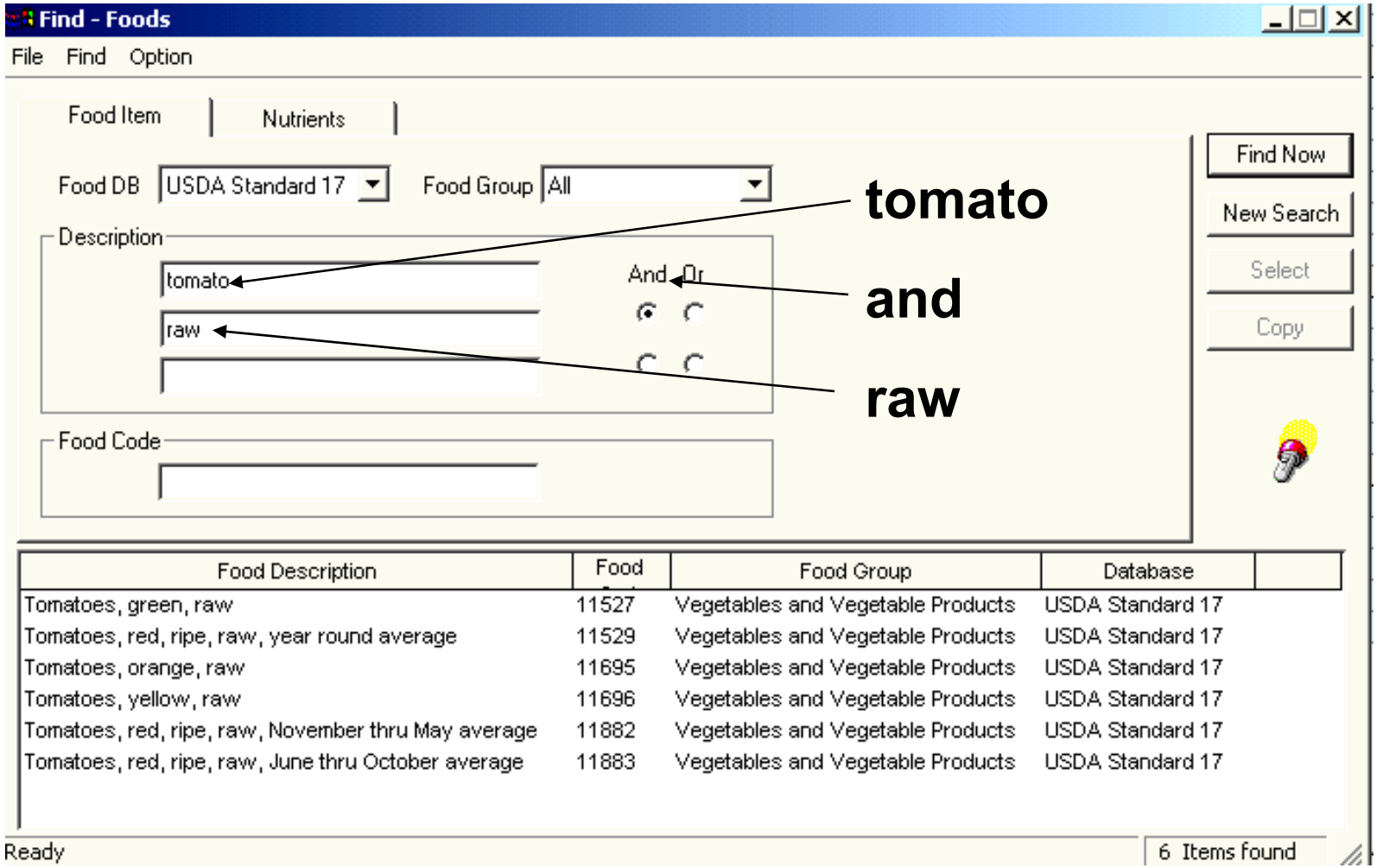
- ***Tomatoes, cooked***
- ***Tomatoes, raw***

eLog (prototype)

- Four data base levels:

  1. “favorite foods” that I choose
  2. “my foods” all foods I have ever eaten
  3. **“common foods” database**
  4. FNDDS (a full survey database)

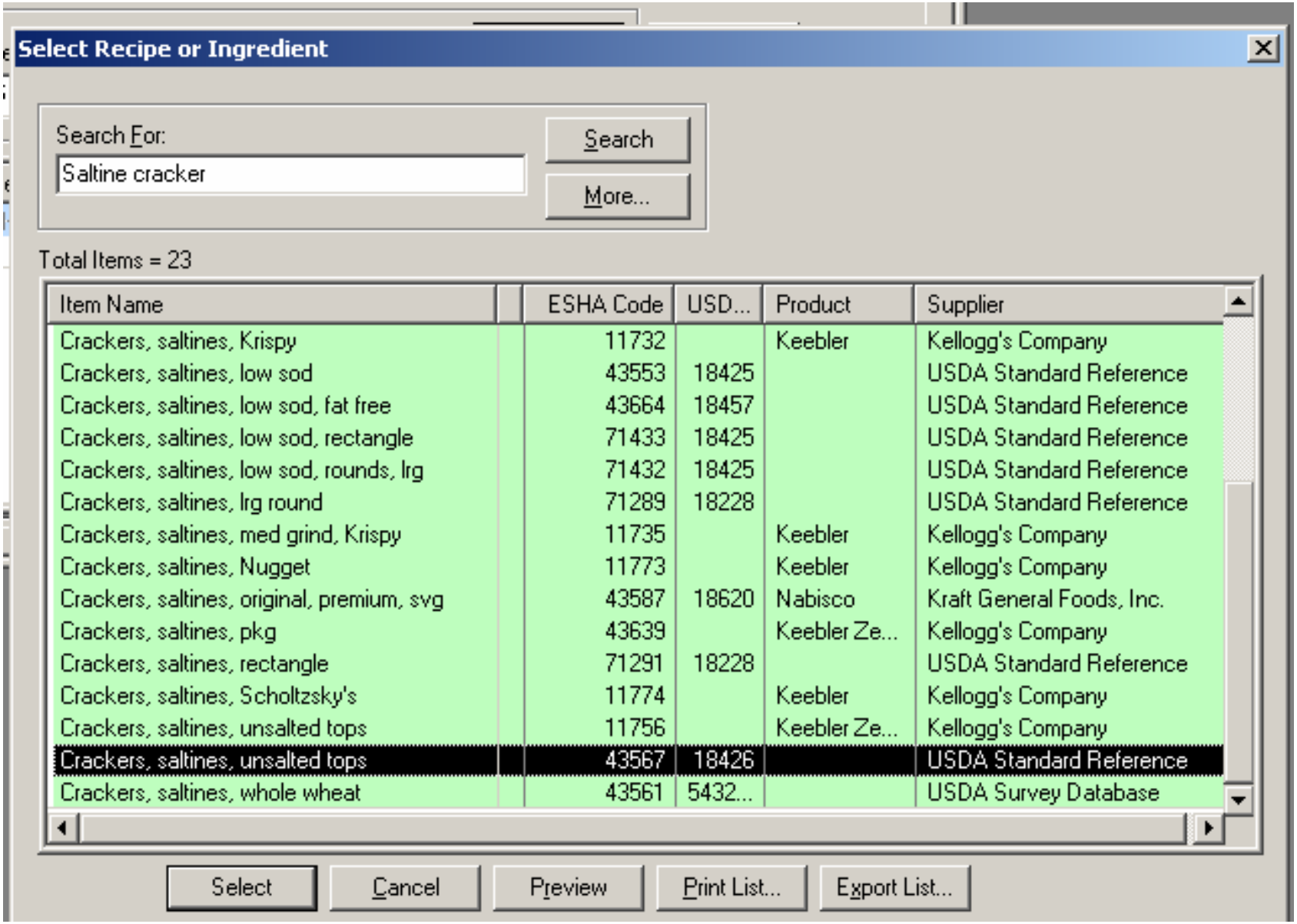
Searching for two words at once speeds the search:



Searching for two words at once ("tomato" and "raw") speeds the search:

Food Description	Food	
Tomatoes, green, raw	11527	Vegeta
Tomatoes, red, ripe, raw, year round average	11529	Vegeta
Tomatoes, orange, raw	11695	Vegeta
Tomatoes, yellow, raw	11696	Vegeta
Tomatoes, red, ripe, raw, November thru May average	11882	Vegeta
Tomatoes, red, ripe, raw, June thru October average	11883	Vegeta

Food Search - ESHA



Food Name	Description	Brand
CHILI BEEF SOUP, CONDENSED	can, commercial	
CHILI BEEF SOUP, CONDENSED	can, prep w/equal volume milk, com, 1 can	
CHILI BEEF SOUP, CONDENSED	can, prep w/equal volume water, commercial	
CHILI BEEF SOUP, CONDENSED	can, prep w/equal volume water, commercial	
CHILI BEEF SOUP, CONDENSED	can, prep w/equal volume water, commercial	
CHILI BEEF SOUP, CONDENSED	commercial, 1 can	
CHILI BEAN		Bush's
CHILI BEAN, ORGANIC, KOSHER	fat-free w/jalapeno & red pepper	Eden Foods
CHILI BEEF SOUP, HEARTY, RTE		Healthy Choice
CHILI CON CARNE W/BEANS	can	
CHILI CON CARNE W/BEANS	can	
CHILI CON CARNE W/BEANS, CANNED		Nalley's
CHILI CON CARNE W/BEANS, CANNED		Nalley's
CHILI CON CARNE W/BEANS, CANNED		Nalley's
CHILI CON CARNE W/O BEAN	can	El Rio
CHILI CON CARNE W/O BEAN	can	El Rio


NDS
NUTRITION DATA SYSTEM

Search by

Food

Hierarchy

User recipe

mixe

Search

Search All

Choose Description

What brand or type of mixed dish was it?

Food Description: mixed dish

Key	Description
	Banquet Barbecue Chicken Meal
	Banquet Beef Enchilada Meal
	Banquet Beef Patty with Country Style Vegetables Meal
	Banquet Boneless Pork Rib Meal
	Banquet Buffalo Style Tenders - Hot 'n' Spicy
	Banquet Chicken and Stuffing Bake
	Banquet Chicken Breast Nuggets
	Banquet Chicken Breast Patties
	Banquet Chicken Breast Tenders - Original
	Banquet Chicken Breast Tenders - Southern
	Banquet Chicken Fingers Meal

Limit to:

Limit to - All Words

Limit to - Any Words

Help

Cancel Search

< Back

Finish >

Cancel

Search by

- Food
- Hierarchy
- User recipe

mixe

Search

Search All

Choose Description

What brand or type of mixed dish was it?

Food Description: mixed dish

Key	Description
	Budget Gourmet Lean Gourmet Cheese Stuffed Rigatoni
	Budget Gourmet Lean Gourmet Chicken Florentine Alfredo
	Budget Gourmet Lean Gourmet Five Cheese Lasagna
	Budget Gourmet Lean Gourmet Five Cheese Pizza
	Budget Gourmet Lean Gourmet Layered Lasagna with Meat Sauce
	Budget Gourmet Lean Gourmet Macaroni & Cheese
	Budget Gourmet Lean Gourmet Mandarin Chicken with Rice
	Budget Gourmet Lean Gourmet Pepperoni Pizza
	Budget Gourmet Lean Gourmet Salisbury Steak and Gravy & Mashed Potatoes
	Budget Gourmet Lean Gourmet Sante Fe-Style Rice & Beans

Limit to: lean

Limit to - All Words

Limit to - Any Words

Help

Cancel Search

< Back

Finish >

Cancel

Search by

- Food
- Hierarchy
- User recipe

mixe

Search

Search All

Choose Description

What brand or type of mixed dish was it?

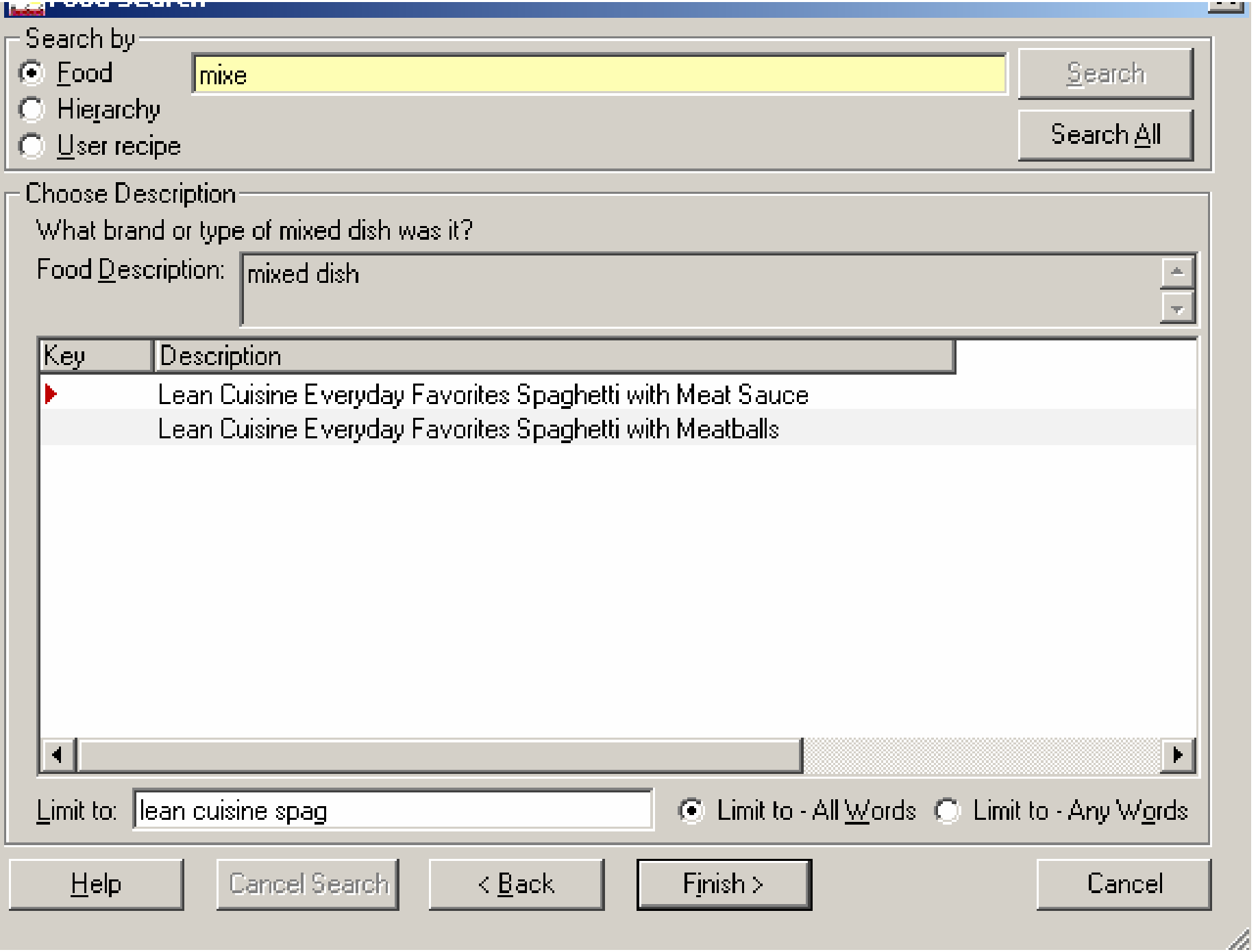
Food Description: mixed dish

Key	Description
	Lean Cuisine Cafe Classics Baked Chicken
	Lean Cuisine Cafe Classics Baked Fish with Cheddar Shells
	Lean Cuisine Cafe Classics Beef Peppercorn
	Lean Cuisine Cafe Classics Beef Portabello
	Lean Cuisine Cafe Classics Beef Pot Roast
	Lean Cuisine Cafe Classics Bow Tie Pasta and Chicken
	Lean Cuisine Cafe Classics Cheese Lasagna with Chicken Breast Scalloppini
	Lean Cuisine Cafe Classics Chicken A L'Orange
	Lean Cuisine Cafe Classics Chicken and Vegetables
	Lean Cuisine Cafe Classics Chicken Carbonara

Limit to: lean cuisine

Limit to - All Words Limit to - Any Words

Help Cancel Search < Back Finish > Cancel

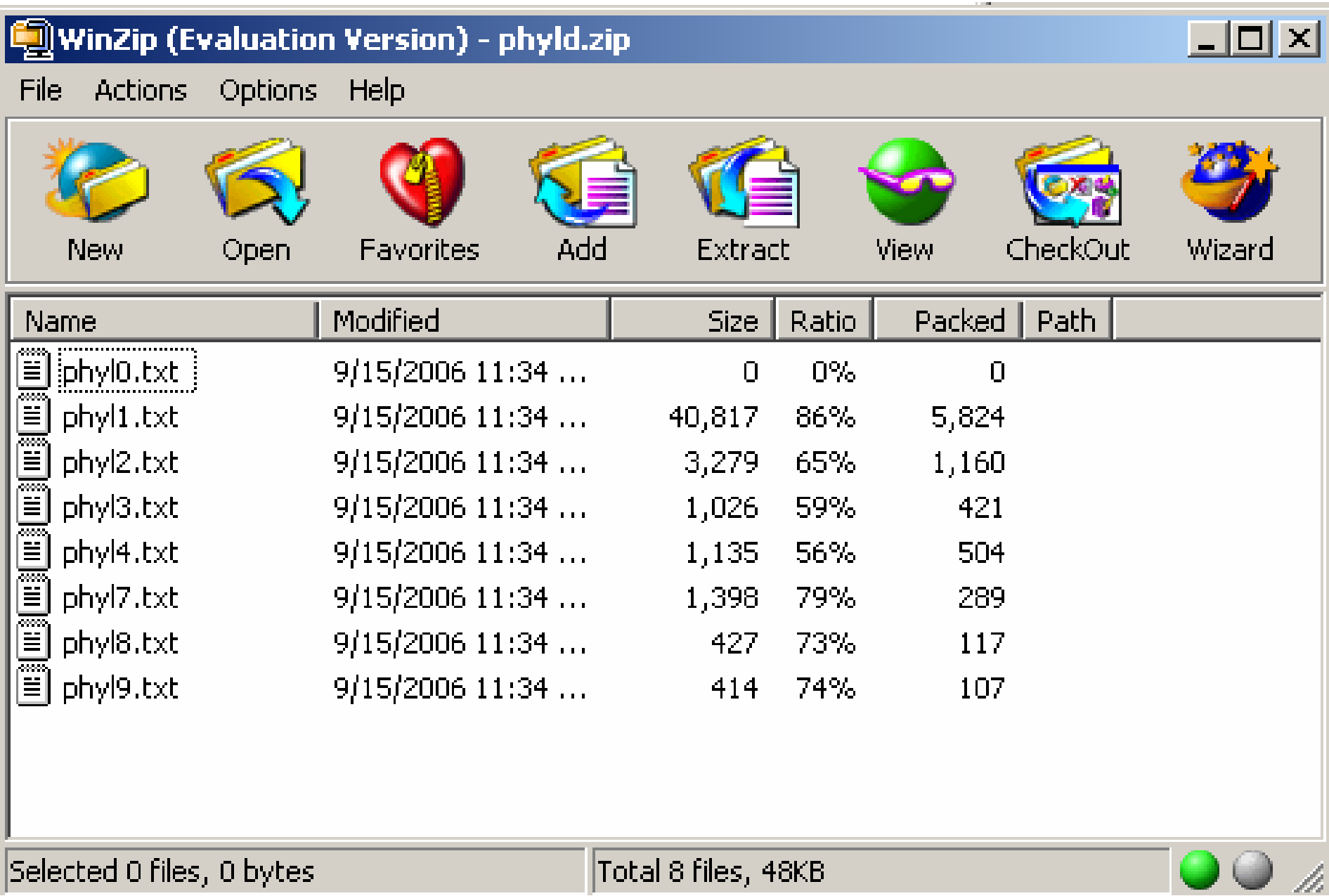

Search by
Food
Hierarchy
User recipe
mixe
Search
Search All
Choose Description
What brand or type of mixed dish was it?
Food Description:
mixed dish
Key
Description
Lean Cuisine Everyday Favorites Spaghetti with Meat Sauce
Lean Cuisine Everyday Favorites Spaghetti with Meatballs
Limit to:
lean cuisine spag
Limit to - All Words
Limit to - Any Words
Help
Cancel Search
< Back
Finish >
Cancel

Reports and Output

Needs for "research" and "clinical" activity vary:

Research – need data in format for spreadsheet manipulation and statistical analysis

Clinical – prefer data in format for educational and counseling purposes, and for manipulating in word processor.


WinZip (Evaluation Version) - phyld.zip
File Actions Options Help
New Open Favorites Add Extract View CheckOut Wizard
Name Modified Size Ratio Packed Path
phyl0.txt 9/15/2006 11:34 ... 0 0% 0
phyl1.txt 9/15/2006 11:34 ... 40,817 86% 5,824
phyl2.txt 9/15/2006 11:34 ... 3,279 65% 1,160
phyl3.txt 9/15/2006 11:34 ... 1,026 59% 421
phyl4.txt 9/15/2006 11:34 ... 1,135 56% 504
phyl7.txt 9/15/2006 11:34 ... 1,398 79% 289
phyl8.txt 9/15/2006 11:34 ... 427 73% 117
phyl9.txt 9/15/2006 11:34 ... 414 74% 107
Selected 0 files, 0 bytes
Total 8 files, 48KB

Spreadsheet view of nutrients

Item	B12 (mcg)	Biot (mcg)	Vit C (mg)	EToco (mg)	Fola (mcg)	fola (mcg)	Vit K (mcg)	Panto (mg)	Calc (mg)	Chrom (mcg)	Copp (mg)	I
Chili Con Carne w/Beef Beans & Rice SVY	0	..	3.94	1.89	56.93	..	..	..	123.30	..	0.37	
Saltine Crackers-Rectangle	0	..	0	0.48	66.72	103.01	3.84	0.42	32.64	..	0.14	
Coleslaw-Prep f/Recipe	0	..	19.62	0.06	16.20	16.20	..	0.08	27.00	..	0.01	
Brewed Coffee-Prep w/Tap Water	0	..	0	0.02	4.74	4.74	0.24	0.60	4.74	..	0.00	
Beef Sirloin Steak Sml Trimmed-Fried SVY	6.03	..	0	0.24	19.87	19.87	..	0.75	13.00	..	0.24	
Mashed Potatoes w/Whole Milk	0.10	0.56	8.72	0.03	11.26	11.26	2.53	0.68	33.77	1.82	0.20	
Green Snap Beans Ckd w/Salt-Drnd	0	..	8.00	0.37	27.22	27.22	13.20	0.06	36.30	1.34	0.05	
Mixed Greens Salad SVY	0	..	13.28	0.58	95.35	95.35	..	0.23	45.21	..	0.06	
Commercial Italian Dressing	0	..	0	1.47	0	0	16.46	0	2.06	..	0	
Double Chocolate Cake w/Frosting SFC-h	..	..	..	..	..	..	..	..	..	..	..	
1% Milk w/Non Fat Milk Solids Vit A & D	0.93	..	2.45	0.10	12.25	12.25	..	0.82	313.60	..	0.02	
Wheat Chex Cereal GML	0.90	..	3.60	0.22	240.00	404.01	0.36	0	60.00	..	0.10	
Totals	7.96	0.56	59.62	5.45	550.54	693.91	36.63	3.64	691.61	3.16	1.19	

Nutrient	Amount Reported	% of Energy	Recommended Intake
Energy	837 kcal		
Fat	17.63 g	18.95 %	20-35 % [1]
Carbohydrate	99.81 g	47.67 %	
Protein	66.74 g	31.88 %	
Alcohol	0.00 g	0.00 %	
Cholesterol	145.65 mg		< 300 mg [1]
Saturated Fatty Acids	4.95 g	5.32 %	< 10 % [1]
Trans-Fatty Acids	0.25 g	0.27 %	
Monounsaturated Fatty Acids	6.27 g	6.74 %	10 % [2]
Polyunsaturated Fatty Acids	4.38 g	4.71 %	10 % [2]
Dietary Fiber	5.86 g		20-30 g [3]
Sodium	1853 mg		< 2300 mg [1]

[1] Dietary Guidelines for Americans, 2005
[2] National Cholesterol Education Program, 1990
[3] National Cancer Institute Dietary Guidelines, 1998

Macronutrient Breakdown

Printed: 09/15/2006
Time: 11:27

Percentage Daily Values[1]

Nutrient	Amount Reported	Daily Value	Daily Value Comparison
Mandatory Components			
Total Calories	837 kcal		
Calories from Fat	159 kcal		
Total Fat	17.63 g	65 g	27 %
Saturated Fat	4.95 g	20 g	25 %
Cholesterol	145.65 mg	300 mg	49 %
Sodium	1853 mg	2400 mg	77 %
Total Carbohydrate	99.81 g	300 g	33 %
Dietary Fiber	5.86 g	25 g	23 %
Sugars	14.79 g		
Protein	66.74 g	50 g	133 %
Vitamin A	8561 IU	5000 IU	171 %
Vitamin C	4.32 mg	60 mg	7 %
Calcium	250 mg	1000 mg	25 %
Iron	5.82 mg	18 mg	32 %
Voluntary Components			
Vitamin D	30 IU	400 IU	8 %
Vitamin E	3 IU	30 IU	9 %
Vitamin K	13.73 mcg	80 mcg	17 %
Thiamin	0.67 mg	1.50 mg	45 %
Riboflavin	0.63 mg	1.70 mg	37 %
Niacin	24.66 mg	20 mg	123 %
Vitamin B6	1.28 mg	2 mg	64 %

% Daily Values

Item

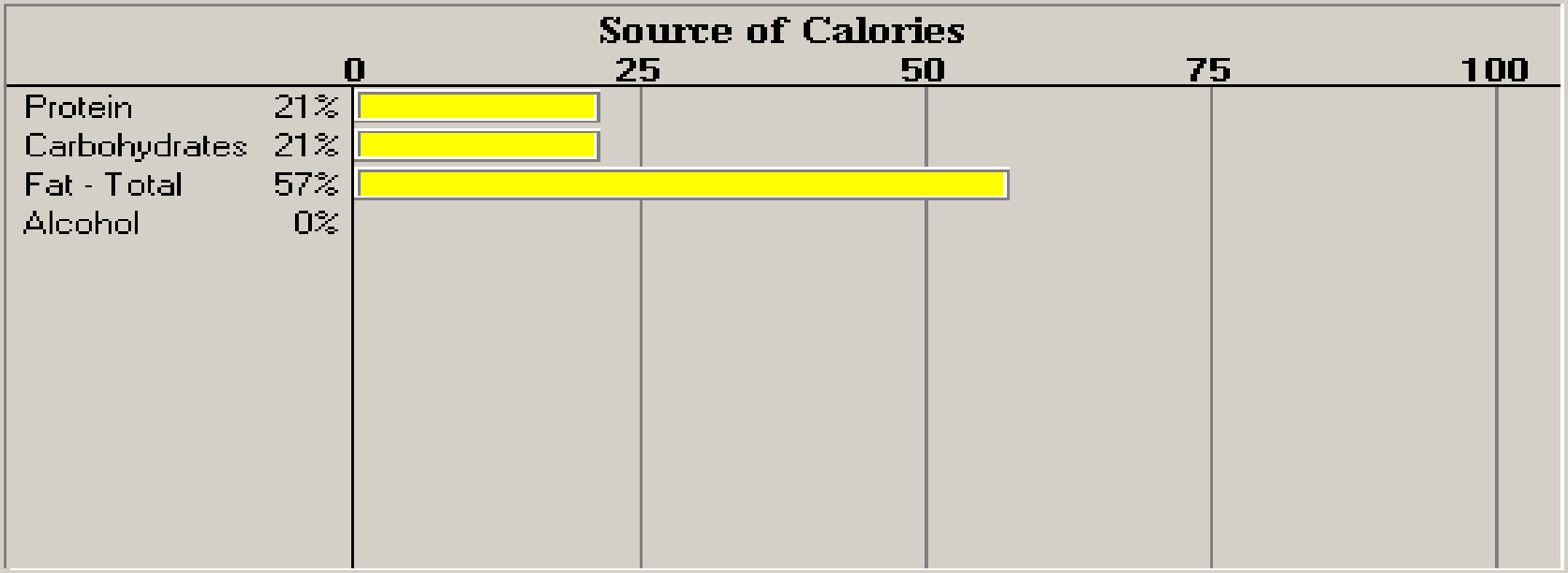
Preview Chicken Salad Lunch Kit PIF-SW

Weight: 104.00 g (3.67 oz-wt.)
User Code:
Source: Manufacturer
Database: \\H...\BRANDS

Cost: --
Water:
ESHA Code: 13282
USDA Code:

OK
Help

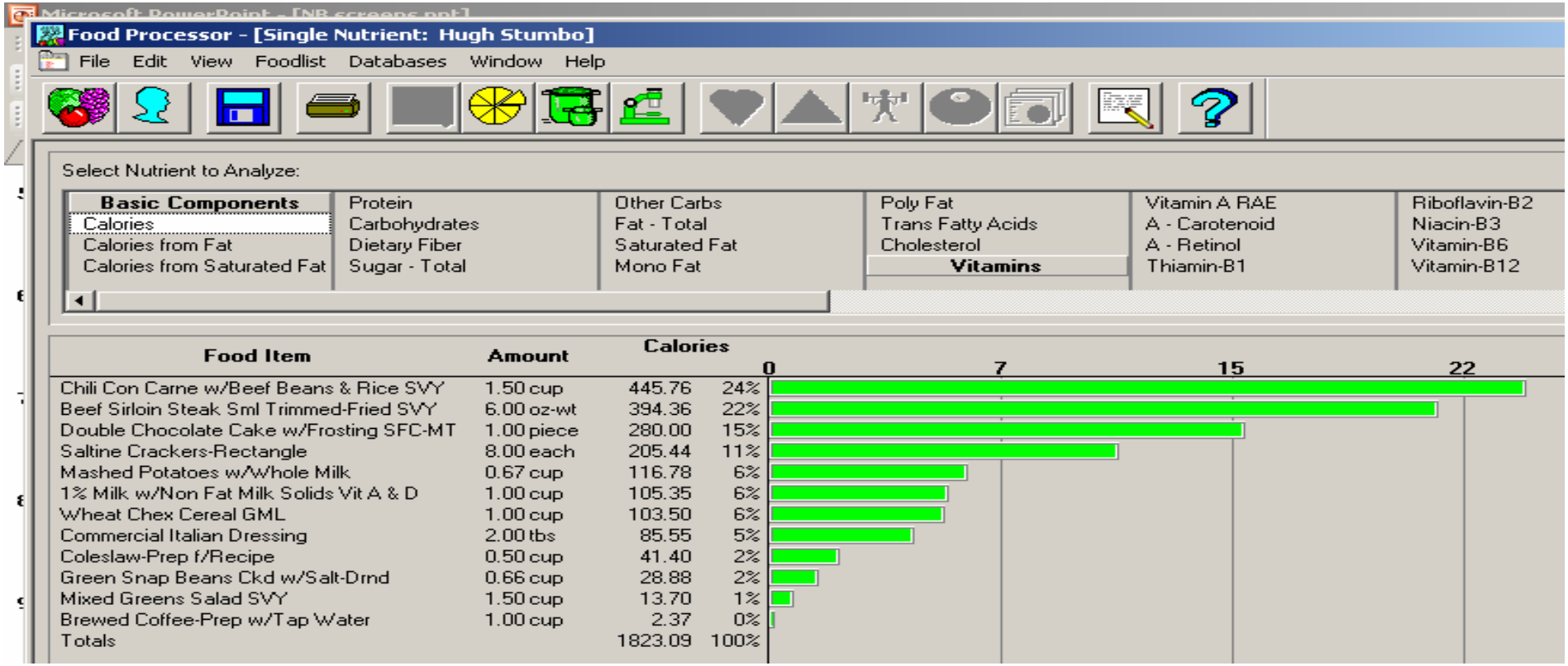
Nutrients | Source of Calories | Ratios and Exchanges | Pyramid



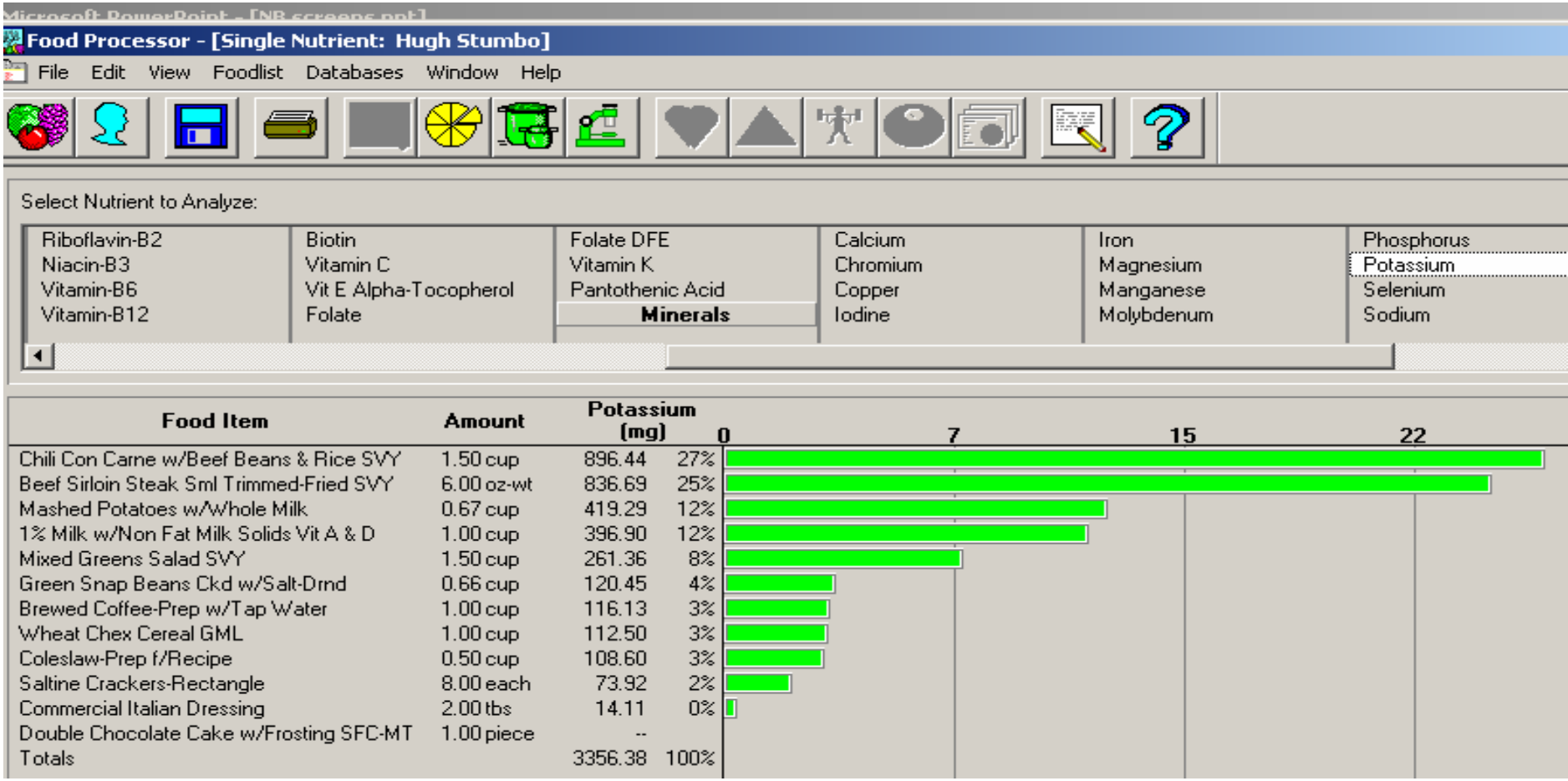
F2 = Preview
F12 = Edit Ingredient
F4 = Keyword
F6 = User Code
F7 = Foodlist (sin
F9 = Foodlist (all

Created 9/9/2006

Calories, highest sources chili, sirloin steak, cake and saltine crackers



Potassium, highest sources chili, sirloin steak, mashed potatoes, milk and greens



% RDA

Nutrient	Amount Reported	RDA	%RDA	AI
Vitamin A	450 mcg RAE	700 mcg RAE	64 %	
Vitamin C	4.32 mg	75 mg	6 %	
Vitamin D	0.76 mcg			10 mcg
Vitamin E	1.77 mg	15 mg	12 %	
Vitamin K	13.73 mcg			90 mcg
Thiamin	0.67 mg	1.1 mg	61 %	
Riboflavin	0.63 mg	1.1 mg	57 %	
Niacin	38.04 mg NE	14 mg NE	272 %	
Vitamin B6	1.28 mg	1.5 mg	85 %	
Folate	268 mcg DFE	400 mcg DFE	67 %	
Vitamin B12	1.09 mcg	2.4 mcg	45 %	
Pantothenic Acid	2.96 mg			5 mg
Calcium	250 mg			1200 mg
Copper	510 mcg	900 mcg	57 %	
Iron	5.82 mg	8 mg	73 %	
Magnesium	111 mg	320 mg	35 %	
Manganese	1.22 mg			1.8 mg
Phosphorus	653 mg	700 mg	93 %	
Selenium	80.85 mcg	55 mcg	147 %	
Zinc	4.49 mg	8 mg	56 %	

RDA/AI values based on the Dietary Reference Intakes provided by the National Academy of Sciences, Institute of Medicine, Food and Nutrition Board (1997-2001).

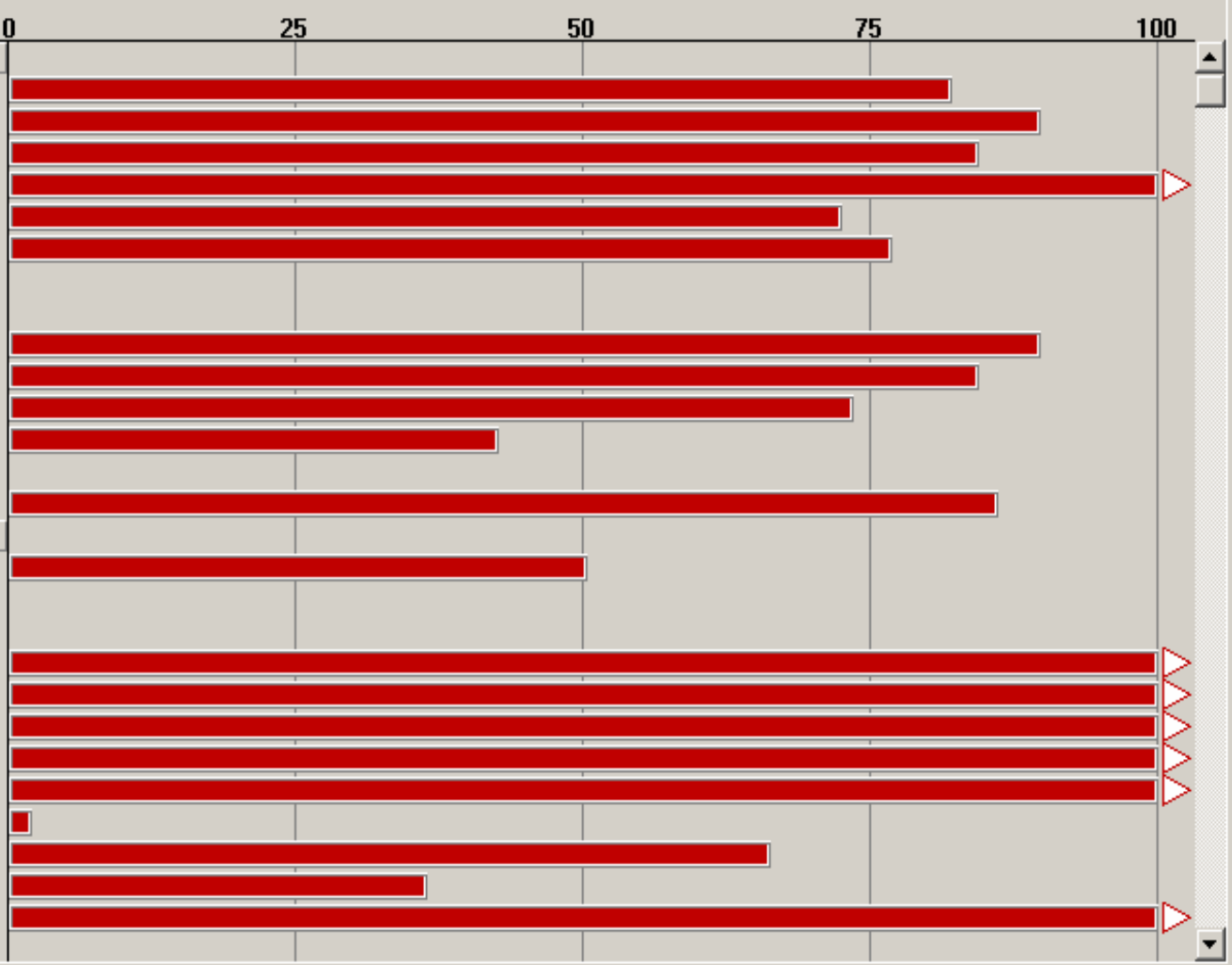
Additional Recommendations

Nutrient	Amount Reported	% of Energy	Recommended Intake
Energy	837 kcal		
Fat	17.63 g	18.95 %	20-35 % [1]

Serves: 1.00 Serving Size: 1585.20 g (55.92 oz-wt.) Weight: 1585.20 g (55.92 oz-wt.)

Compared to: US Male (> 70 years) Water: 73%

Nutrient	Value		Goal %
Basic Components			
Calories	1823.09		82%
Calories from Fat	559.20		90%
Calories from Saturated Fat	168.88		84%
Protein	100.51	g	179%
Carbohydrates	221.57	g	73%
Dietary Fiber	23.95	g	77%
Sugar - Total	48.39	g	
Other Carbs	85.53	g	
Fat - Total	62.13	g	90%
Saturated Fat	18.76	g	84%
Mono Fat	18.15	g	74%
Poly Fat	9.48	g	43%
Trans Fatty Acids	1.80	g	
Cholesterol	258.33	mg	86%
Vitamins			
Vitamin A RAE	453.27	mcg	50%
A - Carotenoid	381.89	RE	
A - Retinol	262.33	RE	
Thiamin-B1	1.24	mg	104%
Riboflavin-B2	2.11	mg	163%
Niacin-B3	20.19	mg	126%
Vitamin-B6	2.38	mg	140%
Vitamin-B12	7.96	mcg	332%
Biotin	0.56	mcg	2%
Vitamin C	59.62	mg	66%
Vit E Alpha-Tocopherol	5.45	mg	36%
Folate	550.54	mcg	138%



For Help, press F1 Created 9/9/2006 Last Modified 9/9/2006

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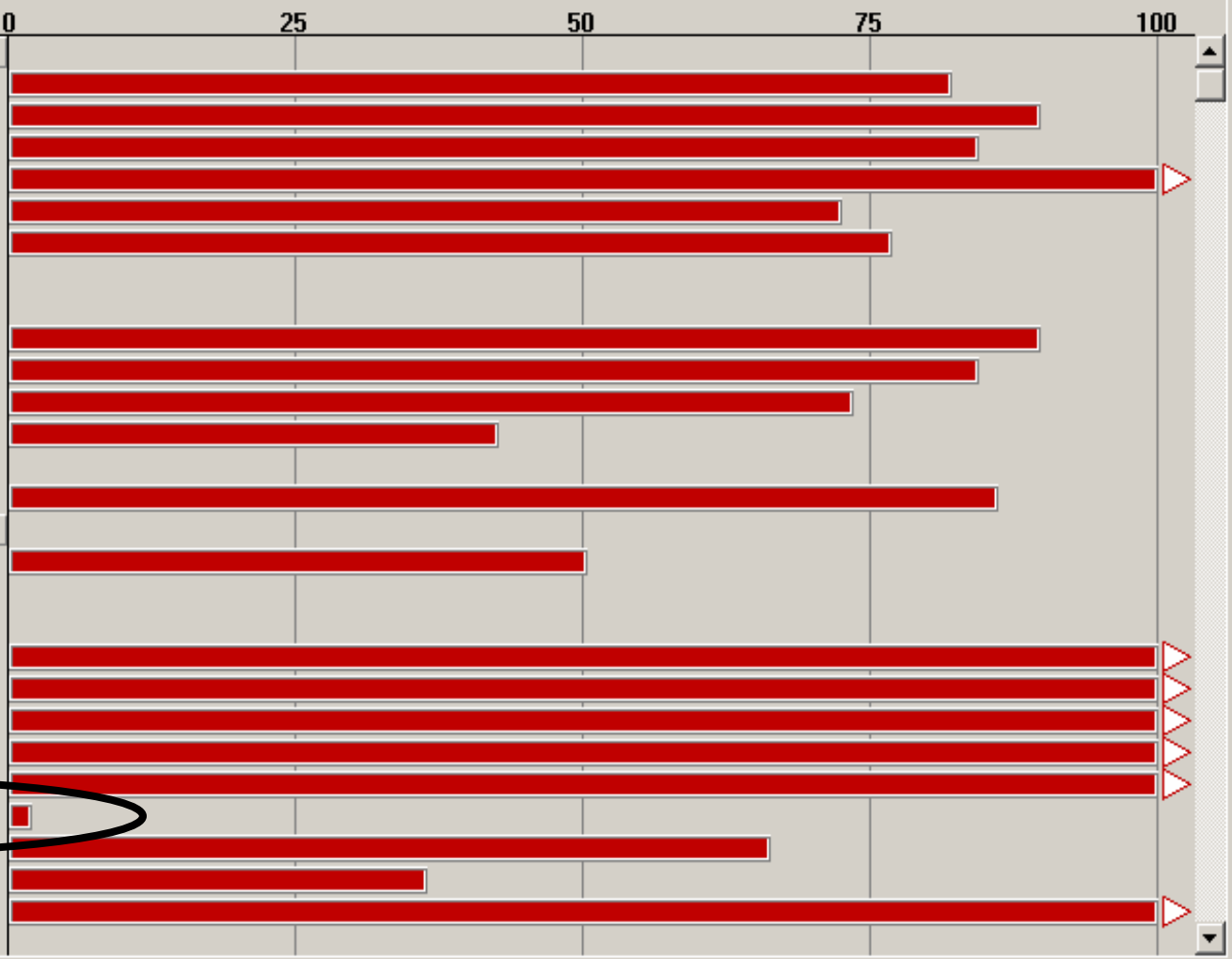
Vitamin A RAE	453.27	mcg	50%
A - Carotenoid	381.89	RE	
A - Retinol	262.33	RE	
Thiamin-B1	1.24	mg	104%
Riboflavin-B2	2.11	mg	163%
Niacin-B3	20.19	mg	126%
Vitamin-B6	2.38	mg	140%
Vitamin B12	7.96	mcg	332%
Biotin	0.56	mcg	2%
Vitamin C	59.62	mg	66%
Vit E Alpha-Tocopherol	5.45	mg	36%
Folate	550.54	mcg	138%

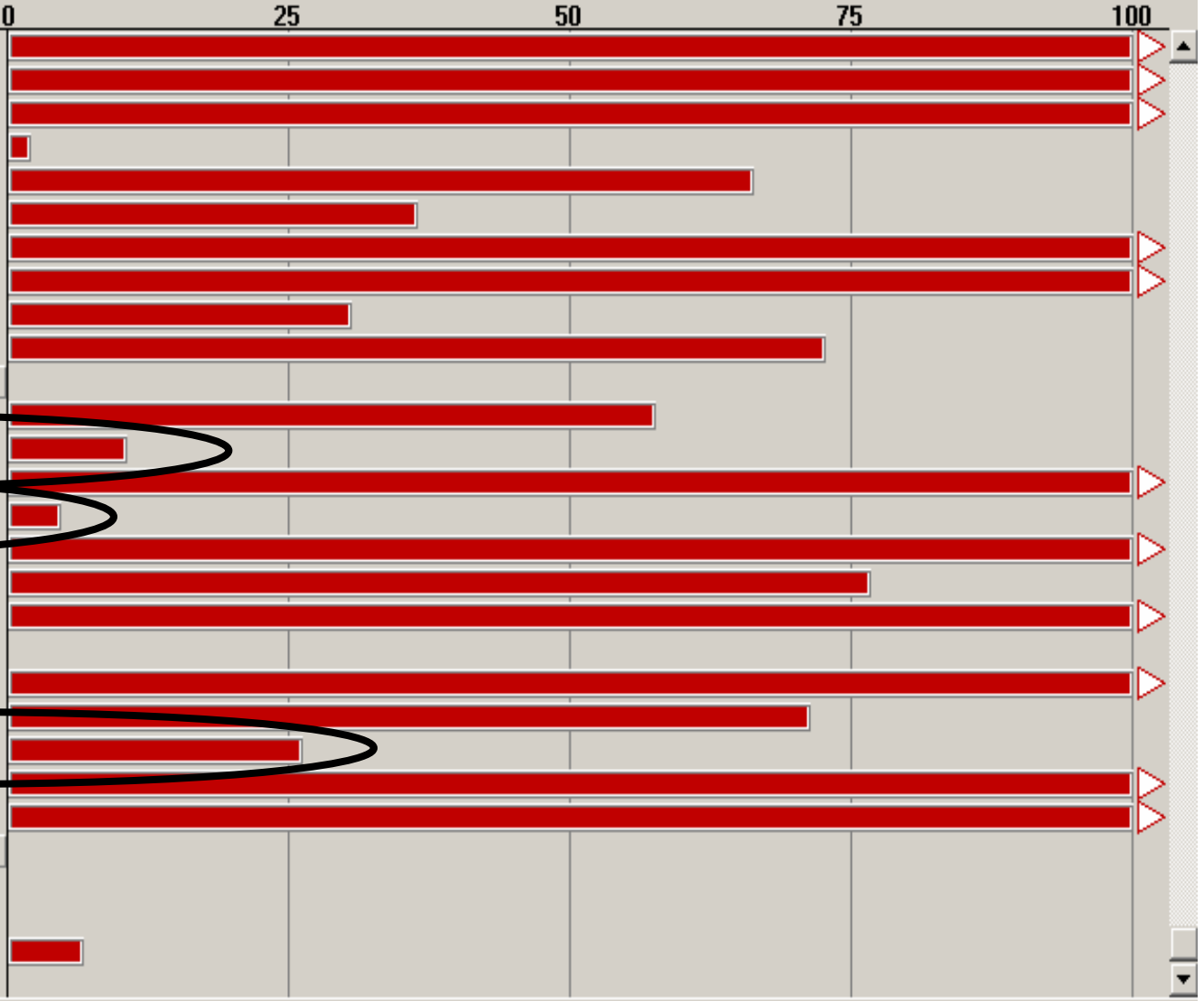


For Help, press F1 Created 9/9/2006 Last Modified 9/9/2006

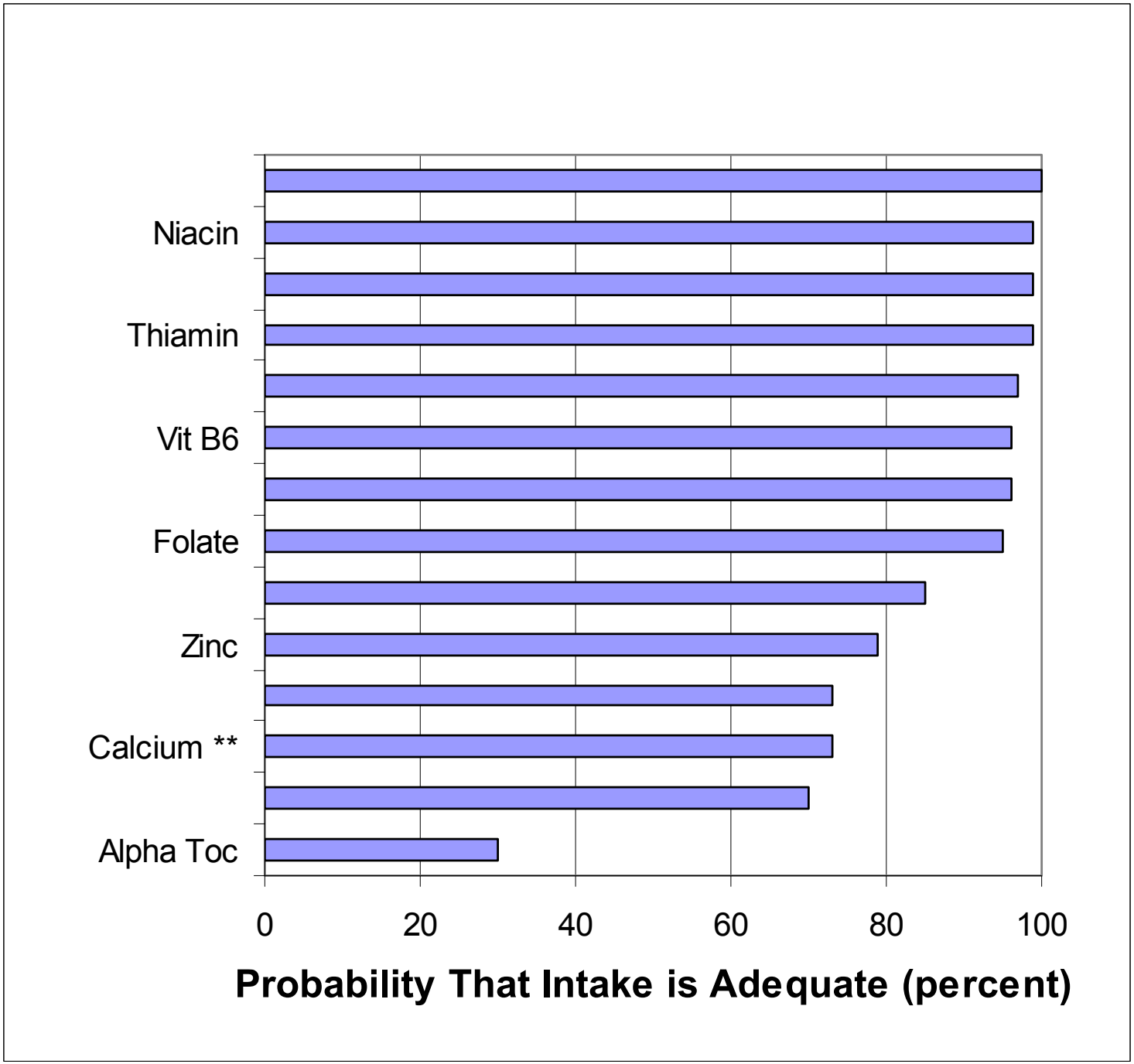
Serves: 1.00 Serving Size: 1585.20 g (55.92 oz-wt.) Weight: 1585.20 g (55.92 oz-wt.)

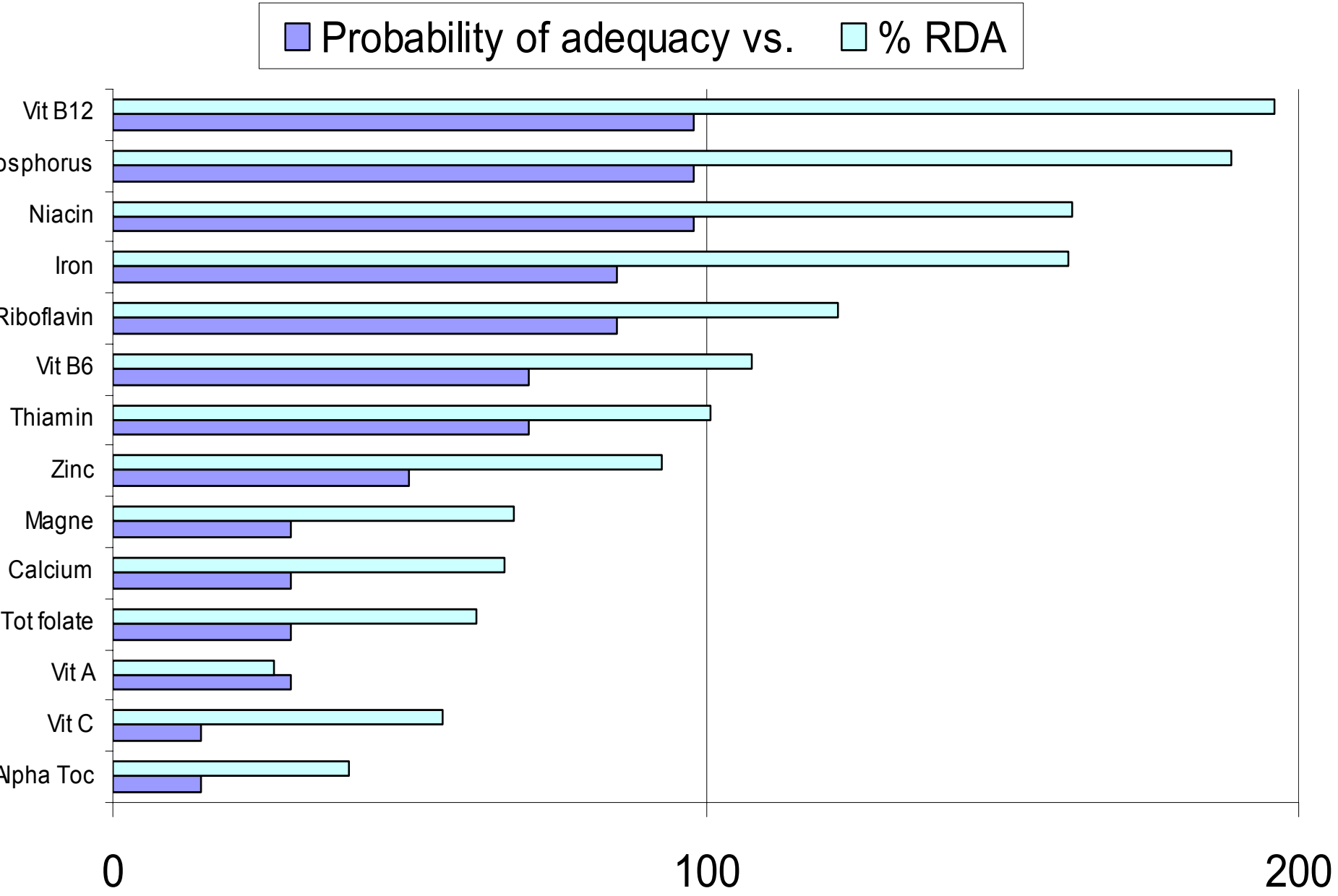
Compared to: US Male (> 70 years) Water: 73%

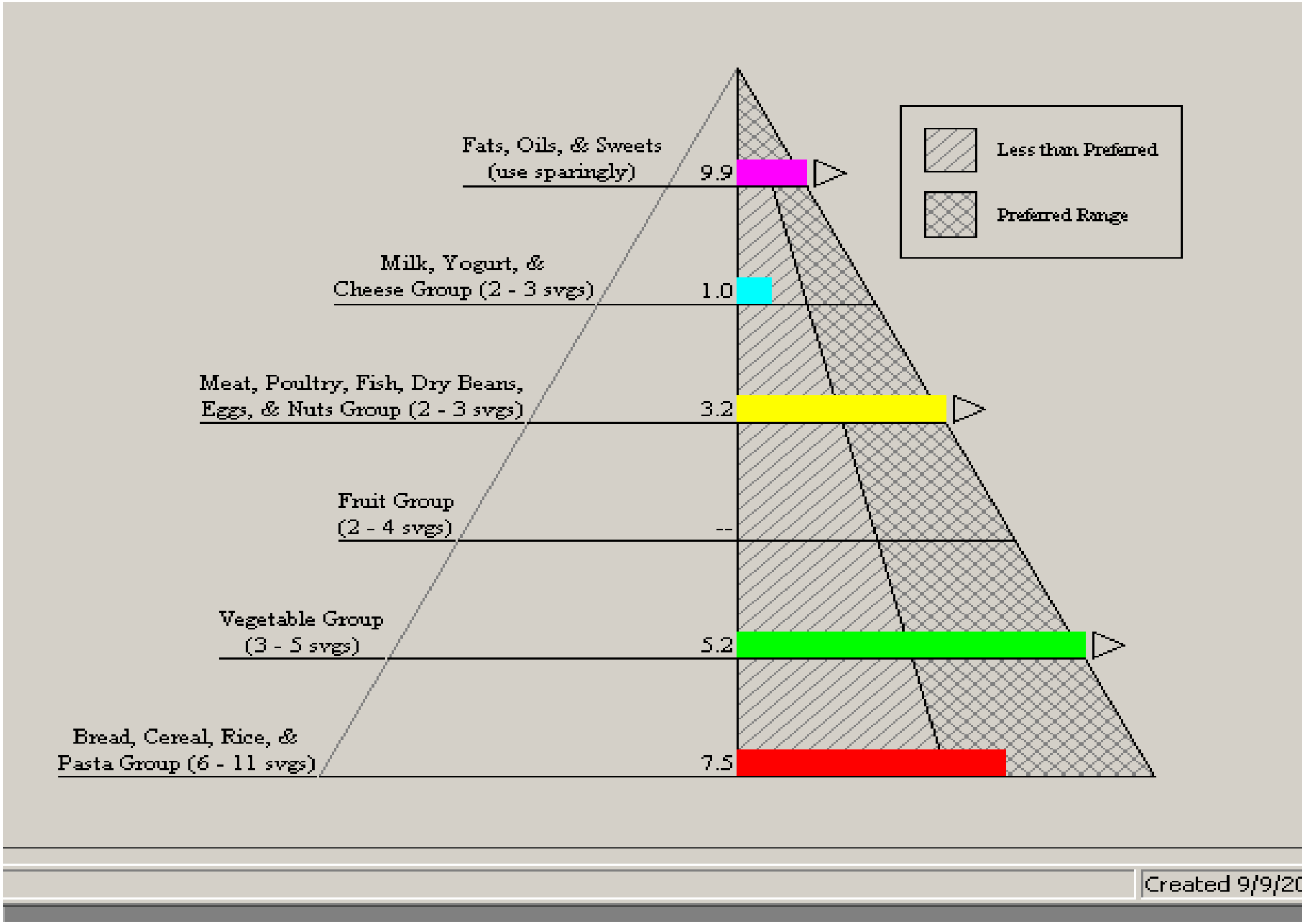
Nutrient	Value		Goal %
Niacin-B3	20.19	mg	126%
Vitamin-B6	2.38	mg	140%
Vitamin-B12	7.96	mcg	332%
Biotin	0.56	mcg	2%
Vitamin C	59.62	mg	66%
Vit E Alpha-Tocopherol	5.45	mg	36%
Folate	550.54	mcg	138%
Folate DFE	693.91	mcg	173%
Vitamin K	36.63	mcg	31%
Pantothenic Acid	3.64	mg	73%
Minerals			
Calcium	[illegible]	mg	[illegible]
Chromium	3.16	mcg	11%
Copper	[illegible]	mg	[illegible]
Iodine	7.04	mcg	5%
Iron	[illegible]	mg	[illegible]
Magnesium	322.39	mg	77%
Manganese	2.43	mg	106%
Molybdenum	--	mcg	
Phosphorus	1426.64	mg	204%
Potassium	[illegible]	mg	[illegible]
Selenium	14.38	mcg	26%
Sodium	[illegible]	mg	[illegible]
Zinc	19.47	mg	177%
Other			
Alcohol	0	g	
Caffeine	94.80	mg	
Choline	36.62	mg	7%



For Help, press F1 Created 9/9/2006 Last Modified 9/9/2006


Niacin
Thiamin
Vit B6
Folate
Zinc
Calcium **
Alpha Toc
0
20
40
60
80
100
Probability That Intake is Adequate (percent)


Probability of adequacy vs.
% RDA
Vit B12
osphorus
Niacin
Iron
Riboflavin
Vit B6
Thiamin
Zinc
Magne
Calcium
Tot folate
Vit A
Vit C
Alpha Toc
0
100
200



Summary:
Important Features of
Dietary Assessment Systems

Cost:

Results: Reports, Output

Search:

Database:

Choose Wisely:

Don't be surprised by

- Missing values,
- Missing features or
- Missing reports

The End

phyllis-stumbo@uiowa.edu

University of Iowa
Iowa City, Iowa