Project 3 FDNS 4600/6600

Nutrients in Fast Food Meals Compared to Healthy Meals

April 6, 2011

Emilie Koetter, Darcy Lenz, Kimberly Jenkins

“We worked as a group on this project.”

**Introduction**

The purpose of this project is to compare two meals: an example of a typical meal obtained at a fast food establishment versus a healthy meal prepared at home. Both meals comply with the given individual’s dietary preferences, however only the healthy meal correlates with the Dietary Guidelines for Americans (USDHHS and USDA, 2010) for protein, fat, and calories, and the Dietary References Intakes (IOM, 2010) for sodium. This individual is male, age 55, and is active. The healthy meal has been designed to meet 30-35% of his daily calorie need of 2800 calories (USDHHS and USDA, 2010). His protein needs are 56 grams per day and his fat intake, at 30% calories from fat, should be around 93.3 grams per day (USDHHS and USDA, 2010). His sodium intake should be less than 1300 milligrams per day (IOM, 2010). The nutrient content of foods is from USDA (2009) and food costs are from a local grocery store (Kroger, Athens, GA) and a local fast food restaurant (Chick-fil-a, Athens, GA). The information is summarized in the table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|   | Amount served in household units and in grams | USDA NDB number for foods | Calories, kcal | Protein, grams | Fat, grams | Sodium, mg | Cost per amount served, $ |
| **Fast food (include at least 3 items), this example is from Chick-fil-a**  |   |   |   |   |   |   |   |
| 8-count nuggets | 113 grams | - | 260 | 28 | 12 | 990 | 2.75 |
| Waffle potato fries, small | 85 grams | - | 270 | 3 | 14 | 125 | 1.39 |
| Fruit cup, small | 124 grams | - | 50 | 0 | 0 | 0 | 1.69 |
| Diet coke, small | 320 grams | - | 0 | 0 | 0 | 5 | 1.29 |
| Chick-fil-a Sauce | 28 grams | - | 140 | 0 | 13 | 170 | 0.00 |
| Banana pudding milkshake, small | 414 grams | - | 780 | 22 | 24 | 440 |  2.55 |
| Totals |   |   | 1500 | 53 | 63 | 1730 | 9.67 |
| Recommendations from USDHHS and USDA (2005) and IOM (2010), assigned person is 55 years old, male, and active, 30% of calories from fat |   |   | 2800 | 56 | 93.3 | 1300 |   |
| % of recommendation |   |   | 53.6 | 94.6 | 67.5 | 75.14 |   |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Healthy meal (include all required items below) - note in the example all numbers are "made up," so be sure to look up all information** | Amount served in household units and in grams | USDA NDB number for foods | Calories, kcal (for healthy meal must be 30% to 35% of recommended) | Protein, grams | Fat, grams | Sodium, mg | Cost per amount served, $ |
| Grains | 1cup long-grain brown rice, 195 grams | 20037 | 216 | 2.52 | 0.88 | 5 | 0.09 |
| Meat | ½ boneless skinless chicken breast, 3 oz, 86 grams | 05064 | 142 | 26.68 | 3.07 | 64 | 0.34 |
| Dairy | 1 cup 2% reduced fat milk, 244 grams | 01079 | 122. | 8.05 | 4.83 | 115 | 0.24 |
| Fruit | 1 cup raw grapes, 151 grams | 09132 | 104 | 1.09 | 0.24 | 3 | 0.63 |
| Vegetables | 1 cup asparagus boiled, 180 grams | 11012 | 40 | 4.32 | 0.40 | 25 | 0.99 |
| Beverage (can be one of the above, such as fruit juice, vegetable juice, or milk) | 1 cup raw orange juice, 248 grams | 09206 | 112 | 1.74 | 0.50 | 2 | 0.47 |
| Any other foods to meet the 30% to 35% of the daily energy recommendation (e.g., one meal) | ½ cup chocolate frozen yogurt, 87 grams |  42186 |  110 | 2.61  | 3.13  |  55 |  0.17 |
| Totals |   |   | 846 | 47.01 | 13.05 | 269 | 2.93 |
| Recommendations from USDHHS and USDA (2005) and IOM (2010), assigned person is 55-year-old, active male, 30% of calories from fat |   |   | 2800 | 56 | 93.3 | 2300 |   |
| % of recommendation |   |   | 30.21 | 83.95 | 13.99 | 11.7 |   |
| NOTE: energy must be 30% to 35% of recommendations; adjust food intake to achieve this |   |   |   |   |   |   |   |

**Questions**

1. What accounts for the differences, if any, in the energy content of the two meals? The fast food meal from Chick-fil-a is significantly higher in calories than the healthy meal mainly because it contains a higher total fat. Since fat contains 9 calories per gram, the fast food meal is higher in energy.
2. What accounts for the differences, if any, in the protein content of the two meals? The healthy meal contains more protein than the fast food meal because several of the foods chosen, such as chicken, milk, and yogurt, are rich sources of complete proteins.
3. What accounts for the differences, if any, in the fat content of the two meals? The Chick-fil-a meal has a significantly higher fat content compared to the healthy meal. Generally, fast food is higher in fat because many contain fried food. Also, the milkshake alone in the fast food meal contains 24 grams of fat. The healthy meal contributes only 13.05 grams total fat.
4. What accounts for the differences, if any, in the sodium content of the two meals? The sodium content of the two meals varies significantly. Fast food restaurants, such as Chick-fil-a, generally offer foods high in sodium. Sodium is used to help preserve fast foods for longer periods of time and add flavor. Usually fresh meats and produce contain less preservatives and sodium.
5. What accounts for the differences, if any, in the cost content of the two meals? Even though fast food may be convenient and may appear to be cheaper than a home-cooked meal, most fast food meals are significantly more expensive when evaluated per serving. The Chick-fil-a meal is more expensive than the healthy meal by almost $6.74.
6. Thinking back to the green house gas emissions project, would GHG be more likely to be higher or lower if you purchased the vegetables for this meal from a Georgia farmer who drove about 60 miles round-trip to sell his produce in a local market in Athens located about 10 miles from your residence? Explain. Purchasing vegetables from a local farmer would most likely be lower in GHG emissions. Buying vegetables at a local grocer may appear to produce lower GHG emissions, but after the vegetables are mass produced and treated with fertilizers, harvested by fossil fuel consuming machinery, driven from the farm to the main hub of a grocery chain, and are then dispersed to stores throughout the country, GHG emissions have accumulated. These pre-consumption activities do not even account for the consumer driving to and from the grocery store to buy the vegetables.
7. Conclusions and what you learned from this project. We often eat fast foods because they are convenient, affordable, and easy to obtain. At the completion of this project, we learned that moderation is the key to a successful diet and healthier lifestyle. The consumption of fast foods on a regular basis can be harmful to health, so it is crucial that we make educated food choices. s tinos

**References**

Food prices:

1. Chick-fil-a, Athens, GA, March 27, 2011.
2. Kroger, Athens, GA, March 26, 2011.

Chick-fil-a, Menu and Nutrition, <http://chick-fil-a.com/Food/Meal>, accessed on March 27, 2010

Institute of Medicine, Dietary Reference Intakes (DRIs): Recommended Dietary Allowances and Adequate Intakes, Vitamins and Elements, <http://iom.edu/Activities/Nutrition/SummaryDRIs/~/media/Files/Activity%20Files/Nutrition/DRIs/RDA%20and%20AIs_Vitamin%20and%20Elements.pdf>, accessed on March 26, 2011.

THIS HAS BEEN UPDATED FOR CALCIUM AND VITAMIN D. Vitamin D conversions: 15 micrograms = 600 IU. USE THIS FOR SODIUM, ESPECIALLY FOR THOSE WITH HYPERTENSION.

United States Department of Agriculture, Agricultural Research Service, USDA National Nutrient Database for Standard Reference, Release 23, Nutrient Data Laboratory Home Page, <http://www.nal.usda.gov/fnic/foodcomp/search/>, accessed on March 26, 2011.

United States Department of Health and Human Services and United States Department of Agriculture, Dietary Guidelines for Americans, 2010; sodium and hypertension recommendations are on page “x”; energy recommendations are on page 14 or page 78; DRIs for several nutrients are on page 76 (not correct for calcium and vitamin D); meal patterns for energy recommendations and serving size recommendations for various food groups are on pages 79 and 80; <http://www.health.gov/dietaryguidelines/dga2010/DietaryGuidelines2010.pdf>, accessed on March 26, 2011. NOTE: the DRIs for calcium and vitamin D are not correct on page 76 in this document.

**USDA-NNDSR Information**

**Rice, brown, long-grain, cooked**

**Refuse:** 0%
**NDB No:** 20037 (Nutrient values and weights are for edible portion)

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutrient**  | **Units**  | **Value per100 grams** | **1.00 X 1 cup -------195g**  |
| **Proximates**  |  |  |  |
| Water  | g | 73.09 | 142.53 |
| Energy  | kcal | 111 | 216 |
| Energy  | kJ | 464 | 905 |
| Protein  | g | 2.58 | 5.03 |
| Total lipid (fat)  | g | 0.90 | 1.75 |
| Ash  | g | 0.46 | 0.90 |
| Carbohydrate, by difference  | g | 22.96 | 44.77 |
| Fiber, total dietary  | g | 1.8 | 3.5 |
| Sugars, total  | g | 0.35 | 0.68 |
| Sucrose  | g | 0.35 | 0.68 |
| Glucose (dextrose)  | g | 0.00 | 0.00 |
| Fructose  | g | 0.00 | 0.00 |
| Lactose  | g | 0.00 | 0.00 |
| Maltose  | g | 0.00 | 0.00 |
| Galactose  | g | 0.00 | 0.00 |
| **Minerals**  |  |  |  |
| Calcium, Ca  | mg | 10 | 20 |
| Iron, Fe  | mg | 0.42 | 0.82 |
| Magnesium, Mg  | mg | 43 | 84 |
| Phosphorus, P  | mg | 83 | 162 |
| Potassium, K  | mg | 43 | 84 |
| Sodium, Na  | mg | 5 | 10 |

**Chicken, broilers or fryers, breast, meat only, cooked, roasted**

**Refuse:** 28%  (19% bone, 9% skin)
**NDB No:** 05064 (Nutrient values and weights are for edible portion)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Nutrient**  | **Units**  | **Value per100 grams** | **1.00 X 1 unit (yield from 1 lb ready-to-cook chicken) -------52g**  | **1.00 X 0.5 breast, bone and skin removed -------86g**  |
| **Proximates**  |  |  |  |  |
| Water  | g | 65.26 | 33.94 | 56.12 |
| Energy  | kcal | 165 | 86 | 142 |
| Energy  | kJ | 690 | 359 | 593 |
| Protein  | g | 31.02 | 16.13 | 26.68 |
| Total lipid (fat)  | g | 3.57 | 1.86 | 3.07 |
| Ash  | g | 1.06 | 0.55 | 0.91 |
| Carbohydrate, by difference  | g | 0.00 | 0.00 | 0.00 |
| Fiber, total dietary  | g | 0.0 | 0.0 | 0.0 |
| Sugars, total  | g | 0.00 | 0.00 | 0.00 |
| **Minerals**  |  |  |  |  |
| Calcium, Ca  | mg | 15 | 8 | 13 |
| Iron, Fe  | mg | 1.04 | 0.54 | 0.89 |
| Magnesium, Mg  | mg | 29 | 15 | 25 |
| Phosphorus, P  | mg | 228 | 119 | 196 |
| Potassium, K  | mg | 256 | 133 | 220 |
| Sodium, Na  | mg | 74 | 38 | 64 |

**Milk, reduced fat, fluid, 2% milkfat, with added vitamin A and vitamin D**

**Refuse:** 0%
**NDB No:** 01079 (Nutrient values and weights are for edible portion)

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutrient**  | **Units**  | **Value per100 grams** | **1.00 X 1 cup -------244g**  |
| **Proximates**  |  |  |  |
| Water  | g | 89.21 | 217.67 |
| Energy  | kcal | 50 | 122 |
| Energy  | kJ | 210 | 512 |
| Protein  | g | 3.30 | 8.05 |
| Total lipid (fat)  | g | 1.98 | 4.83 |
| Ash  | g | 0.71 | 1.73 |
| Carbohydrate, by difference  | g | 4.80 | 11.71 |
| Fiber, total dietary  | g | 0.0 | 0.0 |
| Sugars, total  | g | 5.06 | 12.35 |
| Sucrose  | g | 0.01 | 0.02 |
| Glucose (dextrose)  | g | 0.01 | 0.02 |
| Fructose  | g | 0.01 | 0.02 |
| Lactose  | g | 5.01 | 12.22 |
| Maltose  | g | 0.01 | 0.02 |
| Galactose  | g | 0.02 | 0.05 |
| **Minerals**  |  |  |  |
| Calcium, Ca  | mg | 120 | 293 |
| Iron, Fe  | mg | 0.02 | 0.05 |
| Magnesium, Mg  | mg | 11 | 27 |
| Phosphorus, P  | mg | 92 | 224 |
| Potassium, K  | mg | 140 | 342 |
| Sodium, Na  | mg | 47 | 115 |

**Grapes, red or green (European type, such as Thompson seedless), raw**

**Refuse:** 4%  (Stems)
**Scientific Name:**  *Vitis vinifera*
**NDB No:** 09132 (Nutrient values and weights are for edible portion)

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutrient**  | **Units**  | **Value per100 grams** | **1.00 X 1 cup -------151g**  |
| **Proximates**  |  |  |  |
| Water  | g | 80.54 | 121.62 |
| Energy  | kcal | 69 | 104 |
| Energy  | kJ | 288 | 435 |
| Protein  | g | 0.72 | 1.09 |
| Total lipid (fat)  | g | 0.16 | 0.24 |
| Ash  | g | 0.48 | 0.72 |
| Carbohydrate, by difference  | g | 18.10 | 27.33 |
| Fiber, total dietary  | g | 0.9 | 1.4 |
| Sugars, total  | g | 15.48 | 23.37 |
| Sucrose  | g | 0.15 | 0.23 |
| Glucose (dextrose)  | g | 7.20 | 10.87 |
| Fructose  | g | 8.13 | 12.28 |
| Lactose  | g | 0.00 | 0.00 |
| Maltose  | g | 0.00 | 0.00 |
| Galactose  | g | 0.00 | 0.00 |
| Starch  | g | 0.00 | 0.00 |
| **Minerals**  |  |  |  |
| Calcium, Ca  | mg | 10 | 15 |
| Iron, Fe  | mg | 0.36 | 0.54 |
| Magnesium, Mg  | mg | 7 | 11 |
| Phosphorus, P  | mg | 20 | 30 |
| Potassium, K  | mg | 191 | 288 |
| Sodium, Na  | mg | 2 | 3 |

**Asparagus, cooked, boiled, drained**

**Refuse:** 0%
**NDB No:** 11012 (Nutrient values and weights are for edible portion)

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutrient**  | **Units**  | **Value per100 grams** | **2.00 X 0.5 cup -------180g**  |
| **Proximates**  |  |  |  |
| Water  | g | 92.63 | 166.73 |
| Energy  | kcal | 22 | 40 |
| Energy  | kJ | 94 | 169 |
| Protein  | g | 2.40 | 4.32 |
| Total lipid (fat)  | g | 0.22 | 0.40 |
| Ash  | g | 0.63 | 1.13 |
| Carbohydrate, by difference  | g | 4.11 | 7.40 |
| Fiber, total dietary  | g | 2.0 | 3.6 |
| Sugars, total  | g | 1.30 | 2.34 |
| Sucrose  | g | 0.08 | 0.14 |
| Glucose (dextrose)  | g | 0.42 | 0.76 |
| Fructose  | g | 0.79 | 1.42 |
| Lactose  | g | 0.00 | 0.00 |
| Maltose  | g | 0.00 | 0.00 |
| Galactose  | g | 0.00 | 0.00 |
| Starch  | g | 0.00 | 0.00 |
| **Minerals**  |  |  |  |
| Calcium, Ca  | mg | 23 | 41 |
| Iron, Fe  | mg | 0.91 | 1.64 |
| Magnesium, Mg  | mg | 14 | 25 |
| Phosphorus, P  | mg | 54 | 97 |
| Potassium, K  | mg | 224 | 403 |
| Sodium, Na  | mg | 14 | 25 |

**Orange juice, raw**

**Refuse:** 0%
**NDB No:** 09206 (Nutrient values and weights are for edible portion)

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutrient**  | **Units**  | **Value per100 grams** | **1.00 X 1 cup -------248g**  |
| **Proximates**  |  |  |  |
| Water  | g | 88.30 | 218.98 |
| Energy  | kcal | 45 | 112 |
| Energy  | kJ | 188 | 466 |
| Protein  | g | 0.70 | 1.74 |
| Total lipid (fat)  | g | 0.20 | 0.50 |
| Ash  | g | 0.40 | 0.99 |
| Carbohydrate, by difference  | g | 10.40 | 25.79 |
| Fiber, total dietary  | g | 0.2 | 0.5 |
| Sugars, total  | g | 8.40 | 20.83 |
| **Minerals**  |  |  |  |
| Calcium, Ca  | mg | 11 | 27 |
| Iron, Fe  | mg | 0.20 | 0.50 |
| Magnesium, Mg  | mg | 11 | 27 |
| Phosphorus, P  | mg | 17 | 42 |
| Potassium, K  | mg | 200 | 496 |
| Sodium, Na  | mg | 1 | 2 |

**Frozen yogurts, chocolate**

**Refuse:** 0%
**NDB No:** 42186 (Nutrient values and weights are for edible portion)

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutrient**  | **Units**  | **Value per100 grams** | **0.5 X 1 cup -------87g**  |
| **Proximates**  |  |  |  |
| Water  | g | 71.20 | 61.94 |
| Energy  | kcal | 127 | 110 |
| Energy  | kJ | 531 | 462 |
| Protein  | g | 3.00 | 2.61 |
| Total lipid (fat)  | g | 3.60 | 3.13 |
| Ash  | g | 0.60 | 0.52 |
| Carbohydrate, by difference  | g | 21.60 | 18.79 |
| Fiber, total dietary  | g | 2.3 | 2.0 |
| Sugars, total  | g | 19.24 | 16.74 |
| **Minerals**  |  |  |  |
| Calcium, Ca  | mg | 100 | 87 |
| Iron, Fe  | mg | 0.46 | 0.40 |
| Magnesium, Mg  | mg | 25 | 22 |
| Phosphorus, P  | mg | 89 | 77 |
| Potassium, K  | mg | 234 | 204 |
| Sodium, Na  | mg | 63 | 55 |

Evaluation form

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Requirements** | **Did not follow directions** | **A few problems** | **Very****Good** | **Points off** |
| 1. Filename is **LastnamesDateProject3**, e.g., SamsonSmithJonesMarch1Project3; **no punctuation in the filename**; only one file submitted (all information must be in one file including this grading rubric); submitted to elc as an **attachment** in the correct “assignment” area; **WORD files only** (NO pdf, NO zipped files, do NOT paste file into box). Only ONE submission per group.
 | -4 |  |  |  |
| 1. **Include this grading rubric in the file submitted above**
 | -4 |  |  |  |
| 1. Provided project number, title, date submitted, your name(s), state “we worked as a group on this project” at top of page; followed by an introductory paragraph with mandatory references for the required information, USDA and USDHHS (2010), IOM (2010), nutrient content (USDA, 2011), and stores where nutrition and price information obtained (Kroger, 2011) (about 1/3 page, 300 word limit). Use format from project 1.
 | 2 or more errors (0) | 1 error (2) | Did all of this (6)  |  |
| 1. Table can be 9- or 10-point font; no abbreviations; has required column headings; includes minimum of three fast foods; includes minimum of at least one serving of each of the 5 healthy food groups recommended by USDA and USDHHS (2010); and follows food preferences (e.g., organic or no red meat)
 | 2 or more errors (0) |  | Did all of this (4) |  |
| 1. Calculations for serving sizes and amounts served are all correct
 | 1 or more errors (0) |  | All correct (4) |  |
| 1. Calculations for calories are all correct (healthy meal must be 30% to 35% of daily energy)
 | 1 or more errors (0) |  | All correct (4) |  |
| 1. Calculations for protein are all correct (IOM DRIs, 46 g or 56 g for most adults)
 | 1 or more errors (0) |  | All correct (4) |  |
| 1. Calculations for fat are all correct (recommendation is 20% to 35% of calories for most adults)
 | 1 or more errors (0) |  | All correct (4) |  |
| 1. Calculations for sodium are all correct (best to use IOM DRIs, 1500 mg for most adults, but 1300 mg for 51-70 and 1200 mg for > 70 years old)
 | 1 or more errors (0) |  | All correct (4) |  |
| 1. Calculations for costs are all correct
 | 1 or more errors (0) |  | All correct (4) |  |
| 1. Answered the questions accurately and thoughtfully based on information in the table and the references (up to 1 page, 500 word limit including the questions)
 | Outside word limit, inaccurate, and/or inconsistent with data (0) | Somewhat accurate, thoughtful, and consistent (2) | Within word limit, accurate, thoughtful, consistent with data (4) |  |
| 1. References cited correctly as shown in the example, with attention to capitalization, commas, periods, **correct access date**; no textbooks should be listed (1/2 page)
 | Did not do this (0) |  | Did this accurately (4) |  |
| 1. National Nutrient Database for Standard Reference (USDA-NNDSR) information is included at the end of the file and the data are correct in the table
 | Did not do this; incorrect foods, units, serving sizes, other problems (0) |  | Did this accurately (4) |  |
| 1. Follow formatting guidelines as illustrated in previous projects (spacing for units with a space between the number and the unit, number of significant digits), **do not capitalize nutrients in the middle of a sentence,** correct spelling, grammar and punctuation, 11 or 12 point font for text, single-spaced, 1 inch margins, no extra formatting (no colors, no borders, no shading, etc), no use of “&”, do not use a title page, do use subheadings, follow word count (see above), pages are numbered
 | 2 or more errors (0) | 1 error (2) | Professionally prepared with no errors (4) |  |
| Penalty for late, -50% if 1 day late, 0 if more than 1 day late |  |  |  |  |
| 45 points is maximum if work alone, so please work in groups |  |  |  |  |
| **Total points** |  |  |  | **/50** |