Monitoring the Sodium Content of Foods Including Grain-based Products


ABSTRACT
The 2005 Dietary Guidelines for Americans includes the recommendation to consume less than 2,300 mg of sodium per day. For population groups at risk for hypertension, the recommendation is to consume no more than 1,500 mg of sodium per day. However, the mean sodium intake for people 2 years of age and older, based on the What We Eat in America, NHANES 2007-2008 (WWEIA), is 3,330 mg of sodium per day. Since most of the sodium in the diet comes from processed and restaurant foods, public health advocates are pushing for changes in sodium content over the coming years.

RESULTS AND DISCUSSION
Eighty percent of the sodium in the dietary records collected in 2007-2008 was contributed by 166 foods in SR. These foods will be monitored for changes in sodium content over the coming years.
Foods which were the largest contributors will be monitored by analysis and those lower on the list will be monitored by label claims.
The 13 foods that together contributed 25% of the added sodium intakes are shown in Table 1. Five of these are grain containing products. Even though the sodium content per 100 g is comparatively low, because of the large quantities consumed, bread and rolls are at the top of the list.
Of the 166 foods to be monitored, 68 are grain containing foods. Figure 1 shows the % contribution of grain containing items based on total sodium contributed by the 166 foods.
Other types of foods that were major contributors of sodium include cured meat, cheese, sauces, salad dressing, and french fries.

Table 1. Foods in SR22 contributing 25% of sodium intake in U.S.*

<table>
<thead>
<tr>
<th>Food</th>
<th>Na, mg/100g</th>
<th>Cumulative % Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolls, hamburger or hotdog</td>
<td>479</td>
<td>3.01</td>
</tr>
<tr>
<td>Bread, white</td>
<td>681</td>
<td>5.80</td>
</tr>
<tr>
<td>Cheese food, pasteurized process, american</td>
<td>1265</td>
<td>8.38</td>
</tr>
<tr>
<td>Tortillas, flour</td>
<td>636</td>
<td>10.46</td>
</tr>
<tr>
<td>Soy sauce</td>
<td>5637</td>
<td>12.50</td>
</tr>
<tr>
<td>Frankfurter, beef</td>
<td>1140</td>
<td>14.44</td>
</tr>
<tr>
<td>Fast food, pizza, cheese, thin crust</td>
<td>581</td>
<td>16.11</td>
</tr>
<tr>
<td>Catsup</td>
<td>1114</td>
<td>17.73</td>
</tr>
<tr>
<td>Chicken tenders</td>
<td>857</td>
<td>19.30</td>
</tr>
<tr>
<td>Cheese, cheddar</td>
<td>621</td>
<td>20.87</td>
</tr>
<tr>
<td>Sauce, spaghetti</td>
<td>410</td>
<td>22.28</td>
</tr>
<tr>
<td>Pork, cured, ham</td>
<td>1278</td>
<td>23.67</td>
</tr>
<tr>
<td>Bread, wheat</td>
<td>521</td>
<td>25.03</td>
</tr>
</tbody>
</table>

*Grain-based foods are highlighted in yellow.

Sodium Monitoring of White Bread
In 1999, white bread was sampled nationwide as part of USDA's National Food and Nutrient Analysis Program (NFNAP). The mean value per 100 g was 681 ± 24 mg (n=8); as a result the sodium value for SR16 was changed to 581 mg/100 g.
For SR23, the sodium value for white bread was reduced to 511 mg/100 g based on label claims for store and brand name breads.
In 2010, white bread was again sampled nationwide using NFNAP methodology. Results are presented in Figure 2. Average for all brands is 482 ± 54 mg/100 g (n=21); the average for all store brand breads was 488 mg/100 g, while the four brand name breads sampled had averages ranging from 369 to 512 mg/100 g.
The company for Brand A announced in August 2010 that it had reformulated white bread while the company for Brand D announced it would be reformulating white bread in 2011. Based on label information, store brands have been fairly stable while brand name companies are reformulating more frequently.

CONCLUSION
Many grain-based foods rank high on NDL’s list for monitoring sodium content. The rank is a function of the level of consumption by participants in NHANES as well as the amount of sodium in the food. The food industry is responding to health concerns about the amount of sodium in the US diet and is in the process of reformulating food products to reduce the sodium content. It is thus necessary to continuously monitor these foods to keep up with the changes.
In addition to white bread, other high sodium contributors (hot dog rolls, flour tortillas, and frankfurters) were analyzed earlier this year. Sampling is now underway for cheese and pepperoni pizza, macaroni and cheese, American cheese, and canned vegetables. The results of these analyses will be included in SR24.

REFERENCES
...

METHODS AND MATERIALS
Steps to Identify and Rank Foods to Monitor for Sodium Content
Over 2,800 foods from SR22 (released in 2009) were used as ingredients to estimate the nutrient values in the 7,000 foods contained in USDA’s Food and Nutrient Database for Dietary Studies (FNDDS). This database was developed to calculate nutrient intakes for the What We Eat in America, National Health and Nutrition Examination Survey (NHANES). Commodity type items that do not contain added sodium, e.g., milk, eggs, meat, fruit, vegetables, and grain, were excluded from the list of 2,800 foods.
The over 1,000 remaining foods containing added sodium were matched to the foods in the dietary intake files for respondents in NHANES 2007-2008.
Percent contribution for each food was calculated by dividing the total grams consumed of the food by the total grams of sodium contributed by the foods containing added sodium.
The list of foods was ranked in descending order in order to define the number and type of foods which collectively contributed 80% of added sodium.

Sodium Analysis of White Bread
In March 2010, white bread was sampled in 12 locations across the US from retail outlets. Locations were chosen on a multi-stage probability proportional to size sampling method.
Samples were analyzed by an AOAC ICP method by a pre-qualified contract laboratory.

CONCLUSION
Many grain-based foods rank high on NDL’s list for monitoring sodium content. The rank is a function of the level of consumption by participants in NHANES as well as the amount of sodium in the food. The food industry is responding to health concerns about the amount of sodium in the US diet and is in the process of reformulating food products to reduce the sodium content. It is thus necessary to continuously monitor these foods to keep up with the changes.
In addition to white bread, other high sodium contributors (hot dog rolls, flour tortillas, and frankfurters) were analyzed earlier this year. Sampling is now underway for cheese and pepperoni pizza, macaroni and cheese, American cheese, and canned vegetables. The results of these analyses will be included in SR24.
Mixed dishes 31%

Snacks 8%

Breakfast cereals 5%

Other 56%

Bread, rolls 34%

Other bakery 22%
Bread, rolls 34%
Mixed dishes with grain 31%
Other 56%
Snacks 8%
Breakfast cereals 5%
Other bakery 22%
Tortilla, biscuit, waffles 5%
Cookies, donuts 2%
Bread, rolls 14%
Pizza 8%
Mixed dishes with grain 5%
Snacks 3%
Breakfast cereals 2%
All other 61%