Reduction of sodium in baked products over the last decade
Bethany Showell and Pamela Pehrsson
USDA/ARS, Beltsville Human Nutrition Research Center, Nutrient Data Laboratory, Beltsville, MD 20705

Program No. 594.10

Results and Discussion

Introduction

The Nutrient Data Laboratory (NDL) is responsible for the dissemination of 140 nutrients for over 7500 foods through the USDA National Nutrient Database for Standard Reference (SR)\(^1\). Included in these nutrients and foods are sodium and baked products.

Approximately 77% of sodium in the U.S. diet comes from processed, prepared, and restaurant foods. Of the top 5 contributors to sodium intake, grain products contribute 11%, with baked products comprising 40% of that amount.\(^2\)

Because of high consumption, white bread is considered a major contributor of sodium in the diet. Several other baked products such as hot dog rolls and flour tortillas are also major contributors.

In an effort to combat rising levels of sodium intake in the U.S. diet, companies are beginning to lower levels of sodium in their products.

NDL has initiated a process to monitor sodium levels in foods, including baked products. Foods that contribute highly to sodium will continue to be monitored over the next few years.

As sodium levels are lowered through means such as replacement of leavening agents, other nutrient levels, such as calcium, may be affected.

Objectives

To identify changes in sodium values of selected baked products over the last decade;

To analyze impact of sodium formulation changes on other nutrients in baked products.

Methods

Sampling

Sampling done through the National Food and Nutrient Analysis Program (NFNAP)\(^3\).

Sample units obtained from 12 retail outlets nationwide based on NFNAP’s probability-proportional-to-size (PPS) sampling plan;

2-3 brand-name products sampled as well as multiple store-brand products.

Four types of baked products selected based on key contributors to total sodium intake: white bread, wheat bread, hotdog rolls, and flour tortillas.

Analytical methodology

Both sodium and calcium analyzed using ICP (AOAC 985.01 + 984.27).

Quality control

Analytical quality control performed through the use of duplicate sampling with in-house control and certified reference materials;

Sodium and calcium values generated by NDL in 1999 compared to new values generated in 2011.

Table 1. Sodium values in selected baked products

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Sodium (mg/100 g) 1999(^a) n</th>
<th>SE</th>
<th>Sodium (mg/100 g) 2011 n</th>
<th>SE</th>
<th>RACC sodium (mg/50 g) 1999</th>
<th>SE</th>
<th>RACC sodium (mg/50 g) 2011</th>
<th>SE</th>
<th>Change 1999 to 2011</th>
<th>RACC change 1999 to 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>White bread</td>
<td>688</td>
<td>8</td>
<td>8.6</td>
<td>491</td>
<td>19</td>
<td>10.4</td>
<td>344</td>
<td>256</td>
<td>-192</td>
<td>-18</td>
</tr>
<tr>
<td>Hotdog rolls</td>
<td>479</td>
<td>6</td>
<td>8.3</td>
<td>500</td>
<td>12</td>
<td>10.4</td>
<td>240</td>
<td>250</td>
<td>+71</td>
<td>+10</td>
</tr>
<tr>
<td>Flour tortillas</td>
<td>636</td>
<td>6</td>
<td>18.6</td>
<td>686</td>
<td>13</td>
<td>18.2</td>
<td>318</td>
<td>343</td>
<td>+50</td>
<td>+25</td>
</tr>
<tr>
<td>Wheat bread</td>
<td>521</td>
<td>3</td>
<td>16.6</td>
<td>527</td>
<td>13</td>
<td>15.2</td>
<td>261</td>
<td>284</td>
<td>+5</td>
<td>+3</td>
</tr>
</tbody>
</table>

\(^a\)Reference database release

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Calcium (mg/100 g) 1999(^a) n</th>
<th>SE</th>
<th>Calcium (mg/100 g) 2011 n</th>
<th>SE</th>
<th>RACC calcium (mg/50 g) 1999</th>
<th>SE</th>
<th>RACC calcium (mg/50 g) 2011</th>
<th>SE</th>
<th>Change 1999 to 2011</th>
<th>RACC change 1999 to 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>White bread</td>
<td>151</td>
<td>8</td>
<td>2.7</td>
<td>261</td>
<td>19</td>
<td>7.8</td>
<td>78</td>
<td>131</td>
<td>+110</td>
<td>+55</td>
</tr>
<tr>
<td>Hotdog rolls</td>
<td>138</td>
<td>4</td>
<td>0.6</td>
<td>173</td>
<td>12</td>
<td>1.2</td>
<td>69</td>
<td>87</td>
<td>+26</td>
<td>+18</td>
</tr>
<tr>
<td>Flour tortillas</td>
<td>129</td>
<td>6</td>
<td>9.3</td>
<td>106</td>
<td>13</td>
<td>1.6</td>
<td>66</td>
<td>65</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Wheat bread</td>
<td>142</td>
<td>3</td>
<td>4.4</td>
<td>147</td>
<td>13</td>
<td>6.3</td>
<td>71</td>
<td>71</td>
<td>-4</td>
<td>-0</td>
</tr>
</tbody>
</table>

\(^a\)Reference database release

Figure 1. Sodium and calcium levels of white bread brands (2011)

Acknowledgement

This project was supported by ARS/USDA and the Centers for Disease Control. Partial support was received from the National Institutes of Health, Agreement # Y1-HV-8116-15.

References