Abstract 609.3

Public health advocates are urging people to reduce their sodium intake. While many manufacturers are reducing the sodium content of their products, consumers can also reduce the sodium content. The effect of draining and rinsing before heating on the sodium content of canned vegetables, and that of other minerals and vitamins was evaluated. Four brands of canned corn, peas, and green beans were purchased in Blacksburg, VA. Total can contents, drained solids, and rinsed vegetables were analyzed. Vegetables were rinsed with 3.5 L of lukewarm tap water and allowed to drain for 2 min. Vitamin C was analyzed at Virginia Tech, while minerals and other B-vitamins were analyzed at commercial laboratories under contract with USDA. Sodium in peas went from 281 mg/100 g (total can contents) to 249 mg/100 g (drained) and to 231 mg/100 g (7%) after rinsing. Minimal sodium was lost after draining the green beans; after draining and rinsing, sodium content fell to 214 mg/100 g (5%). Sodium in corn went from 205 mg/100 g (total can contents) to 153 mg/100 g (19%) on draining and to 162 mg/100 g (12%) on rinsing. Vitamin C was also lost with both treatments, 16% and 18% in peas; other nutrients were also evaluated. Based on this study, draining and rinsing may be effective in reducing sodium in canned vegetables; however, varying amounts of some water-soluble nutrients may also be lost.

Introduction

A recent Institute of Medicine report (IOM, 2010a), linked high sodium intakes to hypertension and advocated steps to reduce sodium intake in order to lower rates of hypertension in the United States. The average sodium intake of Americans is more than 3,400 mg/day (USDA, 2010), while recently released Dietary Guidelines for Americans (USDA, 2010) are now recommending intakes be limited to no more than 2,300 mg/day for healthy individuals and 1,500 mg/day for at-risk individuals, who comprise about half of the population. While companies have marketed a number of reduced-sodium products, overall sodium intake has not changed (IOM, 2010b). Some speculate that this may be due to the perception that such products do not have the same flavor as the original product. While some companies have worked to reduce the sodium content of their products, others have not, fearing that if their competitors did not make similar changes, their products would be at a disadvantage.

Methods

Sampling:
- Two national brands and two, store brands, of canned corn, green beans, and peas were purchased in grocery stores in Blacksburg, VA.
- All samples were weighed, homogenized, and composited according to NDL instructions.
- Aliquots were packed under nitrogen and shipped frozen to analytical labs under contract to USDA. Vitamin C was analyzed at Virginia Tech (Blakemore et al., J. Agric. Food Chem. 52 [2004]: p. 5472-6) and Phillips et al., Food Chem. 52 [2005]: p. 357-63.
- Minerals were analyzed using the National Nutrient Database for Standard Reference (SR) 23, and SR 93.5, etc.; all SR 94-62, minerals (SR 95-01), thiamin (SR 94-23), riboflavin (SR 97-65), and niacin (SR 94-13).

Sample preparation and analysis:
- The Food Analysis Laboratory at the Beltsville Human Nutrition Research Center, Beltsville, MD measured and prepared the foods as follows after removal from the cans:
  - Total can contents – vegetables and packing liquid were measured.
  - Drained solids – vegetables were drained for 2 minutes using a standard #8 sieve and weighed.
  - Rinsed – Drained vegetables were rinsed with 3.5 L of lukewarm tap water and allowed to drain for 2 minutes.
- All samples were weighed, homogenized, and composited according to NDL instructions.

Results

Green Beans
- The sodium content of 3 brands of canned corn ranged from 189 to 219 mg/100 g of total can contents, with a mean of 205 ± 3 mg/100 g (Table 1). This is slightly lower than the current value in SR23 of 250 mg/100 g. The current mean label claim of 279 mg/100 g for 4 brands sampled for sweet corn, one brand contained 128 mg/100 g, though the label indicated 340 mg/100 g. As this could be labeled “Reduced Sodium”, it was removed from all calculations, including the effect of draining and rinsing.
- The sodium content was reduced by 2% by draining the total can contents, and an additional 7% by rinsing.
- The calcium content increased on draining (38%) and then decreased slightly (8%) on rinsing. However the calcium content of green beans is relatively low (25 mg/100 g) for total can contents, contributing only 0.3% of the DV per serving.
- While the levels of some minerals (calcium, iron, zinc, copper, and manganese) changed only slightly, and with the exception of potassium, were not present at nutritionally significant levels.
- Vitamin C decreased slightly (3%) during draining and somewhat more (6%) during rinsing. Again, the vitamin C content of canned green beans is low—3 mg/100 g for total can contents.

Peas
- The sodium content of 4 brands of canned sweet peas ranged from 210 to 328 mg/100 g, with a mean of 270 ± 13 mg/100 g (Table 2). This is slightly lower than the current value in SR23 of 320 mg/100 g and 8% lower than the mean label value of 283 mg/100 g.
- Draining the total can contents resulted in a sodium reduction of 5%, an additional 7% in the drained solids was removed by rinsing.
- The potassium content changed only slightly on draining (1%) and an additional 5% lost on rinsing; the values are not nutritionally significant.
- While the levels of some minerals (calcium, iron, zinc, copper, and manganese) did change during draining, they changed only slightly on rinsing and were not found at nutritionally significant levels.
- However, the minerals (magnesium and phosphorus) only changed slightly during both treatments.
- About 5% of the vitamin C was lost during both treatments. One serving of peas (total can contents) provides 10% of the DV.
- While a substantial amount of riboflavin was lost during draining (86%), it was not present at a nutritionally significant level. Other B-vitamins, also not present at nutritionally significant levels, showed little change during either treatment.

References

Table 1. Sodium Content of Canned Green Beans (mg/100 g)

<table>
<thead>
<tr>
<th>Food</th>
<th>Mean ± S.D.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>278 ± 26</td>
<td>249-300</td>
</tr>
<tr>
<td>Drained</td>
<td>262 ± 18</td>
<td>211-296</td>
</tr>
<tr>
<td>Rinsed</td>
<td>249 ± 11</td>
<td>198-272</td>
</tr>
</tbody>
</table>

Table 2. Sodium Content of Canned Sweet Corn (mg/100 g)

<table>
<thead>
<tr>
<th>Food</th>
<th>Mean ± S.D.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>210 ± 20</td>
<td>190-240</td>
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<tr>
<td>Drained</td>
<td>205 ± 13</td>
<td>185-210</td>
</tr>
<tr>
<td>Rinsed</td>
<td>197 ± 14</td>
<td>172-220</td>
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</tbody>
</table>

Table 3. Sodium Content of Canned Sweet Peas (mg/100 g)

<table>
<thead>
<tr>
<th>Food</th>
<th>Mean ± S.D.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>278 ± 26</td>
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<tr>
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</tr>
<tr>
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