Choosing a Food Vehicle for Iodine Fortification in Australia and New Zealand

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Introduction

Australia and New Zealand have a history of iodine deficiency. Both countries introduced iodised salt in the early 1920s, and its use in manufactured food has been permitted for many years, but was not mandatory. The concentration of iodine is approximately 45 mg iodine/kg salt with a permitted range of 25-65 mg iodine/kg salt to allow for batch-to-batch variation. Mild iodine deficiency (MUIC<100 μg/L) has re-emerged in both countries (1-3). Food Standards Australia New Zealand (FSANZ) explored options to address this deficiency through mandatory fortification.

Selecting a Suitable Food Vehicle

This requires consideration of: technical feasibility, safety, efficacy, policy advice, cost/benefit, trade, existing examples of iodine fortification and international guidelines. Key factors included:

- WHO recommendation of universal salt iodisation (USI)
- Low reported use of discretionary salt (Table 1)
- Food technology advice that iodine is most reliably introduced to foods as iodised salt (4, 5).
- In Australia and New Zealand, more than 30% of salt from processed food comes from bread (4, 5).
- Bread is fortified with iodised salt in several countries.
- A voluntary program introduced by the state of Tasmania showed that MUIC increased from 72-75 μg/L to 105-109 μg/L (2) in school children when an estimated 80% of bread contained iodised salt (Figure 1).

Therefore, options explored focused on fortification of bread and cereal foods. The two options considered feasible were: replacement of salt with iodised salt in breads, breakfast cereals and biscuits; or just breads. USI was modelled for comparison.

Table 1: Proportion of Australians in the 1995 NNS who reported ‘Always’ or ‘Usually’ using discretionary salt

<table>
<thead>
<tr>
<th>Group</th>
<th>Proportion (%)</th>
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<tbody>
<tr>
<td>2-3 year olds</td>
<td>36</td>
</tr>
<tr>
<td>4-8 year olds</td>
<td>48</td>
</tr>
<tr>
<td>2 years and above</td>
<td>62</td>
</tr>
<tr>
<td>Women 16-44 years</td>
<td>55</td>
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Dietary Modelling of Food Vehicle Options

Food consumption data from the most recent National Nutrition Surveys (NNS) was used to estimate the effect of different fortification options.

The Estimated Average Requirement Cutpoint method (6) and the Upper Level of Intake (UL) were used to estimate the proportion of the population with inadequate and excessive intakes, respectively.

Results

Absolute salt consumption is similar across different age groups. However, the UL for iodine in young children is several-fold lower than in adults. Consequently, the amount of iodine that can be added to the food supply is limited by the desire to have a low prevalence of young children exceeding the UL. Therefore, as the range of foods containing iodised salt increased, the concentration of iodine in salt needed to decrease to achieve a similar outcome (Figure 2). Also, as the range of fortified foods increased:

- Coverage in the population (reach) increased
- Potential cost to the consumer increased
- Cost of enforcement by government and compliance by business increased
- Trade barriers increased

Figure 2: Estimated Mean Daily Iodine Intake Under Various Fortification Options

Implementation and Monitoring

- A transition period was provided to allow industry time to make the necessary changes. After 9 October 2009, it will be mandatory to replace salt with iodised salt in bread, except bread represented as organic, in both countries.
- Relevant authorities are developing recommendations for supplement use by pregnant and breastfeeding women.
- A monitoring framework has been developed to assess the effect of this initiative.

References


Table 2: Estimated mean iodine intake, and proportion of population with adequate or excessive intake, before and after fortification of bread in Australia and New Zealand

<table>
<thead>
<tr>
<th>Group</th>
<th>EAR (μg/d)</th>
<th>Mean (μg/d)</th>
<th>%&lt;EAR</th>
<th>%UL</th>
<th>Mean (μg/d)</th>
<th>%&lt;EAR</th>
<th>%UL</th>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2-3 years</td>
<td>65</td>
<td>95</td>
<td>16</td>
<td>&lt;1</td>
<td>133</td>
<td>1</td>
<td>6</td>
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<tr>
<td>Women 16-44 years</td>
<td>95/100</td>
<td>100</td>
<td>59</td>
<td>0</td>
<td>146</td>
<td>9</td>
<td>0</td>
</tr>
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<td>Pregnant women</td>
<td>160</td>
<td>100</td>
<td>93</td>
<td>0</td>
<td>146</td>
<td>71</td>
<td>0</td>
</tr>
<tr>
<td>New Zealand</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Women 16-44 years</td>
<td>95/100</td>
<td>99</td>
<td>68</td>
<td>0</td>
<td>172</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>160</td>
<td>99</td>
<td>97</td>
<td>0</td>
<td>172</td>
<td>45</td>
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