ANALYSIS OF VITAMIN D AND PREVITAMIN D IN FOOD

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INTRODUCTION

The U.S. Food and Drug Administration (FDA) newly revised the food labeling regulations requires the vitamin D content on the nutrition or supplement facts list for food and dietary supplements.1 The change in the labeling regulation is to promote vitamin D awareness among consumers.

Recently, a new AOAC standard method which uses a derivatization reaction in the sample prep and a mass spectrometry in quantitation is available. (2) This new derivatization reaction in the sample prep and a mass quantitation, which is the new method that we propose to use in this study, is highly sensitive compared to the existing 2016 methods. The derivatization method can be successfully tested with this method. Good agreement with the label values have been observed for the infant formulas (milk and soy based), energy bar, and canned fish products.

RESULTS

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The total vitamin D (25D or 24D) and the previtamin D in food products were determined using the following equation:

$$\text{Concentration of vitamin D} = \frac{\text{Total peak area} - \text{Previtamin peak area}}{\text{Relative response factor}}$$

where the relative response factor of the vitamin D over the previtamin D was determined each time the samples were analyzed. The calibration plots for vitamin D3 and vitamin D2 are shown in Table 1. Calibration plots for the NIST 1849a reference material and other foods are shown in Table 2. The recovery on vitamin D3 and D2 in different food products.

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Table 4 shows the results of measurements of the total Vitamin D concentrations in different food products.

Table 4. Comparison of two vitamin D methods in the event of different labeling regulation.

<table>
<thead>
<tr>
<th>Method</th>
<th>NIST 1849a</th>
<th>Infant Formula</th>
<th>Powder Formula</th>
<th>Soy Formula</th>
<th>Infant Powder</th>
<th>Oatmeal</th>
<th>Spiked Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method A</td>
<td>5.6%</td>
<td>11%</td>
<td>1%</td>
<td>0.2%</td>
<td>1.3%</td>
<td>11%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Method B</td>
<td>2.8%</td>
<td>10%</td>
<td>1%</td>
<td>0.2%</td>
<td>1.3%</td>
<td>11%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

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