Iodine Fact Sheet

The need for iodine

Iodine is an essential mineral for normal thyroid function, mammary gland development, and foetal and infant neurological growth. Despite this, iodine deficiency is epidemic in developing countries, parts of Europe and the United States\(^1\). This deficiency is largely responsible for an epidemic of hypothyroid-linked illnesses and breast cancer. Such illnesses are being successfully treated with high dosages of iodine equivalent to the Japanese daily intake, which are particularly high as a consequence of a diet of seafood and seaweeds. These levels of iodine intake are 50-fold greater in Japan than in the US\(^2\).

In the UK, 76\(^3\) of school aged girls and 66\(^4\) of adult women are iodine deficient.

The cost of iodine deficiencies can be significant with, for example, Germany spending one billion dollars annually in both healthcare expenditures and lost work time as a result of iodine deficiency and resultant thyroid disease\(^5\).

Sources of iodine

The oceans are the worldwide repository of iodine; very little of the earth’s iodine is actually found in soil. Within the natural environment, iodine is found in various forms (table 1):

- inorganic sodium and potassium salts (iodides and iodates),
- inorganic diatomic iodine (molecular iodine, I\(_2\)),
- organic monoatomic iodine

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\(^4\) Combet et al. (2011) Unpublished. University of Glasgow Medical School, pilot study

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Table 1: Sources of iodine:

<table>
<thead>
<tr>
<th>Soil</th>
<th></th>
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<tbody>
<tr>
<td>NaIO₃</td>
<td>Sodium iodine</td>
</tr>
<tr>
<td>NaIO₄</td>
<td>Sodium periodate</td>
</tr>
<tr>
<td>Seaweed/micro algaes</td>
<td></td>
</tr>
<tr>
<td>KI</td>
<td>Potassium iodide</td>
</tr>
<tr>
<td>Nal</td>
<td>Sodium iodide</td>
</tr>
<tr>
<td>I₂</td>
<td>Iodine</td>
</tr>
<tr>
<td>I⁻</td>
<td>Iodide</td>
</tr>
<tr>
<td>Seawater</td>
<td></td>
</tr>
<tr>
<td>I⁻</td>
<td>Iodide</td>
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</tbody>
</table>

Seaweeds, widely consumed in Asian cultures, contain high quantities of iodine in several chemical forms, including iodine in the molecular form (I₂) and iodine organified to proteins. These forms of iodine are absorbed through the intestinal tract via two different mechanisms:

1) Molecular iodine (I₂) is transported by facilitated diffusion.

2) Iodides (I⁻) are absorbed via a transport protein in the gastric mucosa called the sodium-iodide symporter, a molecule found in a variety of tissues in the body that utilise and concentrate iodine.

**Iodine in seaweeds**

Depending on the species, seaweeds can have 10–100 times higher mineral content, such as iodine, than land-based vegetables.

The species of seaweed used by Seagreens® have relatively moderate and highly beneficial levels of iodine in their naturally occurring forms. These species include Ascophyllum nodosum, Fucus spiralis, Fucus vesiculosus, and Pelvetia canaliculata which have been

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authorised for human consumption in France, the only country to date to define which species can be eaten.\(^9\)

Following from the requirements and health benefits of iodine discussed above, research has demonstrated that Japanese women who consume a traditional high-seaweed diet also have a low incidence of benign and malignant breast disease.\(^{10,11}\) On the contrary, Japanese women who consume a Western diet low in seaweed or who emigrate to the United States lose this protective advantage and gain the same risk for fibrocystic breast disease and breast cancer as their Western counterparts.\(^{12,13}\) Furthermore, Japan also has a low incidence of iodine-deficiency goiter and autoimmune thyroiditis.\(^{14}\) Consequently, it has been hypothesized the amount of iodine in the Japanese diet has a protective effect for breast and thyroid disease.\(^{15}\)

This antioxidant effect of iodine may explain the therapeutic effects of seaweed baths or iodine-rich solutions known as thalassotherapy used historically to treat ocular diseases, thyroid disease, diabetes, cardiac and respiratory disease, and arteriosclerosis.\(^{16}\)

Overall, seaweeds form an essential source of natural iodine, being described as an ideal food-safe natural source of the mineral iodine.\(^{17}\) Iodine is proven to be highly beneficial in the diet, and significantly deficient in western diets.

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Seagreens specific information

Seagreens® *Ascophyllum nodosum* is sourced from the Scottish Outer Hebrides, and the highest of Seagreens®’ species in terms of iodine levels.

The iodine levels are typically **712mcg iodine per 1g Seagreens® *Ascophyllum nodosum***

With the reported range of iodine in the average Japanese diet being between 5.3mg and 13.8mg of iodine per day, this equates to between 7.5 and 20g of Seagreens® per day, assuming no iodine from elsewhere in the diet.

This far exceeds the conservative 140mcg Reference Nutrient Intake\(^{18}\) in the UK, where 66% of adult women are iodine deficient.

Consequently, within a balanced diet consisting of other iodine sources, an intake of between 1 to 4.5g of seaweed per day (the Seagreens® ambition for the UK) would provide a healthy daily dose of iodine, meeting the UK RNI and contributing to the healthy higher levels of iodine intake seen in Japan.

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For further information on seaweeds and the Seaweed Health Foundation, please contact:

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\(^{18}\) Reference Nutrient Intake (RNI) is the amount of a nutrient that is enough to ensure that the needs of nearly all the population (97.5%) are being met  
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