

## Forgotten Nutrients: Iodine

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### Abstract

Iodine is an essential trace mineral required for the synthesis of the thyroid hormones thyroxine (T<sub>4</sub>) and triiodothyronine (T<sub>3</sub>), which are involved in the regulation of metabolic rate, body temperature, growth and development. These hormones regulate many key biochemical reactions including carbohydrate and fat metabolism and protein synthesis. The UK Reference Nutrient Intake for iodine for non-pregnant adults is 140 µg/day, whereas the US Recommended Dietary Allowance is 150 µg/day. Intake close to the recommended intake values supports adequate thyroid hormone production whereas compromised intake or status can impair thyroid hormone production and result in fatigue, weight gain, impaired thermoregulation, reduced exercise tolerance and poor general or cognitive health. Although small amounts of iodine are found in most foods (3 to 75 µg/serving), iodine content varies widely depending on soil and water iodine content, agricultural practices and food processing. Key dietary sources include fish, shellfish, seaweed, dairy products, eggs, and iodized salt. While iodized salt programs are standard in the US and parts of Europe (e.g., Switzerland, Denmark, and the Netherlands), the UK does not have mandatory iodization, and intake in countries including Ireland, Norway and Italy may be particularly suboptimal. Dietary iodine is well-absorbed in the small intestines (typically following reduction to iodide) and is selectively concentrated by the thyroid gland in amounts required for adequate thyroid hormone synthesis. Excess iodine is excreted primarily through urine, but losses through sweating and fecal routes also occur.

This presentation will focus specifically on iodine as a forgotten nutrient in athletes. Athletes may be at elevated risk for poor iodine status due to sweat losses during prolonged or intense training (estimated to average ~37 µg iodine/L of sweat) or to consumption of energy restrictive diets, plant-based or dairy free diets, and preferences for non-iodized or gourmet salts. Moreover, reliance on processed foods, which typically use non-iodized sodium sources, further exacerbate risk. Conversely, certain athletes may be at risk for excess iodine intake due to dietary supplements use, high consumption of iodized food products or habitual seaweed consumption. Accordingly, a comprehensive nutritional assessment is essential for evaluating iodine status in athletes. The ABCDE model—encompassing Anthropometric, Biochemical, Clinical, Dietary, and Environmental factors—provides a structured framework for assessing iodine status and determining an appropriate intervention. Key components include A: current weight, weight history; B: 24-h urinary iodine concentration (UIC), 24-h total urinary iodine excretion (UIE), serum thyroid stimulating hormone; C: fatigue, temperature intolerance, thyroid size, medication use; D: iodine, iron, selenium and total energy intake; and E: iodized salt availability, personal beliefs. Within this context it is worth noting that iodine status is typically assessed by 24-h UIC with standard cut-offs set by the World Health Association but 24-h UIE may better account for urine concentration, volume and hydration status in athletes. Additionally, as little is published concerning the iodine

status of athletic populations, this presentation will share preliminary data in several athletic groups to highlight the importance of both nutritional assessment and further research in this essential but often forgotten nutrient.