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Using seaweed as a supplement or a food ingredient to increase iodine status in women with low habitual intake

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Abstract

Introduction: Most consumers remain unaware of iodine sources in the diet. With no prophylaxis, iodine insufficiency remains a largely unappreciated issue in the UK. Including seaweed to the food supply represents a solution and opportunity but this supply needs to be carefully curated and calibrated, as excess iodine may be harmful for thyroid health. This project aimed to test the efficacy of a proof-of-concept reformulated food using seaweed as an ingredient source of iodine, to supplement women who have a habitual low iodine intake.

Materials and Methods: Self-reported healthy women, pre-menopausal who avoid iodine-rich foods were randomised to: P1) reformulated food (pizza)with seaweed ingredient, or P2) a control food, similar to P1 but without supplemental iodine, or S1) control, empty capsules, or S2) PureSea Natural ascophyllum nodosum seaweed capsules, the ingredient used in P1. Capsules or food were to be consumed three times per week (providing 400µg iodine per intake). At least 10 spot urine samples were collected per person over at least 3 days preceding each study point. Urinary iodine was measured with a modified Sandell-Koltoff assay.

Results: Participants (n = 96, median age 29, IQR 23–42) had a habitual iodine intake of 64µg/d (IQR 39–119, no detectable difference between groups). Dropout rates at 3-month were 41% (P1 &P2 each), 21% for S1, 11% for S2.

Baseline urinary iodine concentration (UIC) was low/marginal, at 66µg/L (IQR 34-71), 64µg/L (IQR 40-96), 54µg/L (IQR 31-86) and 39µg/L (IQR 21-64) for P1, P2, S1 and S2 respectively (no difference between groups, $p > 0.05$).

Change in UIC differed between groups at week-2 ($p < 0.001$), increasing in P1 & S2: by 45µg/L (IQR 2-69), and 35µg/L (IQR 13-48), respectively, decreasing in S1: -14µg/L (IQR –24-(–1)), with no change in group P2. This remained true for groups S1 & S2 when urinary iodine excretion was corrected for creatinine.

After 3 months, differences in changes from baselines remained between groups ($p < 0.01$), with an increase in groups P1 and S2: 28µg/L (IQR 1-112), 43µg/L (IQR 23-93) but not groups P2 or S1. This remained true when UIC was corrected for creatinine.

Changes in weight between and within groups were not detected at either time points, with group median changes within 2 kg of baseline weight.

Discussion: Iodine-rich seaweed is effective in increasing the iodine status of women with a low habitual iodine intake, as a supplement, or as an ingredient in a cooked reformulated product. In term of feasibility, large attrition in the food groups P1 and P2 demands further attention, for interpretation of data and future translation of the findings.

Conflict of Interest

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