Iodine deficiency disorders (IDD) affect close to 1.9 billion people worldwide, and are a major public health concern in many countries. Among children, iodine deficiency is the main cause of potentially preventable deficits of central nervous system development and impairment of cognitive function, as well as goiter and hypothyroidism in people of all ages. Salt iodization is the preferred strategy for IDD prevention and control, however, in some instances where salt is not the major condiment, alternate vehicles for iodine fortification have been considered.

The objective of this review was to assess the effects of fortifying foods, beverages, condiments, or seasonings other than salt with iodine alone or in combination with other micronutrients, on iodine status and health-related outcomes in all populations. Studies were eligible if they:

- were randomized or quasi-randomized controlled trials (RCT), non-randomized RCTs, or prospective observational studies with a control group, such as cohort studies, controlled before-and-after studies, and interrupted time series
- examined the effects of fortification of food, beverage, condiment, or seasoning with iodine alone, or in combination with other micronutrients versus the same unfortified food, or no intervention
- included populations, including pregnant women, from any country

Main results
Eleven studies met the criteria, providing 14 comparisons, and capturing data on 4317 participants. Seven studies were RCTs, three were cluster non-RCTs, and one was a randomized cross-over design. Seven studies were carried out among school children (N = 3636), three among women of reproductive age (N = 648), and one among infants (N = 33). The studies used diverse types of food as vehicle for iodine delivery: biscuits, milk, fish sauce, drinking water, yoghurt, fruit beverage, seasoning powder, and infant formula milk.

Daily amounts of iodine provided ranged from 35 µg/day to 220 µg/day; trial duration ranged from 11 days to 48 weeks.

Five studies examined the effect of iodine fortification alone, two against the same unfortified food, and three against no intervention. Six studies evaluated the effect of cofortification of iodine with other micronutrients versus the same food without iodine but with different levels of other micronutrients.

Two studies reported the effects on goiter, one on physical development measures, and one on adverse effects. All studies assessed urinary iodine concentration.

Pooled results from RCTs showed that urinary iodine concentration significantly increased following iodine fortification; equivalent to an increase of 38 µg/L (95% CI 24 to 53 µg/L). The effects of iodine fortification compared to control on goiter prevalence, and five physical development measures were uncertain. One study reported that there were no adverse events observed during a cross-over trial.

Conclusions
The evidence on the effect of iodine fortification of foods, beverages, condiments, or seasonings other than salt on reducing goiter, improving physical development measures, and any adverse effects is uncertain. However, the findings suggest that the intervention likely increases urinary iodine concentration. Additional, adequately powered, high-quality studies on the effects of iodine fortification of foods on these, and other important outcomes, as well as its efficacy and safety, are required.