

Iodine Contents in Baby Food Consumed in Japan

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Abstract. To evaluate iodine intake in Japanese infants, iodine contents were determined in both commercial and homemade baby food samples consumed in Japan. Fifty-three samples of commercial bottled or retort baby food and 25 samples of homemade baby food for one day were collected and their iodine contents were determined by inductively coupled plasma mass spectrometry after an extraction with 0.5% tetramethylammonium hydroxide. Among the commercial baby food samples, 35 samples showed low iodine values (< 50 ng/g wet weight), while 8 samples showed markedly high iodine values (> 1000 ng/g wet weight). Significantly higher iodine values were observed in 15 samples composed of dishes cooked using *kombu* (a kind of kelp) than other samples. Among the homemade baby food samples, 12 samples brought very low iodine intake (< 1- 24 µg/d), while 5 samples brought very high iodine intake (283-978 µg/d). These results indicate that intermittent high iodine baby food including dishes cooked using *kombu* contributes to sufficient iodine intake in Japanese infants.

Key words: Iodine, baby foods, inductively coupled plasma mass spectrometry, *kombu* (a kind of kelp)

Introduction

Iodine is an essential component of thyroid hormone. Seaweeds contain iodine at a very high level; in particular, *kombu* (several kinds of *Saccharina sp.*, a kind of kelp) contains it at a level of more than 2 mg/g. *Kombu* is a traditional Japanese foodstuff and many Japanese eat it routinely. As a result, the Japanese average iodine intake is over the tolerable upper intake level of iodine for the US and European people (Zava and Zava, 2011). In a general Japanese, there is almost no report of the health disturbance by excess iodine intake. However, in the Japanese infants, a hypothyroidism by excess iodine intake has been reported (Nishiyama *et al.* 2004). In the present study, to evaluate iodine intake in Japanese infants, iodine contents were determined in both commercial and homemade baby food samples consumed in Japan

Materials and Methods

Fifty-three samples of commercial bottled or retort baby food were purchased from 4 Japanese food companies. Among the samples, 24 samples were for ≥ 7 -month-old baby and 29 samples were for ≥ 9 -month-old baby. Twenty-five samples of homemade baby food for one day were collected from Japanese mothers in child-rearing.

The baby food sample was freeze-dried, homogenized and milled. Iodine in the dried samples was extracted with 0.5% tetramethylammonium hydroxide (TMAH). Two hundred

milligrams of the dried samples was mixed with 40 mL of 0.5% TMAH and left overnight. The mixture was heated at 60°C for 6 h and centrifuged. The supernatant was filtrated through a 0.45 µm membrane filter. Iodine were determined by inductively coupled plasma mass spectrometry using tellurium as an internal standards.

Results and Discussion

Fig. 1 shows iodine contents in 53 commercial baby food samples. Among the samples, 35 samples showed low iodine values (< 50 ng/g wet weight), while 8 samples showed markedly high iodine values (> 1000 ng/g wet weight). Among the commercial baby food samples, 15 samples were composed of dishes cooked using *kombu*. Fig. 2 shows effect of *kombu* use on the iodine contents. Significantly higher iodine values were observed in these 15 samples than other samples. Among the samples without *kombu*, 3 samples showed high iodine values. These 3 samples were composed of dishes cooked using *hijiki* (*Sargassum fusiforme*, a kind of edible sea weed).

Fig. 3 shows estimated daily iodine intake from homemade baby food. Among the homemade baby food samples, 13 samples brought very low iodine intake (< 25 µg/d), while 9 samples brought very high iodine intake (> 250 µg/d). These results indicate that intermittent high iodine baby food including dishes cooked using *kombu* contributes to sufficient iodine intake in Japanese infants.

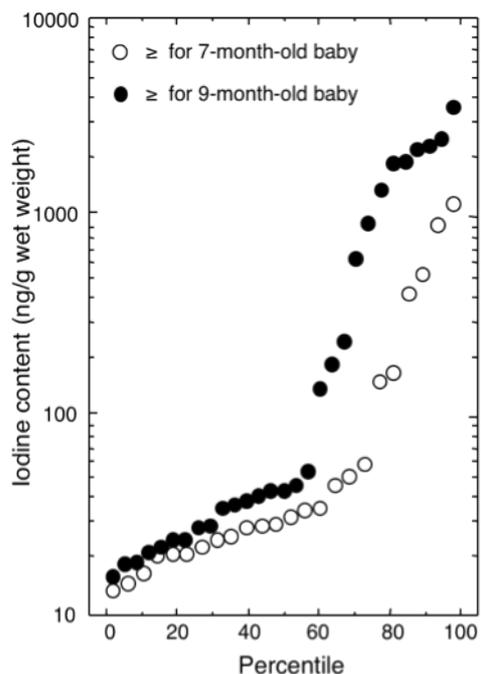


Fig. 1 Percentile curve of iodine contents in 53 commercial baby food samples.

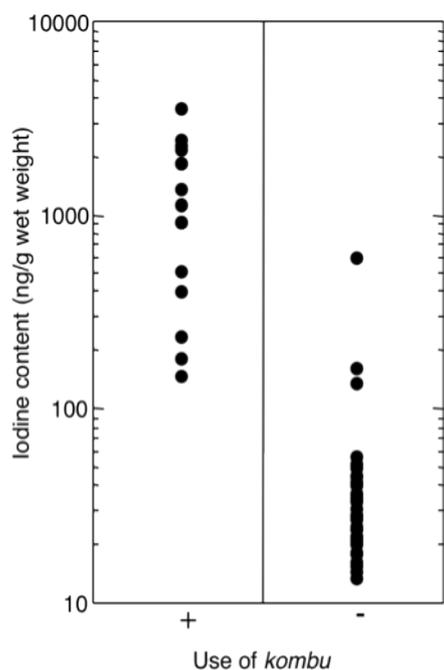


Fig. 2 Effect of kombu use on iodine content in baby food.

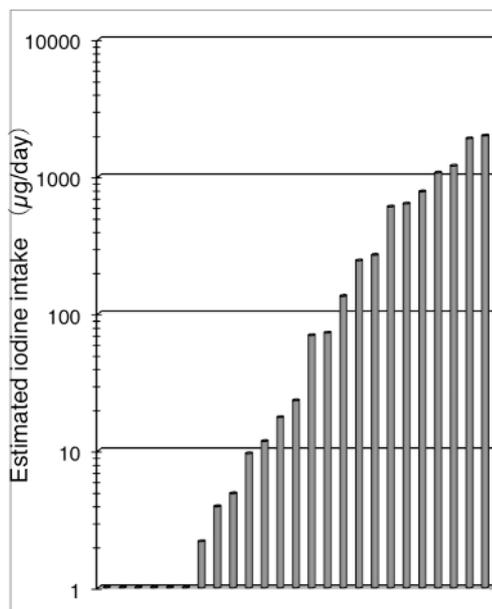


Fig.3 Estimated daily iodine intake from 25 samples of homemade baby food

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