

# Choosing a Food Vehicle for Iodine Fortification in Australia and New Zealand

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## Introduction

Australia and New Zealand have a history of iodine deficiency. Both countries introduced iodised salt in the early 1920s, and its use in manufactured food has been permitted for many years, but was not mandatory. The concentration of iodine is approximately 45 mg iodine/kg salt with a permitted range of 25-65 mg iodine/kg salt to allow for batch-to-batch variation.

Mild iodine deficiency (MUIC < 100 µg/L) has re-emerged in both countries (1-3). Food Standards Australia New Zealand (FSANZ) explored options to address this deficiency through mandatory fortification.

## Selecting a Suitable Food Vehicle

This requires consideration of: technical feasibility, safety, efficacy, policy advice, cost/benefit, trade, existing examples of iodine fortification and international guidelines.

Key factors included:

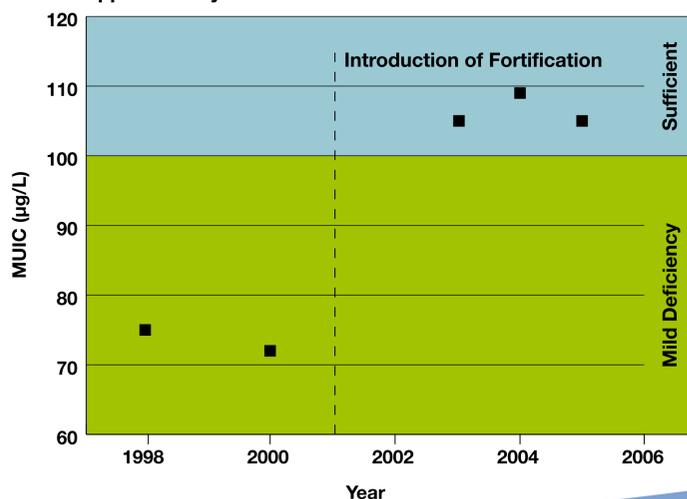
- WHO recommendation of universal salt iodisation (USI)
- Low reported use of discretionary salt (Table 1)
- Food technology advice that iodine is most reliably introduced to foods as iodised salt (4, 5).
- In Australia and New Zealand, more than 30% of salt from processed food comes from bread (4, 5).
- Bread is fortified with iodised salt in several countries.
- A voluntary program introduced by the state of Tasmania showed that MUIC increased from 72-75 µg/L to 105-109 µg/L (2) in school children when an estimated 80% of bread contained iodised salt (Figure 1).

Therefore, options explored focused on fortification of bread and cereal foods. The two options considered feasible were: replacement of salt with iodised salt in breads, breakfast cereals and biscuits; or just breads. USI was modelled for comparison.

Table 1: Proportion of Australians in the 1995 NNS who reported 'Always' or 'Usually' using discretionary salt

Group	Proportion (%)
2-3 year olds	36
4-8 year olds	48
2 years and above	62
Women 16-44 years old	55

Figure 1: Change in Median Urinary Iodine Concentration (MUIC) in Tasmania Following Voluntary Use of Iodised Salt in Approximately 80% of bread



## Dietary Modelling of Food Vehicle Options

Food consumption data from the most recent National Nutrition Surveys (NNS) was used to estimate the effect of different fortification options.

The Estimated Average Requirement Cutpoint method (6) and the Upper Level of Intake (UL) were used to estimate the proportion of the population with inadequate and excessive intakes, respectively

## Results

Absolute salt consumption is similar across different age groups. However, the UL for iodine in young children is several-fold lower than in adults. Consequently, the amount of iodine that can be added to the food supply is limited by the desire to have a low prevalence of young children exceeding the UL. Therefore, as the range of foods containing iodised salt increased, the concentration of iodine in salt needed to decrease to achieve a similar outcome (Figure 2). Also, as the range of fortified foods increased:

- Coverage in the population ('reach') increased
- Potential cost to the consumer increased
- Cost of enforcement by government and compliance by business increased
- Trade barriers increased

Figure 2: Estimated Mean Daily Iodine Intake Under Various Fortification Options

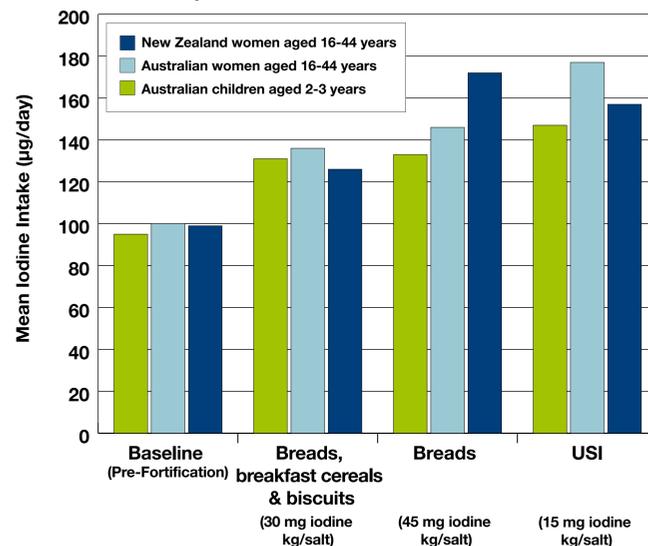


Table 2: Estimated mean iodine intake, and proportion of population with adequate or excessive intake, before and after fortification of bread in Australia and New Zealand

Group	EAR (µg/d)	Baseline			Fortification of Bread		
		Mean (µg/d)	% < EAR	% > UL	Mean (µg/d)	% < EAR	% > UL
<b>Australia</b>							
2-3 years	65	95	16	<1	133	1	6
Women 16-44 years	95/100	100	59	0	146	9	0
Pregnant women	160	100	93	0	146	71	0
<b>New Zealand</b>							
Women 16-44 years	95/100	99	68	0	172	0	0
Pregnant women	160	99	97	0	172	45	0

USI was not considered a viable option because the cost, technical difficulties, and trade impacts were considerable with only a modest improvement in reach. Replacement of salt with iodised salt in breakfast cereals and biscuits was rejected on the basis of:

- Technical difficulties reported by a major breakfast cereal manufacturer potentially leading to large variations in the iodine content
- Public health comment that fortifying biscuits (cookies) was inappropriate
- Trade barriers, particularly for biscuits, due to high levels of importation

The selected food vehicle was bread (organic bread was exempted) with a permitted concentration of iodine in salt of 25-65 mg/kg to achieve an average of 45 mg/kg salt (Table 2). By excluding breakfast cereals and biscuits, the reach decreased from 96% to 88% in Australia and from 94% to 87% in New Zealand, but increased the mean intake in women (Figure 2). Pregnant and lactating women will need additional iodine to achieve adequate intakes.

## Implementation and Monitoring

- A transition period was provided to allow industry time to make the necessary changes. After 9 October 2009, it will be mandatory to replace salt with iodised salt in bread, except bread represented as organic, in both countries.
- Relevant authorities are developing recommendations for supplement use by pregnant and breastfeeding women.
- A monitoring framework has been developed to assess the effect of this initiative.

## References

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