

Monitoring the safety of intense sweeteners – An ‘added sugars’ replacement dietary exposure model

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Introduction

- The increasing prevalence of overweight and obesity in Australia is a major public health problem¹. Reducing the added sugar content of foods and drinks has been targeted as one way of addressing rising overweight and obesity levels.
- Replacing added sugars with intense sweeteners is one approach to reduce added sugars. In this era of product reformulation, the safety of increased dietary exposure to intense sweeteners should be considered.
- Each intense sweetener or group of sweeteners have undergone a safety assessment and most have a numerical Acceptable Daily Intake (ADI). This is expressed as mg/kg body weight and is the amount of a substance that can be ingested daily over a lifetime with no appreciable health risk.
- Currently, eleven intense sweeteners are permitted in foods and beverages in the Australian Food Standards Code.
- It is very resource intensive to collect information about the current use of intense sweeteners by food manufacturers and the potential use if products were reformulated. Therefore to focus limited resources, FSANZ uses a number of methods, including a dietary exposure screening method to assist in determining priorities for a more detailed assessment.

Aim

- To illustrate use of a dietary exposure screening method by using intense sweeteners as a case study
- To identify which of the 11 sweeteners need a more detailed assessment by comparing the screening results to the relevant ADI.

Methods

Calculation of added sugar intakes

- ‘Added sugars’ are defined as sucrose, fructose, dextrose, lactose and sugar syrups such as glucose syrup which are added during manufacture of foods or added by the consumer in the preparation of food and beverages.
- The added sugar content of the foods and beverages were derived from the AUSNUT 2011-13 dataset².
- Usual Intake of added sugar for the population 2 years and above at the mean and 90th percentile were derived from two days of consumption data from the 2011-12 National Nutrition and Physical Activity Survey (NNPAS) (n=12,153) using the NCI method³.

Screening method to estimate sweetener exposures

- A screening method is used to assess a worst case intake scenario where it is assumed that all added sugar in foods and beverages is replaced with an intense sweetener.
- Usual Intakes of added sugar at the mean and 90th percentile were replaced with each intense sweetener separately using the relative sweetness (compared to sucrose) of each to determine the dietary exposure to the sweetener. This value was divided by the population mean body weight and compared to the relevant ADI (Table 1).

Figure 1. Flowchart of added sugar replacement screening model methods

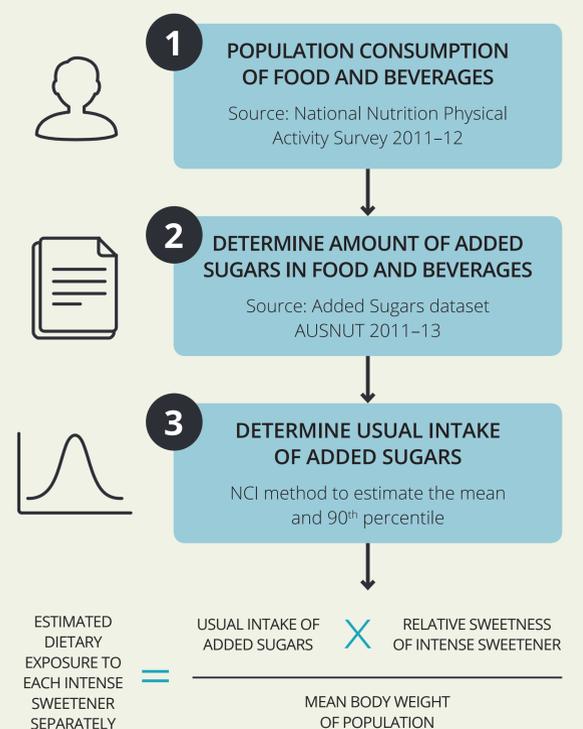


Table 1. Dietary exposure to Intense sweeteners as a percentage of the Acceptable Daily Intake (ADI) assuming replacement of usual intake of added sugars

Intense sweetener	ADI (mg/kg bw/day)	Approximate sweetness (relative to sucrose=1)	Percent of ADI (%)			
			Males		Female	
			Mean	90th Percentile	Mean	90th Percentile
Acesulphame-K	15	200	25	50	15	40
Aspartame	40	180	10	20	10	15
Aspartame-acesulphame salt ^a	31.7	350	6	10	0	0
Advantame	5	20000	1	1	1	1
Alitame	1	2000	40	75	35	60
Cyclamate	11	30	240*	450*	210*	380*
Neotame	2	8000	5	9	4	8
Saccharin	5	300	55	100	45	85
Steviol glycosides	4	200	100	190*	85	160*
Sucralose	15	600	9	15	8	15
Thaumatin	not specified	2000	-	-	-	-

^a Aspartame-Acesulphame salt does not have a specific ADI. The salt dissociates into aspartame and acesulphame which have been assessed separately and had an ADI determined for each. The ADI of 31.7 is based on the ADI of each intense sweetener and account for the 2:1 ratio of aspartame and acesulphame to form the aspartame-acesulphame salt.

* Indicates an exceedance of the ADI.

Conclusions

- The screening method assumes that all added sugar would be replaced with a single intense sweetener. This is highly unlikely, but means that substantial conservatism has been built in and there is no risk of concluding that increased exposure to a particular sweetener would be safe when it would not be.
- The screening method shows that theoretical estimates of dietary exposure for majority of the permitted intense sweeteners are below the ADI and therefore would not require a more detailed assessment.
- Resources should focus on a more detailed assessment of exposure to cyclamates and steviol glycosides, and would consider which foods would realistically contain these particular sweeteners. As many of the foods that contain added sugars would not be suitable to contain intense sweeteners, the result of a more detailed assessment is likely to show much lower estimates of dietary exposure.
- Public health interventions need to avoid inadvertently causing other risks when addressing existing public health issues.

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