

# Sugar Added to Foods Consumed in New Zealand and Tokelau

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Cane sugar, sucrose, is a molecule composed of one unit of glucose and one of fructose. In the body, both the glucose and fructose are eventually burnt to produce carbon dioxide and water and provide energy that allows the body to maintain homeostasis. Other dietary macronutrients including other carbohydrates e.g. as in taro, fats, protein and alcohol are also be burnt to provide energy.

There is consistent evidence for adults<sup>1</sup> and children<sup>2</sup> that the intake of free sugars, including sugar sweetened drinks, is a determinant of body weight and fatness. A randomised controlled trial with normal weight children provides evidence that replacement of sugar containing drinks with non-caloric drinks for 18 months reduced weight gain and fat accumulation.<sup>3</sup>

In the last 10 years (2003 to 2012) imports of “centrifugal cane sugar” (sugar) into New Zealand have averaged more the 220,000 metric tonnes each year.<sup>4</sup> For the New Zealand population of 4.2 million this is equivalent, each year, to 52 kg of sugar for every person, or one kg a week. An unknown quantity of this sugar is not directly consumed. Within New Zealand sugar is used to feed yeast as part of the fermentation process to produce alcoholic beverages and bread. In addition, sugar is exported both as refined sugar (white and brown), and as an ingredient in manufactured food products. Some sugar may be used for the production of biofuels.

What is known is that in the 2008/9 adult nutrition survey<sup>5</sup>, for the average adult, 9% of total energy came from non-alcoholic beverages, sugar and sweets (including confectionary, jams but not sugars added to biscuits, cakes and muffins, breakfast cereals and snack bars).

The World Health Organisation<sup>6</sup> recommends that no more than 10% of energy in the diet be obtained from free sugars – defined as mono and disaccharides added to foods by the consumer, cook or manufacturer plus sugars naturally present in honey, syrups and fruit juices. More recently the World Health Organisation has produced a draft consultation which states that a reduction of free sugars to below 5% of total energy intake per day would have additional health benefits<sup>7</sup>.

There are, of course, other natural sources of sugar, in whole, not refined foods. The main contributors to natural, intrinsic sugars are fruit, vegetables (Table 1) and

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**Table 1.** Average number of times a week fruits and vegetables were consumed in 2004 by Pacific Islands Families study children.

Food item	Average number of times a week	Portion size	g intrinsic sugars*/serve
<b>Fruits</b>			
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Apples or pears	5.8	1 apple	10
Banana	5.6	1 banana	28
Oranges or mandarins	5.5	1 orange	11
Juice	3.2	150 mL	11
Canned or cooked fruit	2.8	2 apricots in juice	6
Strawberries or other berries	2.1	10 berries	3
Nectarines, peaches...	2.1	1 nectarine	11
Kiwifruit	1.4	1 kiwi	9
Dried fruit	1.4	4 dried apricots	5
<b>Vegetables that contain sugar</b>			
Carrot	3.2	1 carrot	1
Mixed vegetables	3.2	1 cup peas, carrots, corn	8
Tomatoes	2.1	1 tomato	3
Corn	2.1	1 cup	7
Peas	2.1	0.5 cup	2
Kumara	1.4	1 small	6

\*intrinsic sugars that are naturally occurring in the food include fructose, glucose and sucrose

milk. In general, fruit and vegetables contain less sugar than the foods with added or free sugar (Table 2). Daily consumption of a variety of fruits and vegetables is essential for lifelong health<sup>8</sup>. Fruits and vegetables health-promoting properties are related to their favourable nutrient density or profile<sup>9</sup> which includes significant quantities of fibre, a wide range of vitamins and minerals and other phytochemicals. On the other hand the foods that have sugar added (Table 1) tend to be low in protein, fibre, and fruit and vegetable content and highly processed. Thus, foods with added sugar are mostly energy-dense and nutrient-poor.

Recently an audit of all the foods imported into the remote Pacific Island of Tokelau, over the period 2008 to 2012<sup>10</sup>,

This audit is probably the most accurate record of added sugar consumption for an island nation. Actions the Tokelau government are now considering include the importation of more nutrient dense foods, increased consumption of local foods and reductions in the importation of cans and bottles (waste).

In the national New Zealand 2002 children's nutrition survey (CNS2002)<sup>11</sup>, a reliable<sup>12</sup> food frequency questionnaire asked how often 111 different foods and drinks were consumed over the last four weeks. These foods represented those most frequently consumed by New Zealand children at this time.<sup>13</sup> Of all the foods surveyed, more than one out of four (32/111 or 28.8%) were sweetened with added sugar (Table 2).

In 2004 and then 2006, when the children in the Pacific

**Table 2.** Average number of times a week the thirty-two foods with added sugar were consumed in 2004 by Pacific Islands Families study children. Ranked by descending frequency of consumption

Food item	Average number of times a week	Portion size	g sugars*/serve
Bread, including toast and bread rolls	9.3	1 thick slice white	1.2
Food drink	4.1	250 ml made with water	13
Tomato sauce or ketchup	3.5	65g	16
Powdered fruit drink	3.6	200 ml made with water	30
Biscuits	2.7	4 arrowroot biscuits	8
Ice cream	2.8	½ a cup	14
Jam or honey	2.8	3 tsp honey	16
Nutella	2.7	3 tsp	9
Chocolate coated or cream filled biscuits	2.1	4 chocolate coated biscuits	18
Canned or cooked fruit in syrup	2.8	1 cup fruit salad	64
Peanut butter	2.1	3 tsp	1
Ice blocks	2.1	1 ice block	14
Chocolate, eg. Moro bar	1.4	1 bar	41
Bars, eg. muesli	2.1	1 bar	5
Fruit drink from concentrate or cordial e.g. Raro	2.1	38g	13
Other sweets	1.4	1 lollipop	10
Soft drinks	1.4	1 can (355ml)	40
Candy coated chocolate, eg. Pebbles	1.4	10 pieces	6
Pancake or pikelets	1.4	1 pancake	1
Cake or slice	1.4	1 slice (90g)	32
Mayonnaise or salad dressing	1.4	1 tablespoon	15
Scones, muffins or sweet buns	1.4	1 scone	1
Doughnuts or croissants	1.4	1 small doughnut	6
Favoured milk	1.4	1 cup (264g)	23
Coca cola or fruit drinks	1.4	1 can (355ml)	40
Milk shake	0.7	1 cup	22
Mountain Dew	0.7	240g	30
Custard or custard puddings	0.7	170g	18
Pudding, eg. sponge pudding...	0.7	90g	17
Fruit pie, fruit crumble or tart	0.7	1 whole tart (60g)	21
New Age drinks	0.7	1 can Red Bull	27
Sports drinks	0.7	500ml	34

Will include in addition to the added sugar, natural sugars for items that include fruit or milk

showed that on average 10% of the total imported food energy came from the sugar in soft drink and a further 18% from brown sugar. Imported food energy over this period averaged 6MJ/person/day and therefore provided a large proportion of the total food energy requirement of the population.

Islands Families study cohort<sup>14</sup> were aged four and six years the CNS2002 food frequency questionnaire was completed by the child's parent, usually the mother. How often the children were eating each food in a week was determined as a weighted average from the frequency reported by each mother. A

variety of fruits were consumed regularly and vegetables less often (Table 1). On the other hand food drinks such as Milo™ and other powdered drinks (that do not contain fruit), such as Raro, were, on average, consumed four and two times a week and contained 13 g of sugar/serve (Table 2). Many items that would not be classified as everyday foods<sup>15</sup> because of their nutrient composition and added sugar were also consumed (Table 2). At an individual child level the median number of times foods containing sugar were consumed each day was 5.8 and the 25 and 75% quartiles were 4.0 and 8.6 respectively.

The question that needs to be asked is- why is sugar added to these foods and could the amount of sugar added be reduced by food manufacturers in a similar fashion to how salt is being removed from the food supply in partnership with the Heart Foundation of New Zealand?<sup>16</sup>

People eat foods not nutrients. Some sugars are an important and intrinsic component of nutrient dense foods such as fruit and milk. These foods are included in the food and nutrition guidelines for a balanced diet. Recently, foods have started to be categorised as being either nutrient or energy dense; healthy and unhealthy.<sup>9</sup> Most nutrition profiling systems include sugar as one of the detractors from what is considered more nutritious foods but the detractor of sugar can be balanced by fruit and vegetable, fibre and protein content of the food. The whole of diet balance is important.

Looking at the problem it is not just about what and how much we are eating so much as what we are not eating and doing. More sedentary occupations and leisure time activities mean that less energy is required yet sugar added to foods and

drinks increases the energy but not nutrient density of the diet. The New Zealand food and nutrition guidelines<sup>17</sup> include the statement “prepare or choose pre-prepared foods, drinks and snacks with little added sugar, limit your intake of high-sugar foods.” It is easy to consume more energy than needed when eating foods with added sugar as they have high palatability and low satiety<sup>18</sup>.

An evaluation of the effectiveness of this guideline for New Zealand needs for the quantity of sugar added to foods in the food supply to be measured and monitored. For parents in particular, a front of pack label stating that sugar has been added may inform a choice that would benefit the long-term health of their children.

There is sufficient evidence for public health promotion strategies to actively discourage the addition of sugar to drink and food for dental health<sup>19</sup> and obesity<sup>1</sup> and to encourage and support the consumption of water and nutrient dense foods<sup>20</sup> such as fruit, vegetables and dairy<sup>21</sup>. Interventions to improve the uptake of healthful diets during critical periods of growth including early pregnancy<sup>22</sup> and adolescence<sup>23</sup> would bode well for generations to come.

## Analysis

Data was analysed using numerical summary and frequency/score analysis based on a daily consumption score. Results were prepared with R/S+ v. 2.15.2 (<http://cran.r-project.org/>)

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