

# **SD1. Consumer Literature Review for P1058 – Update**

Nutrition Labelling About Added Sugars

2025

## Executive Summary

In 2022, FSANZ conducted a rapid systematic review of the literature relating to consumer understanding of 'added sugars' and similar terminologies, and consumer perceptions of 'added sugars' in the Nutrition Information Panel (NIP) or international equivalents (FSANZ 2022). To support FSANZ's 2025 Review of the NIP, the literature review was updated to evaluate consumer evidence produced since 2022.

The update investigated the same three research questions that were addressed in the original review:

1. What do consumers understand the terms 'sugars', 'total sugars', 'added sugars', and 'free sugars' to mean?
2. Does the presence of 'added sugars' information in addition to 'sugars' or 'total sugar' information in the NIP or international equivalents confuse consumers?
3. How do consumers understand added sugars information for single ingredient foods?

Three additional articles ranging in publication from 2022 to 2024 were identified. These articles had low quality samples and provided limited additional evidence in relation to research question 1 only. The findings are consistent with the conclusions from the original literature review, namely:

- Consumers have varying perceptions of whether sugar ingredients are natural or artificial, added or inherent.
- Sugar ingredients such as honey or fruit juice are commonly perceived as 'natural' rather than 'added sugar', even when added as an ingredient to a packaged food.

## Method

FSANZ undertook a supplementary systematic search for literature related to the research questions in October 2025. The search strategy was similar to that utilised in the 2022 literature review, but also included additional databases not previously available to FSANZ. Literature was identified by:

- Searching online databases for peer-reviewed studies published between January 2022 and October 2025;
- Reviewing reference lists and citing studies of any additional studies identified.

The literature search and screening process was undertaken by one FSANZ officer. Analysis was undertaken by two officers. Further details on the search strategy and research review process are available in Appendix 1.

## Findings

Three studies, published between 2022 and 2024 were identified. This included one study with Australian, New Zealand and international participants, and two international studies (Canada and Ghana). All studies were quantitative cross-sectional surveys with relatively small convenience samples (n = 96 – 269). All three studies provided evidence toward research question 1. No additional evidence was found relating to research questions 2 and 3.

## Consumers' ability to classify sugar ingredients

Two studies investigated consumer understanding of sugar terminology by asking participants to classify ingredients as added sugars, free sugars, natural sugars or artificial sweeteners. Similar studies in the 2022 literature review are discussed in Section 1.5.1.

Adjei et al. (2024) asked a convenience sample of 96 university staff in Ghana how they would classify 16 sugar ingredients if they saw them in the ingredient list of a pre-packaged food. Options included 'natural sugars', 'added/free sugars', 'artificial sweeteners' or 'don't know'. Consistent with previous findings, consumers' ability to classify sugar ingredients was generally poor and varied based on the specific ingredient (Table 1). Sugar sources often perceived as 'natural', such as honey and fruit juice, were frequently incorrectly classified.

Table 1. Ghana university staff classification of sugar ingredients (Adjei et al. 2024)

<b>Sugar Ingredient (Correct Classification*)</b>	<b>Correct n (%)</b>	<b>Incorrect n (%)</b>	<b>Don't Know n (%)</b>
Glucose (Unclear)	18 (18.8)	64 (66.7)	14 (14.5)
Sucrose (Added/free sugars)	19 (19.8)	51 (53.1)	26 (27.1)
Saccharin (Artificial sweetener)	18 (18.8)	25 (26)	53 (55.2)
Fructose (Unclear)	10 (10.4)	54 (56.3)	32 (33.3)
Maltose (Added/free sugars)	13 (13.5)	48 (50)	35 (36.5)
Honey (Added/free sugars)	6 (6.3)	82 (85.4)	8 (8.3)
Agave nectar (Added/free sugars)	9 (9.4)	49 (51.0)	38 (39.6)
Molasses (Added/free sugars)	15 (15.6)	27 (27.1)	54 (56.3)
Fruit juice (Added/free sugars)	18 (18.8)	69 (71.9)	9 (9.4)
Corn syrup (Added/free sugars)	16 (16.7)	49 (51.0)	21 (32.3)
Aspartame (Artificial sweetener)	23 (23.9)	8 (8.3)	65 (67.7)
Invert sugar (Added/free sugars)	14 (14.6)	30 (31.3)	52 (54.2)
Isoglucose (Added/free sugars)	9 (9.4)	35 (36.5)	52 (54.2)
Sugars present in milk (lactose) (Natural sugars)	32 (33.3)	21 (21.9)	43 (44.8)
Sugars in fresh fruits and vegetables (Natural sugars)	52 (54.2)	7 (7.3)	37 (38.5)

\*Correct answer as determined by study authors. This was not always apparent from the article.

Q: Pre-packaged food labels contain a list of ingredients. If you saw the following items listed how would you classify them? Please categorise each one as natural sugar, added/free sugar or an artificial sweetener... Note: Added/Free sugars are those that are added to foods during manufacturing/cooking.

Adjei et al. (2024) did not make a distinction between added and free sugars, and provided a definition of 'added/free sugars' as being added during manufacturing or cooking. They also did not specify the context in which sugar ingredients were presented. For example, it is unclear whether consumers would have perceived honey or fruit juice as added or natural sugar if the pre-packaged food in question was a jar of 100% honey or a bottle of 100% fruit juice. The small, international convenience sample also limits generalisability of the results to Australia and New Zealand.

An international survey of 61 Australian, 29 New Zealand, 90 American and 49 'other western country' participants (total n = 229) recruited via social media and professional networks, included a similar sugar classification task (Clarke et al. 2022). Participants were asked how they would classify 15 sugar ingredients if they saw them in the ingredient list of a pre-packaged food. Options included 'added sugar', 'naturally occurring sugar', 'artificial sweeteners', or 'don't know' (Table 2). Participants correctly categorised a mean of 7.6 out of 14 sugars (fruit juice was excluded from 'correct' analysis due to differences of opinion in the literature around whether this constituted added sugar or not). 'Sugars present in milk (lactose)' and 'sugars in fresh fruit and vegetables' were considered by the authors to be naturally occurring, while 'saccharin' and 'aspartame' were considered artificial sweeteners. It is unclear what the authors considered to be the correct response for other sugar ingredients except for 'stevia' and 'corn syrup', which were classified as added sugars. Consistent with previous research, these results indicate variability in how consumers classify sugar ingredients, with honey being frequently classified as naturally occurring.

Specific results for Australian and New Zealand ('Australasian') respondents were not provided, however, this group were reported to have lower accuracy at the classification task than participants from countries such as the United States. Increased ability to correctly categorise ingredients was significantly ( $p < 0.05$ ) associated with higher self-reported interest in food and nutrition and higher self-reported motivation to choose healthy foods and foods that contain 'natural' ingredients. On survey items about sugar avoidance, nobody indicated that they avoided sugars in fruits and vegetables. The most avoided sugar ingredient was aspartame (65.9%), followed by corn syrup (51.5%). Other sugar ingredients were avoided by less than half of participants (Clarke et al. 2022).

While Australian and New Zealand participants were included in this study, the low participant numbers and convenience sample with apparent self-selection bias (e.g. very high self-reported label use) limit generalisability of the results to the broader populations.

Table. 2 International consumer classification of sugar ingredients (Clarke et al. 2022)

Ingredient	Added sugar (%)	Naturally occurring sugar (%)	Artificial sweetener (%)	Don't know (%)
Corn syrup	75 (71.6)*	10	10	5
Molasses	55	40	2	3
Rice malt syrup	50	20	10	20
Sucrose	55	20	15	10
Fruit juice	50 (50.2)*	45 (44.5)*	2	3
Maltose	45	20	15	20
Glucose	50	35	5	10
Agave nectar	40	50	5	5
Honey	35	65	0	0
Fructose	30	55	10	5
Stevia	15 (15.7)*	15	65 (59.4)*	5
Sugars present in milk (lactose)	5	90 (85.6)*	0	5
Saccharin	5	0	80 (71.6)*	15

Aspartame	0	0	85 (84.3)*	15
Sugars in fresh fruit and vegetables	0	95 (97.8)*	0	5

\* Percentages are estimates derived by Microsoft Co-Pilot from an image in Clarke et al. (2022) and differ slightly from the small number of proportions reported in the article text (reported in brackets).

Q: "Pre-packaged foods contain a list of ingredients. If you saw the following items listed how would you classify them? Please categorize each one as one of the following: a) Sugar naturally occurring in the product; b) Sugar added to the product; c) Artificial sweetener; d) Don't know".

## Consumer attitudes towards sugar and added sugar

In a non-representative survey of 269 Canadians aged 18-50 years, Viana et al. (2022) investigated consumer attitudes towards sugar and added sugar. Participants were presented with 16 statements about sugar and asked to rate their own and others agreement with those items on a 5 point scale ( 1= does not describe me and does not describe others, 2 = does not describe me but describes others, 3 = just don't know, 4 = describes me but does not describe others, and 5 = describes me and describes others). Statements related to general sugar beliefs (e.g. 'Sugars are hidden in a lot of foods that you would not expect to find them in'), concerns about consuming sugars (e.g. 'Consuming sugars negatively affects the gut microbiome'), information sources for sugar (e.g. friends or family, healthcare professionals), or trends in sugar consumption (e.g. Dramatically increased over the past 20 years).

The researchers clustered the sample into three different groups ('mindset segments') based on their expressed attitudes about sugars, using k-means clustering. The sample clusters were as follows:

- Mindset 1: This group believed that sugars are hidden in many foods, and that honey and agave syrup are more nutritious than table sugar and high fructose corn syrup. They also believed that limiting your sugar intake will have positive health benefits. This group had strong beliefs about sugar that were unlikely to be influenced by 'credible or evidence-based sources of information'. They self-reported seeking nutritional information on labels.
- Mindset 2: This group believed that there is a widely held belief that sugar consumption has increased over the last 20 years. They were more likely to be sceptical of the negative impacts of sugar, that some forms of sugar are healthier than others, or that sugars are 'hidden' in many foods.
- Mindset 3: This group was concerned about the negative health impacts of sugar. They were likely to seek professional advice related to sugar.

This study contributes further to the understanding that sugar and added sugar information may not be interpreted or understood uniformly through a population. No similar studies were identified in the 2022 literature review.

## References

- Adjei, R. R., Sarfo Boateng, A., & Owusu-Kwarteng, J. (2024). Self –reported knowledge and understanding of added sugars by consumers in Ghana. *Heliyon*, 10(10), e31243. <https://doi.org/https://doi.org/10.1016/j.heliyon.2024.e31243>
- Clarke, C., Abel, K., & Best, T. (2022). Consumer understanding of sugar types predicts food label use. *Nutrition & Food Science*, 53(5), 823-836. <https://doi.org/10.1108/nfs-02-2022-0066>
- FSANZ. (2022). Rapid Systematic Literature Review for P1058 – Nutrition Labelling About Added Sugars. Food Standards Australia New Zealand, Canberra. <https://www.foodstandards.gov.au/sites/default/files/2023-12/P1058%20Literature%20Review.pdf>
- Viana, K. D. A. L., Davidov, S., Morello, O., Arguello, D. M. P., Moskowitz, H., & Bellissimo, N. (2022). Identifying Consumer Mindsets Related to Sugars Consumption in Canadian Adults. *Dietetics*, 1(3), 137-147. <https://doi.org/10.3390/dietetics1030014>

## Appendix 1 – Detailed Methods

The methodology adopted in this update aligned with the 2022 literature review (FSANZ 2022).

### Search Strategy

EBSCO and Web of Science databases were searched on 30 October 2025 using the following queries, replicated from the 2022 review:

- Query A: TI ("sugar\*" OR "total sugar\*" OR "added sugar\*" OR "free sugar\*") AND AB ("consumer\*" OR "customer\*" OR "user\*") AND AB ("understand\*" OR "perceive" "perception\*" OR "know\*" OR "comprehend\*" OR "confus\*" OR "aware\*") AND AB ("label\*", OR "pack\*" OR "nutrition information panel" OR "NIP" OR "nutrition facts" OR "defin\*")
- Query B: TI ("consumer\*" OR "customer\*" OR "user\*") AND AB ("understand\*" OR "perceive" "perception\*" OR "know\*" OR "comprehend\*" OR "confus\*" OR "aware\*") AND TI ("sugar\*" OR "total sugar\*" OR "added sugar\*" OR "free sugar\*")

### Screening

All decisions regarding inclusion/exclusion criteria were made prior to the literature search commencing.

Inclusion criteria:

- Original, peer-reviewed research published between 1 January 2022 and 30 October 2025
- Consumer understanding of specific sugar terminologies, including 'sugars', 'total sugar', 'added sugar', and 'free sugar'
- Consumer attitudes towards different types of sugar
- Consumer perceptions of specific products as being added sugars when added to other products
- Consumer perceptions of specific processes that create sugar as contributing to added sugar
- Consumer perceptions of added sugars information for single ingredient foods
- Consumer confusion arising from added sugars labelling

Exclusion criteria:

- Consumer behaviour in relation to sugar
- Sources of information about sugar
- Sufficiency of current information about sugar
- Consumer value of added sugar labelling
- Impact of added sugars labelling on consumer behaviour
- Impact of added sugars labelling on reformulation
- Effect of the NIP in changing consumer behaviour

No restrictions were placed with respect to study type or sample size.

81 unique references were identified from online databases, from which 3 papers were included. No papers were identified from reference lists or citing studies of included papers.