

# The Health Effects of 100% JUICE

## Findings from an Umbrella Review

Beckett, E.L., et al., *Health effects of drinking 100% juice: an umbrella review of systematic reviews with meta-analyses*. Nutr Rev, 2024.



### A JUICY problem:

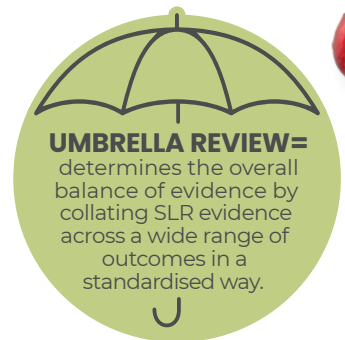
**100% juice in dietary guidelines is controversial: a recommended beverage in some countries but not others.**

This might be because guidelines judge 100% juice on selective nutritional components (sugars, fibre, vitamins) or singular health outcomes (satiety, dental health) vs. the totality of its health effects.



### SO, WHAT ARE THE TOTAL HEALTH EFFECTS OF 100% JUICE?

	WHAT WAS ELIGIBLE?	WHAT WAS FOUND?
<b>STUDIES:</b> 	Systematic literature reviews (SLRs) with meta-analysis (MA) on 100% juice and health.	15 SLRs with 51 primary and 144 total MAs.
<b>JUICES:</b> 	100% fruit or vegetable juice (reconstituted or not from concentrate) with no added sugars, sweeteners, or fortification.	100% fruit juices only (no vegetable juices) at doses 50-1200 mL/day.



## What was the BALANCE OF EVIDENCE?

**KEY:** Benefit Risk  
 MD = Mean difference  
 SMD = Standard mean difference  
 RR = Relative risk  
 HR = Hazard ratio

### INTERVENTION STUDIES:

Systolic blood pressure	<b>B</b> MD (mmHg) = -3.14 (-4.43, -1.85)
Flow-mediated dilation	<b>B</b> MD (%) = +2.10 (1.14, 3.06)
C-reactive protein	<b>B</b> MD (mg/L) = -1.09 (-0.17, -2.01)
Uric acid	<b>B</b> MD (mg/dL) = -0.28 (-0.43, -0.13)
Diastolic blood pressure	<b>C</b> MD (mmHg) = -1.68 (-2.94, -0.43)
Interleukin-6 (orange juice only)	<b>D</b> MD (pg/mL) = -1.51 (-2.13, -0.7)
Interleukin-6 (pomegranate juice only)	<b>D</b> SMD = -1.07 (-1.9, -0.19)

### OBSERVATIONAL STUDIES:

Stroke mortality	<b>D</b> RR = 0.67 (0.60, 0.76)
CVD mortality	<b>D</b> HR = 1.20 (1.01, 1.42)
Type 2 diabetes	<b>D</b> RR = 1.07 (1.01, 1.14)
Prostate cancer	<b>D</b> RR = 1.03 (1.01, 1.05)

### NO EFFECT (INTERVENTION):

- B:** AST liver enzyme
- C:** ALT liver enzyme
- C:** Total cholesterol
- C:** HDL-cholesterol
- C:** LDL-cholesterol
- C:** Triglycerides
- C:** Insulin
- C:** HbA1c
- D:** HOMA-IR
- D:** Body weight
- D:** BMI
- D:** Waist circumference
- D:** TNF alpha
- D:** Pulse wave velocity
- D:** Malondialdehyde
- D:** Fasting blood glucose

### NO EFFECT (OBSERVATIONAL):

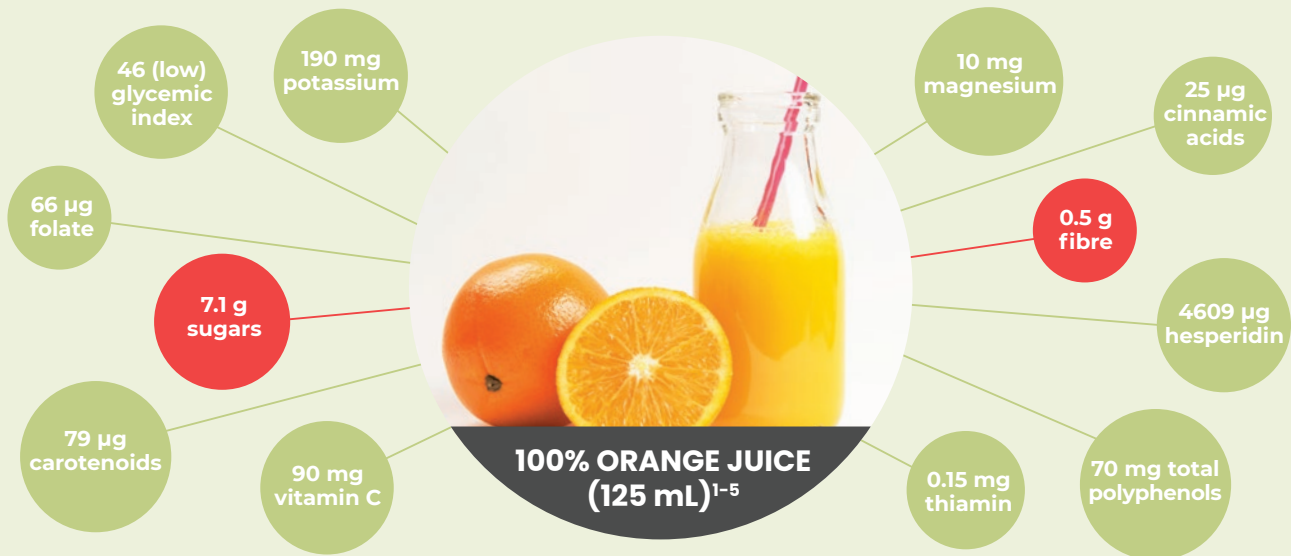
- C:** Cardiovascular disease (CVD)
- C:** Coronary heart disease (CHD)
- D:** All-cause mortality
- D:** CHD mortality
- D:** Colorectal cancer
- D:** Breast cancer
- D:** Hypertension
- D:** Stroke
- D:** z-BMI

**GRADE (QUALITY OF EVIDENCE):** **D** = VERY LOW **C** = LOW **B** = MEDIUM **A** = HIGH

## Why might 100% juice have health BENEFITS?

**100% JUICE**  $\neq$  just high sugars and low fibre.

**100% JUICE**  $=$  a minimally processed beverage providing sugars, vitamins, minerals and bioactives.



## DISCUSSION points



### DENTAL HEALTH?

No studies met criteria. A 2019 SLR on 100% juice reported some dental erosion at intakes  $\geq 750$  mL/day but concluded evidence “not conclusive” as studies did not reflect real-world conditions<sup>6</sup>.



### DIABETES?

Small increased risk (observational) vs. no effect on any metabolic outcome (interventions).

More research needed:

- Are intervention studies insufficient to detect small risk?
- Are subjects in observational studies self-reporting sweetened juices as 100% juice?



### WEIGHT?

No effect on weight, BMI or waist circumference in this review, even at 750 mL/day.



### SATIETY?

Very few studies & no SLR.

## Key takeaways on 100% JUICE

**1**

### Benefits to human health:

Cardioprotective and anti-inflammatory effects across a wide range of doses.

**2**

### Limited evidence of harm:

Exclusion in dietary guidelines is not supported by high-level evidence and may have unintended consequences.

**3**

### Don't limit focus to 1 or 2 nutritional components:

This is an inadequate model to explain the total health effects of 100% juice.



### References:

1. Australian Food Composition Database (2022).
2. Perez-Jimenez (2010) <https://doi.org/10.1021/jf100128b>
3. Bestwick (2020) <https://doi.org/10.3390/foods9070891>.
4. The International Glycemic Index Database (2012).
5. Pupin (1999) [https://doi.org/10.1016/S0308-8146\(98\)00095-8](https://doi.org/10.1016/S0308-8146(98)00095-8).
6. Liska (2019) <https://doi.org/10.3389/fpubh.2019.00190>

FOODiQ Global carried out the umbrella review and developed this 2-page summary. The umbrella review was funded by Hort Innovation and AUSVEG who had no contribution to the final methodology, implementation or interpretation of results, nor drafting of the manuscript. This visual summary was funded by the Australian Beverages Council. The data that support this study have been published (open-access) in Mendelay Data: <https://doi.org/10.17632/6t3yx49wbs.1>