



TEDDY LAB EXPLORER GUIDE • FILE 08

THE JUICE FILE

Fruit in a glass – or soda in disguise? Nine researchers went after the truth.

Ages 8+

Real research inside

0% baby stuff

01 What the machine keeps – and throws away



Squeeze an apple and something surprising happens: you get the sugar of **about 3 apples** in one easy-to-drink glass – and almost nothing else. Juicing keeps the water (~88%), the sugar, and the vitamins. It throws away **~90% of the fiber**, the pulp, the peel, and the food's whole structure.

Here's the twist nobody expects: **per calorie, juice matches whole fruit on vitamin C, folate and potassium**. The juicer doesn't destroy vitamins. It removes fiber and fullness – the two things that make an apple a meal instead of a drink.

The label trick: apple juice's "vitamin C" is mostly **added ascorbic acid** – the factory puts it back in. Natural apple juice has ~1 mg per 100 g. Without the added vitamin, it's sugar water with potassium.

02 The duel: juice vs soda, glass for glass

Apple juice

- 24 g sugar per 250 ml – cola has 27 g
- Grape juice: 36 g – **more than cola**
- Up to 67% fructose – more fructose-heavy than HFCS soda
- Real vitamin C (in orange juice, at least)

VS

Cola

- 27 g sugar per 250 ml
- ~60% fructose (HFCS)
- Zero vitamins, zero fiber
- The undisputed king of empty calories

MYTH BUSTED

"Juice sugar is natural, so your body handles it differently." Nope. The World Health Organization counts juice sugar as **free sugar** – the same category as the sugar in soda and candy, with the same daily budget. "Natural" describes where it grew, not what your liver does with it.

The surprising fairness: juice is NOT soda. Metabolically, each serving of juice does about **half** the damage of a soda serving – the vitamins are real, and studies consistently show smaller harms. The honest verdict: closer to soda than to fruit, but not identical to either.

"Three apples. One glass. Zero full feelings. Do the math, young explorer." – Prof. Buzz

03 Why your body's radar misses liquid calories

Your brain counts **chewed** calories carefully – but liquid calories slip past. In experiments, people who drank extra juice or soda didn't eat less later. People who ate the same calories as jelly beans *did*. And when scientists added pectin (fiber) back into juice, fullness did NOT return – your body wants the whole **structure** of food, not just its fiber grams.

HONEST FLAG

The grown-up studies are stronger than the kid studies. The most careful child experiment (2025, 64 kids ages 4–6) found **no significant difference** in how well kids compensated for apple slices vs purée vs juice. We print that, because that's how science works. Real-life data still favors limiting drinks: kids who drank lots of sweetened drinks didn't eat less food – and drank 122–147 g less milk every day.

04 What the big studies show

x Type 2 diabetes: whole fruit protects (HR 0.98 per 3 servings/wk); juice raises risk (HR 1.08) – same people, same study, opposite directions (187k adults, BMJ 2013).

~ Kids' weight: juice adds +0.03 BMI per serving/day – real, but modest, and only in under-8s. Teens: no detectable effect. Soda's effect is about double.

x Gout: 2+ glasses of orange juice daily = RR 2.42, the same as soda (JAMA 2010). Whole fruit: neutral.

x Teeth (erosion): juice acid dissolves enamel directly – 93% of all drinks test below pH 4.0. Fluoride protects against cavities but NOT erosion.

✓ **BUT the twist:** at normal amounts in cups with meals, big studies find little tooth damage. The real villain is the **delivery system:** bedtime bottles and all-day sippy sipping.

~ The quiet harm: every glass of juice can crowd out milk – calcium, protein and vitamin D gone with it.

The detox detour: juice "cleanses" are the biggest myth of all. Not one trial has ever shown a toxin leaving a body because of juice. In 2020 the US government fined one detox brand **\$15.2 million** for false claims. Your liver and kidneys filter ~140 liters of blood a day – that IS the cleanse, and it runs for free.

"Your kidneys filter 140 liters a day. A \$12 cleanse can't beat organs that work the night shift for free."
– Prof. Buzz

05 The doctor rules

The American Academy of Pediatrics is crystal clear: **no juice at all before 12 months** – not even a taste. After that: max 4 oz (120 ml) for ages 1–3, 4–6 oz for 4–6, and 8 oz for teenagers – **in a cup, with meals**. Never in a bedtime bottle, never sipped all day. Why? Sipping juice for hours is a constant acid+sugar bath for teeth – the classic recipe for early childhood cavities.

06 The label maze

"Juice drink", "cocktail", "nectar" – these words mean the box is mostly **not juice**: often 5% fruit or less, plus added sugar, wearing pictures of orchards. In the US, 62% of all kids' drink sales are sweetened drinks like these – 80% show fruit on the box. **Rule of thumb: flip the box. Look for "100% juice". If it doesn't say that, it's a soda wearing a fruit costume.**

07 Where juice genuinely wins

Iron booster

Vitamin C multiplies plant-iron absorption 2–6×. Orange juice with a lentil meal genuinely helps.

Stomach bugs

Dilute apple juice beat electrolyte solution in a 647-kid trial (mild dehydration, half-strength).

Low-sugar rescue

For kids with diabetes, 4 oz of juice is the standard fast-sugar rescue (the "15-15 rule").

Constipation

Doctors actually publish prune-juice dosing: 1 oz per month of age, max 4 oz.

The verdict of every authority on record: whole fruit first. Juice is a tool, not a drink – occasional, small, in a cup, with a meal.

Explorer quiz – check yourself

1. How much sugar is in 250 ml of apple juice vs cola? (24 g vs 27 g – nearly identical; grape juice has 36 g, MORE than cola)
2. Does the WHO count juice sugar as "free sugar"? (Yes – same budget as candy and soda)
3. What percentage of fiber survives juicing? (About 10% – ~90% is lost)
4. What does the AAP say about juice before age 1? (None at all – not even a sip)
5. Has any juice cleanse ever been proven to remove a toxin? (No – zero trials; one brand was fined \$15.2M)

Free sugar – WHO's category: added sugars + honey + syrups + juice sugars.

Fructose – the fruit sugar; too much strains the liver.

AAP – American Academy of Pediatrics; writes the juice rules.

Ascorbic acid – vitamin C, often added back to juice after processing.

Erosion – acid dissolving enamel directly; fluoride can't stop it.

Crowding out – when a drink replaces milk or food kids needed.