

Fruit juice and sugar

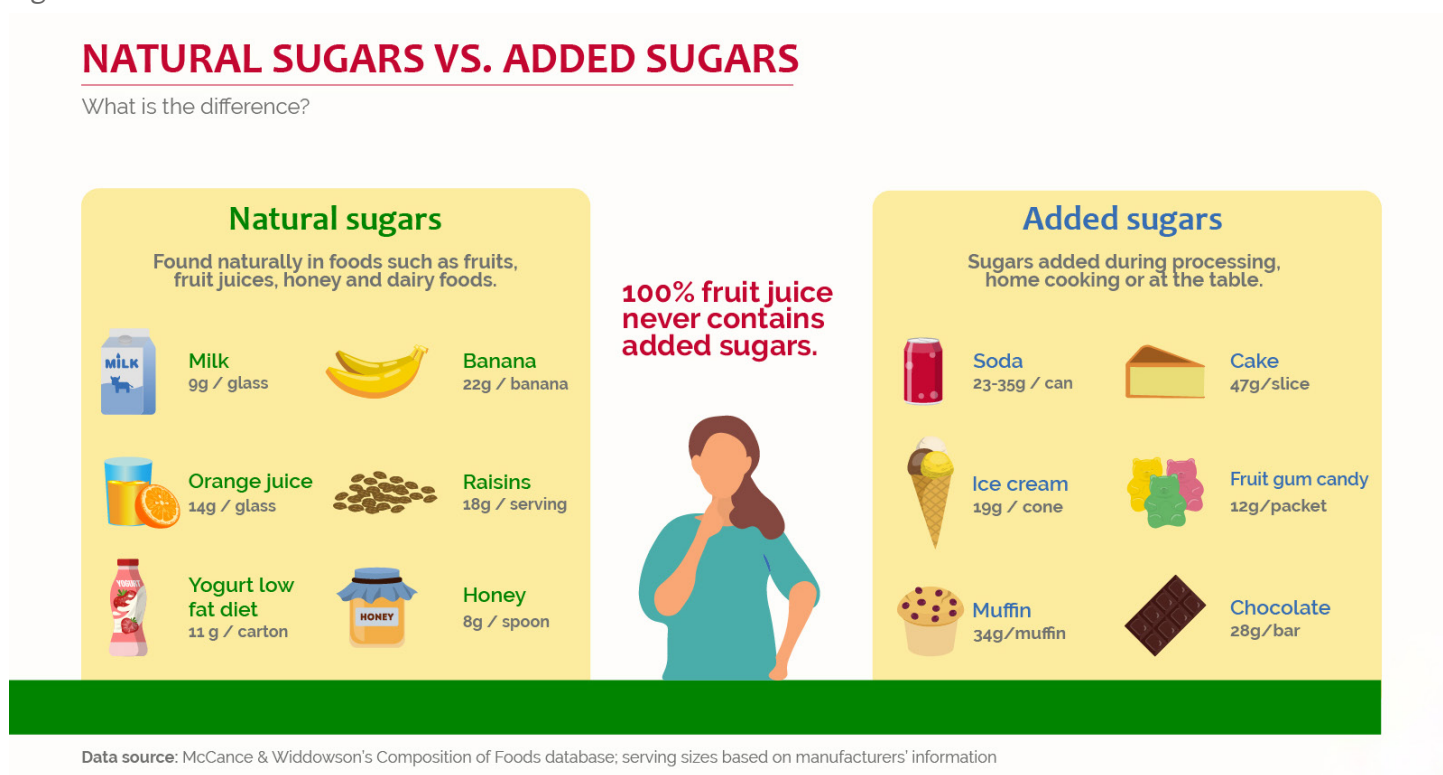
Key points

- The sugars found in 100% fruit juice (FJ) are naturally occurring and are never added.
- The current definition of free sugars includes those found naturally in FJ. However, FJ only accounts for 2 to 14% of average free sugar intakes in Europe while providing useful amounts of vitamin C, potassium, folate and bioactive compounds.
- FJ has been shown to exert neutral or positive effects on cardiometabolic health and body weight. In contrast sugar-sweetened beverages tend to have neutral or negative effects despite a similar total sugar content.
- These differences are thought to relate to the food matrix of FJs versus foods with added sugars, or to the higher potassium, polyphenol and fibre content of FJ.

What are the different types of sugar?

Sugars are simple carbohydrates which come in several different forms. They can be naturally occurring, as in fruit and milk, or they can be added to different foods and drinks, such as in carbonated drinks, confectionery or cakes - see Figure 1. It's not widely understood that products labelled as FJ never contain added sugars by law. Indeed, FJ only contains the sugars which are naturally present in the fruit before it is juiced.

Figure 1



Free sugars are defined as those added to foods and drinks as ingredients plus those naturally present in FJs, purees, honey and syrups. FJ makes only a modest contribution to free sugar intakes in Europe. A recent study estimated that FJ contributes on average 2 to 14% of free sugars while 86 to 98% comes from foods such as confectionary,

sugar-sweetened beverages and baked goods¹. The World Health Organization classification for free sugars does not differentiate between added sugars and the free sugars naturally found in FJ implying that all sources of free sugars are equally harmful. Current evidence suggests this is incorrect..

Sugars and health

Glycaemic response and insulin sensitivity

The glycaemic index (GI) is a validated international classification reflecting the expected impact of a food on blood glucose levels. Like whole fruits, most FJ are classified as low GI. In human intervention trials, the impact of FJ on markers of glucose control depends on whether FJ is added to the diet or replaces other energy (calorie) sources. In moderate amounts, and especially when replacing sugar-sweetened beverages, FJs have neutral or beneficial effects on glycaemic control.

Other sources of free sugars, including sugar-sweetened drinks, ice cream, cakes and biscuits are classified as intermediate or high glycaemic index foods. Combined analyses of clinical trials typically report no significant impact of FJ on fasting blood glucose or insulin^{2,3}. In contrast, a meta-analysis of 5086 participants concluded that sources of added sugars, including sugar-sweetened beverages and sweetened milks, had harmful effects on glycaemic control when tested in substitution studies⁴.

Blood lipids, lipoproteins and inflammation

There is good evidence that the source of sugars can influence low-density lipoprotein cholesterol (LDL-c) levels (sometimes called 'bad' cholesterol). Studies report that a complex or intact food source lowers LDL-c concentrations compared with simple sources of sugars⁵. Given this, it is unexpected that FJ have either neutral or beneficial effects on blood lipids in observational studies and clinical trials suggesting that FJ sugars do not behave the same as added sugars⁶. In addition, some studies report beneficial effects of FJ on inflammation⁷, although this is not a universal finding and more research is needed⁶.

Blood pressure and vascular function

Improving vascular health and blood pressure can help to protect cardiometabolic health. A meta-analysis of studies found that sugar-sweetened beverages or honey did not improve blood pressure. In contrast, the addition of either FJ or whole fruit to the diet lowered both systolic and diastolic blood pressure⁸.

Appetite and body weight

Diets high in free sugars have been shown to increase energy intakes, which is likely to be explained by the greater energy density of the diet⁹. Evidence from clinical trials indicates different effects on body weight when different sources of sugar are compared. One meta-analysis found that adding sugar-sweetened beverages to the diet can increase body weight, whereas addition of either FJ or fruit can lower body weight¹⁰. When effects on appetite are studied, evidence typically finds that sugar-sweetened beverages given prior to a meal do not produce compensation in subsequent energy intake, meaning more energy is consumed overall. In comparison, studies of FJ given with meals have found that compensation can occur such that subsequent energy intake does not differ from controls⁵.

Fruit is more than sugars

Many FJs provide a source of vitamins or minerals. For example, 100% orange juice is a rich source of vitamin C and a source of folate and potassium. FJ is also a major contributor to dietary polyphenols. According to studies, these are plant bioactives with a role in vascular function and other markers of health. In many countries, a serving of fruit juice complements recommendations for fruits and vegetables.

Conclusion

Despite the relatively simple physical structure of FJ with its natural source of sugars, it contains vitamin C, some fibre (as pectin) and a useful amount of potassium, folate and polyphenols. It therefore differs from other sources of free sugars, such as sugar-sweetened beverages, in terms of nutritional composition and health effects. Whereas sugar-sweetened beverages may have harmful effects on glycaemic control and body weight, FJ seems to have

neutral effects on glycaemic control, body weight and inflammation, and positive effects on blood pressure and vascular function.

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References

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