

Nutritional benefits of 100% fruit juice

Fruit juices contain a range of minerals, vitamins and bioactive compounds, such as phytochemicals, that are important for good health. Guidelines for a healthy, balanced diet typically recommend plenty of fruits and vegetables are required to supply our vitamin and mineral needs. However, within this model, moderate consumption of 100% fruit juices can make a significant contribution to potassium and some other micronutrients.

Vitamin and mineral claims

European Union regulation 1924/2006 states that, in order to use a nutrition claim, 100 g of a food or 100 ml of a drink must contain at least 15% or 7.5% respectively of the nutrient reference value (NRV)¹. In accordance with this, 100% juices of orange, grapefruit, lemon, pineapple and tomato can be declared a “source” of vitamin C; orange, pineapple and tomato juices meet the criterion for potassium; while orange juice additionally meets the criterion for folate.

The nutrients in fruit juice come directly from the squeezed fruit. When micronutrient levels of vitamin A, folate, vitamin C, calcium, magnesium and potassium were compared in juices versus the whole fruits from which they were derived, no significant differences were found². In some cases, sodium may be higher in 100% fruit juices while the content of potassium, phosphorus and magnesium may be lower compared with the corresponding fresh fruit extract².

Nutritional benefits

Intestinal absorption of non-haem iron is inhibited by some compounds present in foods, such as phytates or polyphenolic compounds, and conversely, is promoted by others, such as vitamin C (ascorbic acid). The role of vitamin C in this regard is so important that the WHO considered its impact on the bioavailability of iron when developing Dietary Reference Values³. Thus, consuming 100% fruit juice along with foods rich in non-haem iron can help increase absorption of this mineral.

Pro-vitamin carotenoids (for example, β -carotene), present in fruit and vegetables, represent about 40% of the vitamin A consumed daily in western countries. A study of 8,861 subjects, including 2,310 who routinely drank juice, reported a 14% higher daily vitamin A intake among the routine orange juice drinkers compared to non-consumers (660 μ g retinol equivalent/day vs. 580 μ g retinol equivalent/day respectively)⁴.

A study that analysed blood carotenoids, found higher blood concentrations of alpha-carotene after the consumption of juice compared with consumption of raw or cooked whole vegetables⁵. Fruit (and vegetable) juices typically have a high content of certain micronutrients whose bioavailability, as in the case of provitamin carotenoids, can be higher compared with corresponding raw or cooked whole fruits and vegetable.

Potassium and blood pressure

Potassium is found in significant quantities in 100% fruit juices, as well as vegetables, whole-grain cereals and legumes. The average daily intake of potassium in Europe is 2,463 to 3,991 mg/day in adults⁶. The WHO suggests a potassium intake of 3,510 mg/day, based on a systemic review of the literature, with a view to controlling blood pressure and reducing the risk of cardiovascular disease, particularly stroke⁷. Consumption of fruit juices in moderate amounts (around 150-200ml per day) and as part of a balanced diet could help consumers achieve recommended potassium intake levels and support the maintenance of normal blood pressure in the general population⁸.

Energy density of fruit juices

Concerns have been raised as to whether the energy content of fruit juices (arising from fruit sugars) may modify the overall nutritional quality of the diet and contribute to a “nutrient dilution” effect. Studies have shown that, notwithstanding their energy density which is not high, fruit juice consumption is not associated with dilution of essential micronutrients such as vitamin A; indeed quite the opposite as they can contribute to meeting recommended intakes of these nutrients^{9,10}.

Phytochemicals

Phytochemicals such as carotenoids, particularly lutein, β -carotene and lycopene, as well as polyphenols are present in many 100% fruit juices. In citrus fruits, as most of the phenolic compounds and carotenoids are found in the skin¹¹, industrial pressing allows for a greater amount of phytochemicals to pass into the juice¹².

Conclusion

Typically, dietary guidelines recommend a vitamin and mineral intake preferably from fruit and vegetables as part of an overall balanced diet. 100% fruit juices have a high density of certain micronutrients and their consumption is associated with greater likelihood of adherence to dietary guidelines for vitamins and minerals. Concerns that the natural sugar content may adversely affect diet quality or energy intake are unfounded. 100% fruit juices may be declared a “source” of key micronutrients, and some nutritional compounds in fruit juice have greater bioavailability than in the fresh fruits from which they are derived.

References

¹ See Annex XIII of Regulation 1169/2011.

² Serpen JY (2012) Comparison of sugar content in bottled 100% fruit juice versus extracted juice of fresh fruit. *Food Nutr Sci* 3: 1509-1513.

³ EFSA Panel on Dietetic Products, Nutrition and Allergies (2015) Scientific Opinion on Dietary Reference Values for iron. *EFSA J* 13:4254, 115 pp.

⁴ O'Neil CE et al. (2012) 100% Orange Juice consumption is associated with better diet quality, improved nutrient adequacy, decreased risk for obesity, and improved biomarkers of health in adults: National Health and Examination Survey, 2003 – 2006. *Nutr J* 11: 107.

⁵ McEligot AJ et al. (1999) Comparison of serum carotenoid responses between women consuming vegetable juice and women consuming raw or cooked vegetables. *Cancer Epidemiol Biomarkers Prev* 8: 227-231.

⁶ EFSA (2012) Use of the EFSA Comprehensive European Food 1767 Consumption Database in Exposure Assessment. *EFSA J* 9(3): 2097, 34 pp.

⁷ World Health Organization (2012) Effect of increased potassium intake on blood pressure, renal function, blood lipids and other potential adverse effects. WHO: Geneva, Switzerland.

⁸ EFSA Panel on Dietetic Products, Nutrition and Allergies Scientific (2010) Opinion on the substantiation of health claims related to potassium and maintenance of normal muscular and neurological function (ID 320, 386) and maintenance of normal blood pressure (ID 321) pursuant to Article 13(1) of Regulation (EC) No 1924/2006. *EFSA J* 8:1469, 17 pp.

⁹ O'Connor L et al. (2013) Dietary energy and its association with the nutritional quality of the diet of children and teenagers. *J NutrSci* 2: e10.

¹⁰ Gibson S et al. (2009) Associations between added sugars and micronutrient intakes and status: further analysis of data from the National Diet and Nutrition Survey of Young People aged 4 to 18 years. *Br J Nutr* 101: 100–107.

¹¹ Peleg H et al. (1991) Distribution of bound and free phenolic acids in oranges (*Citrus sinensis*) and grapefruits (*Citrus paradisi*). *J Sci Food Agric* 57:417–426.

¹² Gil-Izquierdo A et al. (2002) Effect of processing techniques at industrial scale on orange juice antioxidant and beneficial health compounds. *J Agric Food Chem* 50: 5107–5114.