

## **100% fruit juice and cardiovascular disease**

Evidence clearly shows that consumption of fruit and vegetables has a beneficial effect on cardiovascular disease (CVD). The available evidence relating to 100% fruit juice consumption indicates modest benefits for blood pressure and cholesterol levels, while there is an emerging trend revealing inverse associations between 100% fruit juice consumption and risk of stroke. Overall, this suggests that 100% fruit juice is an appropriate choice of beverage for a heart health diet.

### **100% fruit juice consumption and coronary heart disease risk**

Evidence from prospective observational studies suggests a clear protective effect of fruit and vegetables against the risk of coronary heart disease and, in general CVD. For example, a meta-analysis including 9 cohort studies<sup>1</sup> reported a 4% reduction in the risk of coronary heart disease for each additional portion of fruit and vegetables (106g) a day and a 7% reduction for each additional portion of fruit. A linear-type inverse dose-response ratio was observed between the consumption of fruit and mortality. Similar results were obtained from another meta-analysis<sup>2</sup> which reported an 11% reduction in the risk of coronary heart disease for each additional portion of fruit and vegetables (110g a day).

There is substantial evidence from observational prospective studies that the consumption of fruit and vegetables has a protective effect against the risk of major CVD events (myocardial infarction and stroke). The few cohort studies that evaluated the consumption of fruit juices in relation to coronary heart disease risk did not reveal any significant associations.

### **Fruit, 100% fruit juice and risk of stroke**

Evidence from two meta-analyses<sup>3,4</sup> as well as cohort studies<sup>5,6,7</sup> show a clear inverse relationship between fruit and vegetable consumption and the risk of stroke. One cohort<sup>7</sup> (including 69,622 women, monitored for 14 years) reported a 10% reduction in the risk of ischaemic stroke with consumption of citrus fruits and juices (orange and grapefruit).

With regard to cerebrovascular disease, one meta-analysis<sup>3</sup> revealed an 11% risk reduction in stroke for each portion of fruit, a 5% reduction was observed for combined fruit and vegetables, and a 3% reduction was observed per fruit portion, again with a linear dose-response ratio. A second meta-analysis<sup>4</sup> showed that the risk of stroke was reduced by 11% for the consumption of 3 to 5 portions of fruit and vegetables and by 26% for consumption of more than 5 portions a day compared with consumption of less than 3 portions. In the few studies that have evaluated the consumption of fruit juices, a trend was noted towards a statistically significant inverse association with risk of stroke.

### **100% fruit juices and hypertension**

Numerous randomised controlled trials indicate a clear beneficial effect of fruit and vegetable consumption on the reduction of blood pressure. A recent review<sup>8</sup> revealed that fruit juices, too, confer benefits similar to those seen for fruit and vegetables. Evidence indicates a modest yet consistent reduction in blood pressure with fruit juice consumption. For example, one clinical trial<sup>9</sup> which examined the effects of pomegranate juice for 4 weeks, reported a 6% reduction in systolic and diastolic blood pressure. Similar reductions were seen following consumption of juices made from blueberry<sup>10</sup>, cranberry<sup>11</sup>, chokeberry<sup>12</sup> and blood oranges<sup>13</sup>. It is proposed that the mechanisms relate to potassium, or fruit bioactives such as flavonoids, and include lowering serum LDL-cholesterol, increasing adiponectin, antioxidant effects, improvement of endothelial function, inhibition of platelet aggregation, anti-inflammation, and prevention of hyperhomocysteinemia<sup>14</sup>.

### **100% fruit juices and cholesterol levels**

A review<sup>15</sup> of five randomised controlled trials found significant reductions in total cholesterol and LDL-cholesterol, a significant increase in HDL-cholesterol (+21%) and a significant reduction in the LDL/HDL ratio when fruit juice was consumed. The effects were strongest in participants with hypercholesterolaemia. Another review<sup>8</sup> reported a significant increase in HDL-cholesterol, a significant reduction in total cholesterol, LDL-cholesterol, and ratios for total/HDL-cholesterol and LDL-/HDL-cholesterol.

The available studies provide moderate evidence that 100% fruit and/or vegetable juices reduce LDL- and total cholesterol with an upward trend in HDL-cholesterol. Stronger evidence exists for modulations in vascular health, inflammation and platelet aggression, mostly likely due the flavonoid content of 100% fruit juices. These effects are seen particularly in participants with underlying risk of CVD, such as dyslipidaemia, type 2 diabetes and obesity.

### **Conclusion**

There is substantial evidence that consumption of fruit and vegetables has a protective effect against the risk of major cardiovascular events. In contrast, the evidence from observational studies suggests either no impact or a modest beneficial effect of 100% fruit juices on CVD, with the strongest associations seen with stroke. However, experimental research is more promising. Clinical studies reveal several mechanisms relating to vascular health, inflammation, lipid oxidation and platelet aggregation that could explain a benefit for 100% fruit juices in lowering CVD risk. Polyphenol compounds and potassium in fruit juices are most likely responsible for these effects.

## References

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