

# **Adverse cardiovascular effects of soft drinks – the contributions of fructose and added caffeine**

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Overconsumption of fructose, particularly in the form of soft drinks is increasingly recognized as a public health concern. The acute cardiovascular responses to ingesting fructose have not, however, been well-studied in humans. In this randomized crossover study we compared cardiovascular autonomic regulation after ingesting water and drinks containing either glucose or fructose in fifteen healthy volunteers (aged 21-33 years). The total volume of each drink was 500ml and the sugar content 60g. For 30 min before and 2 hours after each drink, we recorded beat-to-beat heart rate, arterial blood pressure, and cardiac output. Energy expenditure was determined on a minute-by-minute basis. Ingesting the fructose drink significantly increased blood pressure, heart rate and cardiac output but not total peripheral resistance. Glucose ingestion resulted in a significantly greater increase in cardiac output than fructose but no change in blood pressure and a concomitant decrease in total peripheral resistance. Ingesting glucose and fructose, but not water, significantly increased blood pressure variability, and decreased cardiovagal baroreflex sensitivity. Energy expenditure increased by a similar amount after glucose and fructose ingestion but fructose elicited a significantly greater increase in respiratory quotient. These results show that ingestion of glucose and fructose drinks are characterized by specific hemodynamic responses. In particular, fructose ingestion elicits an increase in blood pressure that is probably mediated by an increase in cardiac output without compensatory peripheral vasodilatation.