

Appendix 2 (as supplied by the authors): High-Fructose Corn Syrup

An extensive body of research finds that excessive sugar and caloric sweetener consumption can induce multiple risk-factors and metabolic syndromes. Sugars include sucrose, normally derived from cane and beets and commonly known as ‘table sugar’, as well as ‘caloric sweeteners’, which are manufactured and added to food during processing. Caloric sweeteners include high-fructose corn syrup (HFCS), a sweetener derived from corn.¹

There are concerns that HFCS that is an especially hazardous form of sugar. Sucrose and HFCS both contain glucose and fructose but HFCS can contain relatively high proportions of fructose. This underlies concerns that HFCS is particularly harmful. Fructose can cause non-alcoholic fatty liver disease and hepatic insulin resistance, and can increase serum triglycerides and fat deposition in adipose tissue. Fructose metabolism may also stimulate hepatic pathways, encouraging habituation and possibly dependence, and drive uric acid production, contributing to hypertension and endothelial dysfunction.^{2,3}

Researchers have therefore argued that overconsumption of HFCS may play a role in the development of NCDs and risk-factors, including dyslipidemia, cardiovascular disease, metabolic syndrome, obesity, and diabetes.⁴ Cross-national comparisons support this view, identifying higher rates of diabetes prevalence in countries with higher availability of HFCS.⁵ This is consistent with findings from clinical randomized controlled trials that identify elevated, dose-dependent risk factors for cardiovascular disease among young adults assigned HFCS sweetened beverages.^{6,7}

References

1. Lustig RH, Schmidt LA, Brindis CD. Public health: The toxic truth about sugar. *Nature*. 2012;482(7383):27-29. doi:10.1038/482027a.
2. Duffey KJ, Popkin BM. High-fructose corn syrup: Is this what’s for dinner? *Am J Clin Nutr*. 2008;88(6). doi:10.3945/ajcn.2008.25825C.
3. Lustig RH. Fructose: metabolic, hedonic, and societal parallels with ethanol. *J Am Diet Assoc*. 2010;110(9):1307-1321. doi:10.1016/j.jada.2010.06.008.
4. Bray GA, Nielsen SJ, Popkin BM. Consumption of high-fructose corn syrup in beverages may play a role in the epidemic of obesity. *Am J Clin Nutr*. 2004;79(4):537-543.
5. Goran MI, Ulijaszek SJ, Ventura EE. High fructose corn syrup and diabetes prevalence: a global perspective. *Glob Public Health*. 2013;8(1):55-64. doi:10.1080/17441692.2012.736257.
6. Stanhope KL, Bremer AA, Medici V, et al. Consumption of fructose and high fructose corn syrup increase postprandial triglycerides, LDL-cholesterol, and apolipoprotein-B in young men and women. *J Clin Endocrinol Metab*. 2011;96(10). doi:10.1210/jc.2011-1251.
7. Stanhope KL, Medici V, Bremer AA, et al. A dose-response study of consuming high-fructose corn syrup-sweetened beverages on lipid/lipoprotein risk factors for cardiovascular disease in young adults. *Am J Clin Nutr*. 2015;101(6):1144-1154. doi:10.3945/ajcn.114.100461.