

# No Effect of the Type of Sugar on Changes in Traditional Risk Factors for Cardiovascular Disease When Consumed at Typical Levels

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## Introduction

- The American Heart Association recommends that women and men should not consume more than 100 or 150 kcal/day, respectively, from added sugars.
- The potential of high doses of fructose to cause cardiometabolic disorders is well established.
- However, few data exist on the effects of the most commonly consumed sugars, high fructose corn syrup(HFCS) and sucrose, both of which contain fructose, when consumed at typical population levels (higher than the current AHA recommendations).
- The purpose of this study was two fold:
  - To investigate the effects of short term intake of sugar at typical population levels (50<sup>th</sup> percentile for sugar intake in the USA)
  - To compare the effects of different types of sugars

## Methods

- The study included 268 weight-stable individuals (no change in weight >3% for 3 months) who were either normal weight or over weight overweight, normotensive, normoglycemic and with no other overt health problems.
- Individuals were required to consume sugar-sweetened low-fat milk every day for ten weeks as part of their usual diet.
- The added sugar in the milk represented the 50<sup>th</sup> percentile for sugar consumption in the United States:
  - Fructose - added fructose providing 9% of calories required for weight maintenance
  - Glucose - added glucose providing 9% of calories required for weight maintenance
  - HFCS - added HFCS providing 18% of calories required for weight maintenance
  - Sucrose - added sucrose providing 18% of calories required for weight maintenance.
- Energy intake required for weight maintenance was estimated from the Mifflin St Joer prediction including an individualized activity factor based on responses to a physical activity questionnaire.
- Other than milk consumption participants followed no structured dietary program. They were counseled on how to account for the calories in the sweetened milk, but were told to continue to eat to the same level of fullness as prior to enrollment.
- Three-day food diaries and NDSR were used to evaluate dietary intake at baseline and after ten-weeks.
- Subjects and research staff were blinded to which sugar was consumed.
- Due to ongoing investigation the blind has still not been broken.

## Results

		Entire Cohort	Time p	A	B	C	D	Time X Group p
Weight (lbs)	Pre	162.23 ± 27.28	<0.001	162.09 ± 26.12	166.61 ± 30.90	159.13 ±24.88	161.66 ±27.26	0.118
	Post	164.15 ±28.14		164.05 ± 27.28	168.15 ± 32.52	160.44 ± 24.81	164.66 ±2 7.99	
BMI	Pre	26.27 ±3.29	<0.001	26.26 ± 3.16	26.52 ± 3.33	25.66 ± 3.14	26.75 ± 3.51	0.083
	Post	26.58 ± 3.42		26.58 ± 3.32	26.75 ± 3.52	25.88 ± 3.17	27.24 ± 3.62	
Systolic Blood Pressure (mmHg)	Pre	109.16 ± 10.17	<0.001	108.61 ± 9.70	107.71 ± 10.51	109.17 ± 10.09	111.14 ±10.28	0.081
	Post	106.13 ± 10.39		107.57 ± 11.29	105.49 ± 9.97	104.60 ± 9.78	107.25 ± 10.55	
Diastolic Blood Pressure (mmHg)	Pre	69.78 ± 8.71	0.003	69.48 ± 9.71	69.68 ± 8.83	68.96 ± 8.34	71.14 ± 8.02	0.510
	Post	68.05 ± 9.68		68.90 ± 10.78	67.82 ± 8.91	66.12 ± 9.35	69.81 ± 9.48	
Total Cholesterol (mg/dl)	Pre	177.39 ± 39.44	0.038	175.33 ± 41.67	181.26 ± 40.84	176.28 ± 39.35	176.75 ± 36.43	0.116
	Post	180.10 ± 39.98		179.98 ± 41.96	180.72 ± 35.53	176.16 ± 42.30	184.33 ± 39.96	
LDL (mg/dl)	Pre	104.27 ± 34.20	0.341	100.52 ± 35.18	109.20 ± 34.74	103.37 ± 34.31	103.92 ± 32.80	0.361
	Post	105.41 ± 34.58		101.13 ± 33.37	107.97 ± 30.86	103.84 ± 36.68	108.78 ± 36.85	
HDL (mg/dl)	Pre	51.51 ± 12.77	0.760	53.52 ± 13.07	51.45 ± 12.97	52.92 ± 13.06	52.11 ± 12.11	0.766
	Post	52.36 ± 12.93		53.08 ± 13.91	51.42 ± 12.75	52.33 ± 12.91	52.67 ± 12.40	
Glucose (mg/dl)	Pre	90.00 ± 6.50	0.187	89.43 ± 6.54	90.48 ± 7.07	90.66 ± 6.18	89.27 ± 6.27	0.170
	Post	90.66 ± 7.89		88.41 ± 8.24	91.65 ± 9.25	91.03 ± 6.69	91.38 ± 7.09	

## Discussion & Conclusion

- These data suggest that when consumed as part of normal diet at typical levels the effects of commonly consumed sugars on traditional cardiovascular risk factors are small and mixed.
- More importantly, the often cited negative effects of fructose compared to glucose do not seem to be applicable to the commonly consumed sugars (HFCS and sucrose) when consumed at typical population consumption levels.