

=> Researchers compared low GI diet with other dietary approaches to see how they stack up against each other against diabetes.

=> Diabetes is all about glucose control and controlling blood sugar

=> Serum HbA1c is a measure of how well we are able to manage our blood glucose; higher is worse (keep it low)

Impact of low GI diet



Low-glycemic index diets as an intervention for diabetes: a systematic review and meta-analysis
Mohammad Ishraq Zafar, Kerry E Mills, Juan Zheng, Anita Regmi, Sheng Qing Hu, Luoneng Gou, Lu-Lu Chen



- Compared low glycemic index diets to participants' usual diets, "healthy" diets, high GI diets, high fat diets, low fat diets, low carbohydrate diets, "diabetes diets," high fibre diets, "carbohydrate exchange" diets, and "hypertensive diets"
- Low-GI diets were effective at reducing glycated hemoglobin (HbA1c), fasting glucose, BMI, total cholesterol, and LDL cholesterol
- Greatest effect shown in longer-term studies

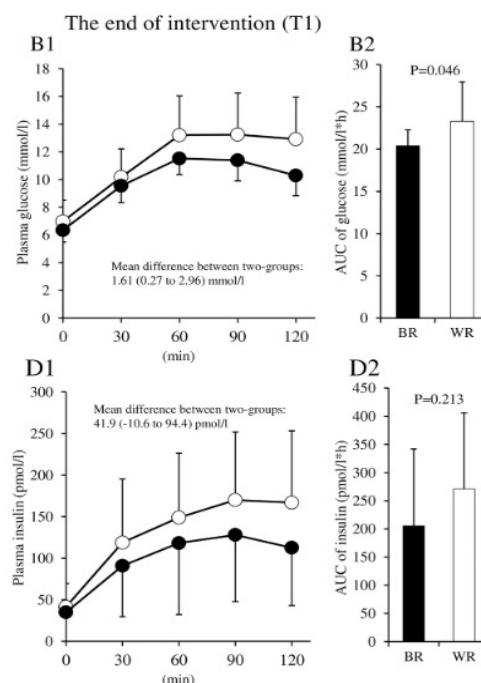
Mohammad IZ et al. *The American Journal of Clinical Nutrition*, 110 (4), 2019, 891–902

=> This study shows the effects of people consuming brown rice over white rice for 8 weeks

=> People in the white rice group, white bars and white dots, had higher glucose/insulin at the end of the study

Brown rice vs white rice... does it matter?

- RCT
- N=28 patients with type 2 diabetes
 - 14 white rice (250kcal)
 - 14 brown rice (250 kcal)
- 8 weeks
- 3 day diet record
- Brown rice group → 6 g more of fibre / day

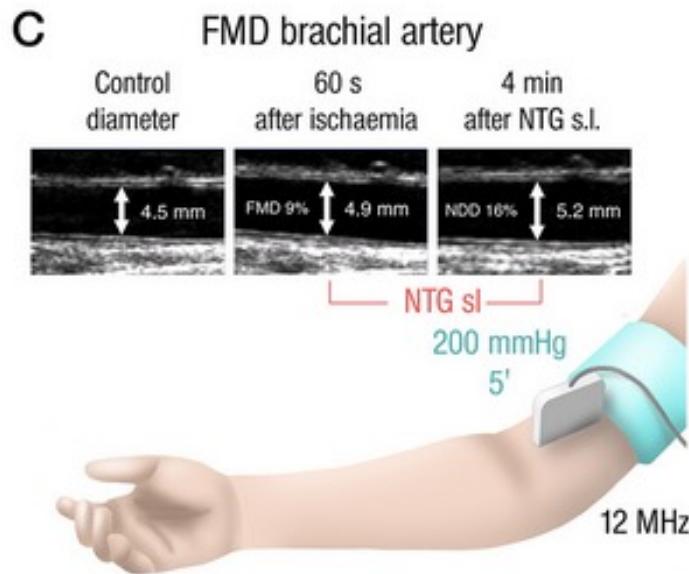


Kondo K et al. *PLoS ONE* 12(6):e0179869.

=> Indicates that making small dietary changes is helpful for controlling glucose levels

=> FMD = Flow Mediated Dilation

Represents how well blood can flow through arteries in the arms



Daiber, A. et al. (2017) *British Journal of Pharmacology*, 174: 1591– 1619.

=> People who consumed brown rice had

=> Brown rice group had better FDR, and other better measures of circulation and blood flow

measures of circulation than the white rice group

Table 4. Changes in endothelial function in the brown rice and white rice diet groups.

	Brown rice group			P value	White rice group			P value	P value between randomized groups
	Baseline (T0)	The end of intervention (T1)	Change		Baseline (T0)	The end of intervention (T1)	Change		
Fasting FDR (%)	46.3±17.1	66.7±34.5	20.4 (5.1 to 35.7)	0.013	47.5±23.2	41.7±19.7	-5.8 (-13.7 to 2.1)	0.136	0.004
Fasting Peak FBF (%)	407.7 ±130.1	526.6±199.9	118.8 (40.4 to 197.2)	0.006	387.1 ±192.4	343.8±157.9	-43.3 (-109.5 to 22.9)	0.179	0.002
Fasting duration of RH (sec)	59.6±20.5	69.3±23.9	9.7 (1.9 to 17.6)	0.019	62.1±14.2	61±12.5	-1.1 (-3.1 to 0.9)	0.266	0.012
Postprandial FDR (%)	31.3±9	49.2±23.2	17.9 (3.8 to 32)	0.017	38.6±19.5	34.2±19.2	-4.4 (-16.3 to 7.5)	0.435	0.015
Postprandial Peak FBF (%)	329.9±71	437±189.5	107.2 (2 to 212.3)	0.046	342.9 ±172.9	290.3±152.3	-52.6 (-134.8 to 29.6)	0.189	0.017

FDR= flow debt repayment, FBF = forearm blood flow

What's causing improved endothelial function?

- Inflammation? → Reduced CRP with higher fibre diet, CRP linked to endothelial dysfunction
- Lower insulin? → hyperinsulinemia linked to endothelial dysfunction
- Other nutrients in brown rice? → vitamin B1 and Mg

=> Nutrients in brown rice are stripped away when converted into white rice

=> Insulin is required to manage blood sugar

Kondo K et al. PLoSONE 12(6):e0179869.

=> FDR = Flow Debt Repayment

=> High blood sugar can cause damage by binding to blood cells; it causes ruptures and tears in arteries

How much blood can flow in the arteries in the arm, after it has been cut off by a cuff

Learning objectives

1. Discuss the value of whole grains in the diet
2. Distinguish the types of dietary fibre, health effects of dietary fibre and recommendations
3. Explain the concepts of glycemic index and glycemic load, and describe the health effects of foods with different glycemic index values
4. Define added sugar and describe the impact of added sugar and artificial sweeteners on health

=> Sweetened yogurt has added sugar and naturally occurring sugar from the milk that's used to make it; the natural sugar is lactose

=> If sugar is listed on the ingredients panel, then additional sugar is added

Added sugar

- sugar that is not in its naturally-occurring state (no longer in fruits, vegetables, grains), has been extracted or whole-food sugar that has been added to product (i.e., honey)
- can be consumed as is or incorporated into other foods

Examples: table sugar (sucrose), corn syrup, honey, fruit juice, nectars, brown rice syrup, agave, maple syrup

*How do we know how much
added sugar we are consuming?
Is this on the NFT?*

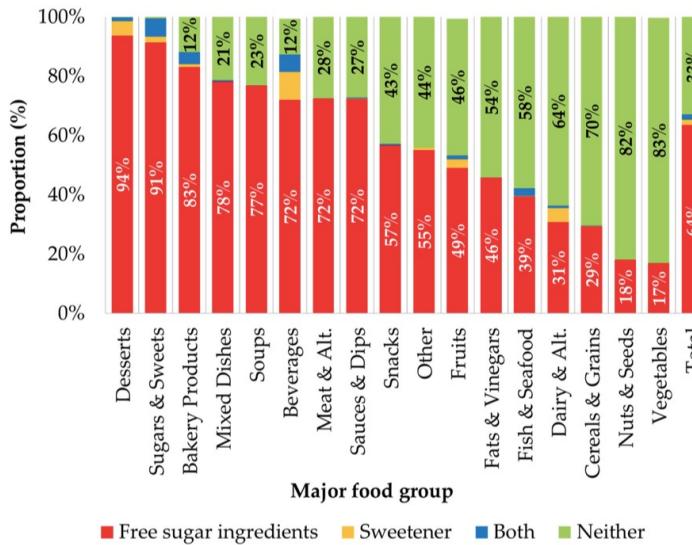


=> Researchers looked at how much sugar is in food, naturally and added
=> Added sugar is referred to as Free Sugar

Article

Total and Free Sugar Content of Canadian Prepackaged Foods and Beverages

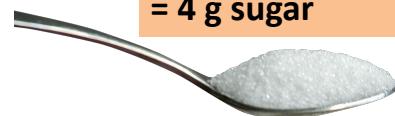
Jodi T. Bernstein ¹, Alyssa Schermel ¹, Christine M. Mills ² and Mary R. L'Abbé ^{1,*}



= 1 tsp of sugar

Canadians consume
110g of sugar/day
(27 teaspoons!)

1 tsp table sugar
= 4 g sugar



=> Some vegetable products have added sugar

Which one has the most sugar?

(The most sugar in general)

A



B



C



=> The apple juice has the most amount of sugar



Nutrition Facts Valeur nutritive	
Amount Teneur	% Daily Value % valeur quotidienne
Calories / Calories 120	
Fat / Lipides 0 g	0 %
Saturated / saturés 0 g	0 %
+ Trans / trans 0 g	
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 15 mg	1 %
Potassium / Potassium 95 mg	3 %
Carbohydrate / Glucides 29 g	10 %
Fibre / Fibres 0 g	0 %
Sugars / Sucres 27 g	
Protein / Protéines 1 g	
Vitamin A / Vitamine A	0 %
Vitamin C / Vitamine C	120 %
Calcium / Calcium	0 %
Iron / Fer	0 %

~7 tsp of sugar!!

INGREDIENTS:
100% PURE APPLE JUICE (NOT FROM CONCENTRATE),
VITAMIN C.

INGRÉDIENTS :
JUS DE POMME PUR À 100 % (NON FAIT DE CONCENTRÉ),
VITAMINE C.



~5 tsp of sugar!!



CHOOSE WATER



~6 tsp of sugar!!

=> Water is the best beverage

=> Honey, agave, etc. get a health halo because they are seen as healthier options. But sugar is sugar. They have a similar effect on our body.

=> Maple syrup has a GI of 54

=> Honey GI is 58

=> White sugar is 65

Sugar is sugar!



Nutrition Facts	
Serving Size 1 Tbsp (21g)	
Servings Per Container 16	
Amount Per Serving	
Calories 60	% Daily Value*
Total Fat 0g	0%
Trans Fat 0g	
Sodium 0mg	0%
Total Carbohydrate 17g	6%
Sugars 16g	
Protein 0g	0%

* Percent Daily Values are based on a 2,000 calorie diet.

Try our syrup on pancakes, ice cream, hot cereal, ham, and in tea

Refrigerate after opening

12 oz. (340g) Honey

Honey should not be fed to infants under one year of age.

=> Fibre slowly releases sugar into the blood stream and it limits the gastric emptying since it is a solid food

Added sugar vs. naturally occurring

Is there is difference in how these sugars are handled in the body?

- **Naturally occurring sugar accompanied by other nutrients**
 - Apple also has antioxidants, fibre
 - Impact on gastric emptying
 - High fibre smoothie (Booster juice) vs juice (Rawlicious)
- **Must read label to see if sugar has been added**
- **Earlier in the list, greater qty.**

=> The first item on the ingredient list is the one that's contained in the highest quantity. The last ingredient is something that is very small in quantity in the food

=> The NFT alone does not tell us if a product has added sugar

=> Must look at ingredients list to determine if sugar has been added

=> The Ragu sauce does contain added sugar (i.e. Organic Sugar)

Does this contain added sugar?



Nutrition Facts		
Serving Size 1/2 cup (113g)		
Servings Per Container about 6		
<hr/>		
Amount Per Serving		
Calories 45	Calories from Fat 10	
<hr/>		
% Daily Value*		
Total Fat 1g	1%	
Saturated Fat 0g	0%	
Trans Fat 0g		
Cholesterol 0mg	0%	
Sodium 480mg	20%	
Total Carbohydrate 8g	3%	
Dietary Fiber 2g	8%	
Sugars 4g		
Protein 2g		
<hr/>		
Vitamin A 6% • Vitamin C 15%		
Calcium 6% • Iron 6%		
<hr/>		
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:		
Calories: 2,000 2,500		
Total Fat	Less than 65g	80g
Sat Fat	Less than 20g	25g
Cholesterol	Less than 300mg	300mg
Sodium	Less than 2,400mg	2,400mg
Total Carbohydrate	300g	375g
Dietary Fiber	25g	30g
<hr/>		
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4		
<hr/>		
INGREDIENTS: ORGANIC TOMATO PUREE, ORGANIC TOMATOES, SALT, ORGANIC ONIONS, ORGANIC SOYBEAN OIL, ORGANIC SUGAR, ORGANIC PARMESAN CHEESE (CULTURED PASTEURIZED ORGANIC MILK, SALT, POWDERED CELLULOSE, MICROBIAL ENZYMES), ORGANIC GARLIC POWDER, ORGANIC GARLIC, ORGANIC BASIL, ORGANIC OREGANO.		
<hr/>		
CONTAINS: MILK		
CERTIFIED ORGANIC BY QUALITY ASSURANCE INTERNATIONAL		

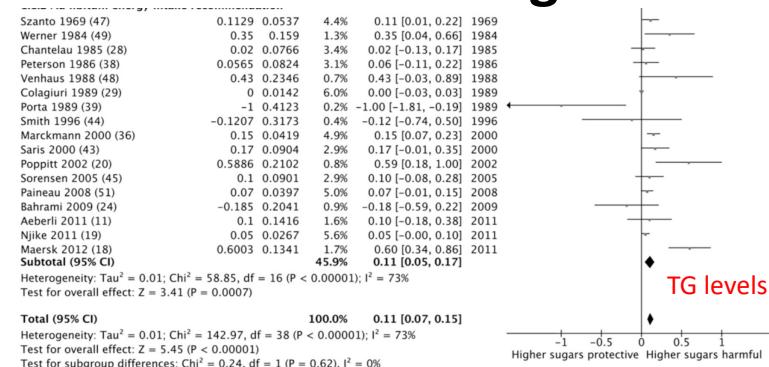
=> Can't rely on NFTs to determine added sugar

Tracking added sugars

World Health Organization:
<10% of total kcal/day from *added* sugar



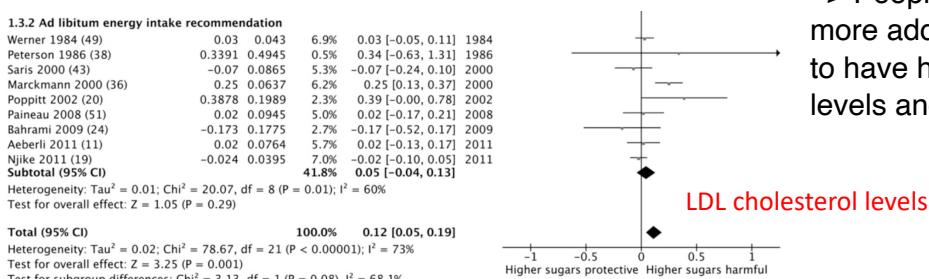
Health effects of too much dietary added sugar



=> This is a meta-analysis which shows us 2 different outcomes; Triglyceride concentration and LDL cholesterol levels

=> In both cases, higher added sugar intake is harmful for both triglyceride and LDL

=> People who consumed more added sugars tend to have higher triglyceride levels and LDL



Alternative Sweeteners



Artificial, 0 calorie sweeteners

- Non-nutritive sweeteners (NNS) (no energy provided)
- Ex: acesulfame potassium, aspartame, sucralose, dextrose, maltodextrin, saccharin

Natural, 0 calorie sweeteners (Stevia)

- FDA approved for addition to products
- So sweet relative to regular sugar that only very small quantities are needed to sweeten foods to the same degree

Sugar alcohols

- Products can claim “sugar-free”, but doesn’t mean 0 kcal
- Fewer kcal than carbohydrates (0.2-2.4 kcal/g)
- Possible side effects when consumed in large quantities
- Examples: erythritol (Truvia), maltitol

=> Consuming sugar alcohols in high quantity is not good; can cause diarrhea

Non-nutritive, artificial sweeteners

- Introduced ~100 years ago, consumed by 1/3 people
- Draw:
 - sweet, but less of an impact on blood glucose, better for T2D?
- But, research shows link between consumption and weight gain, CVD and T2D?!
 - **Stimulate glucose uptake?**
 - **Decrease ability of sweetness to signal food intake?**
 - **Increase appetite?**
 - **Gut microbiome?**

=> People eat more food/snacks because its sugar free

=> Effects of prenatal artificial sweeteners consumption on birth outcomes; a systematic review and meta-analysis



Effects of prenatal artificial sweeteners consumption on

Received: 28 February 2021 | Revised: 20 May 2021 | Accepted: 23 May 2021
DOI: 10.1002/fsn3.2395

REVIEW

Food Science & Nutrition

WILEY



Sugar and artificially sweetened beverages linked to

Review Article | Published: 15 May 2010

Received: 3 January 2020 | Revised: 2 March 2020 | Accepted: 3 March 2020
DOI: 10.1111/obr.13020

ETIOLOGY AND PATHOPHYSIOLOGY

OBESITY
Reviews

WILEY

Effects of nonnutritive sweeteners on body weight and BMI in diverse clinical contexts: Systematic review and meta-analysis

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Raigam Jafet Martinez-Portilla⁵

=> Millions of people have participated in artificial sweetener studies

=> Generally, we aren't seeing a drastic effect in consuming artificial sweeteners

=> Not enough evidence to show a positive/negative effect relationship

=> Rodent studies don't scale to humans

=> Artificial sweeteners may disrupt our natural gut microbiome