

Does Consuming Sugar and Artificial Sweeteners Change Taste Preferences?

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ABSTRACT

Americans consume a lot of sugar, primarily from sweeteners that are added to processed foods and beverages. Data from the US Department of Agriculture reveals that in 2013, Americans consumed 22.3 teaspoons of added caloric sweeteners a day, which is significantly more than the American Heart Association’s recommendation. Artificial and alternative sweeteners have also been added to a plethora of foods. These sweeteners range from about 180 times sweeter to as much as 13,000 times sweeter than sugar. Consumption of both sugar and artificial sweeteners may be changing our palates or taste preferences over time, increasing our desire for sweet foods. Unfortunately, the data on this are lacking. In the summer of 2014, a group of 20 people from Kaiser Permanente facilities throughout California agreed to cut out all added sugars and artificial sweeteners for 2 weeks and then complete a survey to determine whether their taste preferences had changed. After the 2-week challenge, 95% of participants (18 out of 19 respondents) found that sweet foods and drinks tasted sweeter or too sweet, 75% (15 out of 20 respondents) found that other foods tasted sweeter, and 95% (19 out of 20 respondents) said moving forward they would use less or even no sugar. Additionally, 86.6% of participants (13 out of 15 respondents) stopped craving sugar after 6 days. Although this was a small survey, the results suggest that using a 2-week sugar challenge can help to reset taste preferences and make consuming less or no sugar easier. Physicians should consider recommending a sugar and artificial sweetener challenge to all their patients, especially those with obesity, diabetes, or cardiovascular disease.

INTRODUCTION

Sugars are simple carbohydrates found naturally in fruit and milk. Although we do get some of the sugar we consume from these foods, much of our intake comes from sugars that are added to processed foods and beverages. Cane sugar, high-fructose corn syrup, agave, honey, evaporated cane juice, and other forms of sugar are added to products such as sodas, cakes, cookies, and candies. They are also added to many processed foods such as breakfast cereals, pasta sauce, yogurt, soymilk, barbeque sauce, and bottled teas. In fact, using their new on-line database, the Environmental Working Group has found that almost 60% of the 80,000 products evaluated contained added sugar.^{1,2} For examples of sugar content in commonly consumed foods, see Sidebar: Examples of the Amounts of Sugar Found in Processed and Restaurant Foods and Drinks.

According to the Dietary Guidelines for Americans 2010, our biggest source of sugar is sugary drinks, which supply 35.7% of our intake.³ Almost 13% of the sugar we consume is from grain-based desserts, such as cookies, cakes, muffins, and scones (Figure 1).³

Most people have a natural propensity for sweet foods and beverages. Data from the US Department of Agriculture reveals that in 2013, Americans consumed 22.3 teaspoons of added caloric sweeteners a day. This includes sugar, high-fructose corn syrup, and other sweeteners.⁴ The consumption of sugars and sugary drinks has been linked with obesity, diabetes, heart disease, hypertension, impaired lipid metabolism, inflammation, and an increase in cravings and feelings of hunger, which is why major health organizations have weighed in on how much we should consume.⁵⁻¹³

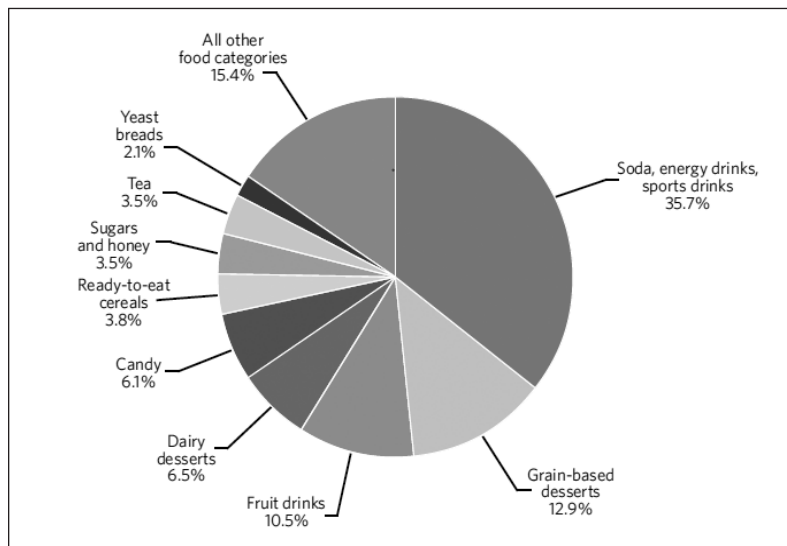


Figure 1. Sources of added sugars in the diets of the US population, ages 2 years and older, National Health and Nutrition Examination Survey 2005-2006.

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New Recommendations for Sugar

In 2009, for the first time ever, the American Heart Association came out with recommendations for sugar consumption.⁷ For women, they recommend consuming no more than 6 teaspoons or 100 calories of added sugar each day. This is equivalent to about 24 g of sugar. For men, they recommend no more than 9 teaspoons or 150 calories of added sugar a day. This is equal to about 35 g of sugar. It is interesting to note that one 12-ounce can of cola has about 10 teaspoons of sugar, putting the drinker, whether a man or a woman, over the limit recommended by the American Heart Association with just one item.

The World Health Organization's new draft guidelines say sugar consumption should be less than 10% of total energy intake per day, but a reduction to below 5% would have added benefits.¹⁴ Five percent of 2000 calories would be 100 calories (around 6 teaspoons or 24 g) of sugar per day.

Sugar, Artificial Sweeteners, and Health

Artificial sweeteners have also been added to a plethora of foods for those who want a sweet taste without the calories. These sweeteners range from about 180 times sweeter to as much as 13,000 times sweeter than sugar.¹⁵ Recent research has linked artificial sweeteners to a number of health problems, including metabolic syndrome, a decrease in kidney function, and possibly even a disruption in the regulation of blood sugar caused by changes in the microbiota.¹⁶⁻¹⁸ Although more research is needed, these observational and preliminary data have caused many to rethink their use of artificial sweeteners.

In addition to the health problems associated with the use of sugars and artificial sweeteners, their consumption may be changing our palates or taste preferences over time, increasing our

desire for sweet foods. Unfortunately, the data on this are lacking.

I asked Marion Nestle, PhD, for her thoughts on the impact of sugar and artificial sweeteners on the palate. She told me, "Sugar is sweet and everyone loves it. Artificial sweeteners give the illusion of sweetness and not everyone loves them. People get used to a level of sweetness that tastes good to them. The more sugar we eat, the more it takes to reach that taste point. To people deprived of sugar (do any still exist?), even a little tastes delicious. At this point, just about everyone would be healthier eating less sugar and enjoying it more" (Marion Nestle, PhD, personal communication; 2014 Oct 24).^a

AN ALTERED PALATE

I have seen for myself the impact that sugar can have on taste preferences. As a child I loved sugar. I was the one who ate 7 cupcakes at a birthday party and would eat all my Easter candy in a day. For a number of reasons, I decided to cut out sugar when I was in my late 20s. Two things happened pretty quickly: 1) I found out I did not crave sugar once I cut it out, and 2) other foods tasted sweeter to me, foods that had never tasted sweet before, such as Wheat Thins. I realized that my palate appeared to be changing in response to the lack of sugar in my diet, just as the palate can change when salt is limited.¹⁹ This idea was supported by what happened one day when I made a smoothie for several friends using only strawberries and bananas. The smoothie tasted great to me and was really sweet. However, to my surprise, every one of my friends said it was too sour and they wanted to add sugar.

I also noticed that people who consumed a lot of artificial sweeteners seemed to have an altered palate. A case in point is a friend who uses artificial sweeteners every day. One year at Thanksgiving she added several packets of an artificial sweetener to a dessert because it was not sweet enough for her. Although it was more than sweet enough for everyone else, her copious use of artificial sweeteners seemed to have altered her palate and made super-sweet foods normal for her.

Examples of the Amounts of Sugar Found in Processed and Restaurant Foods and Drinks

- 1 tsp sugar = 4 g
 - Kiwi Strawberry Vitamin Water, 20 oz bottle—32 g¹
 - Yoplait Original Mountain Blueberry Yogurt, 6 oz—26 g²
 - Oscar Mayer Lunchables Ham and Cheddar Cracker Stackers (with fruit punch)—31 g³
 - Silk Very Vanilla Soy Milk, 1 cup—15 g⁴
 - Sweet Baby Rays Barbecue Sauce, 2 tbsp—16 g⁵
 - Kellogg's Smart Start Strong Heart Antioxidants Cereal, 1 cup—14 g⁶
 - Starbucks Blueberry Scone—20 g⁷
 - Subway 6" BBQ Oven Roasted Chicken Melt—17 g⁸
 - Panda Express Orange Chicken (2 Entrée meal) with chow mein—47 g⁹
 - California Pizza Kitchen Thai Crunch Salad (full)—48 g¹⁰
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THE SUGAR CHALLENGE

Because there is a lack of data on the impact of sugar and artificial and alternative sweeteners on the palate, I decided to try a 2-week sugar and artificial sweetener challenge and then look at its impact on taste. In the summer of 2014, a group of 20 people from Kaiser Permanente facilities throughout California agreed to try the challenge (see Sidebar: Sugar and Artificial Sweetener Challenge Instructions).

After the two-week challenge, I asked the participants to fill out a survey to determine whether their palate had changed (see Sidebar: Survey Results of the Two-Week Challenge).

Some comments about the challenge were

- “I think this challenge really helped me to reset my palate. Before the challenge I did not eat a lot of sugar, but would put stevia in my

tea, oatmeal, and yogurt daily. Now I enjoy the flavor of it without the added sweetener.”

- “I enjoyed the challenge; it opened my eyes to how many processed products add sugar. Thank you for helping me move on to a healthier lifestyle.”
- “I rediscovered that I like my morning espresso unsweetened—used to drink it that way before getting hooked on sweetener. Will not go back. Also found that adding raisins to oatmeal eliminated need to use a couple packets of Splenda.”
- “I realized I was emotionally dependent on these evening snacks and they were not contributing to my goals around weight loss/maintenance. It was a good exercise.”

Many of us eat and drink too much sugar and would benefit from consuming less of it. Although this was a small survey, the results suggest that we can make consuming less or no sugar easier by cutting out sugar and artificial sweeteners for two weeks. We can also let our patients know that cravings seem to go away for most people after just six days and that food and desserts will taste sweeter for most people after the challenge. Finding processed foods with less added sugar, eating more real foods instead of processed foods, choosing fruit for dessert, and having some tasty dessert recipes that do not add sugar, can also help patients move forward with a low- or no-sugar diet. Two of the best recipes from a Kaiser Permanente healthy dessert contest (banana cream pie and watermelon and berry skewers) follow this article and are worth trying.

Sugar and Artificial Sweetener Challenge Instructions

For two weeks, cut out all added sugars and artificial sweeteners.

1. Do not add any form of sugar (see list below) or any alternative sweeteners to foods or drinks! Avoid artificial and alternative sweeteners including Sweet ‘N Low, Equal, Splenda, monk fruit, neotame, stevia, and xylitol, etc. No added sweeteners!
2. Avoid all sweetened sodas, bottled teas, sports drinks, energy drinks, fruit drinks and juice (even 100% juice), specialty coffee drinks, and any other liquid with added sweeteners.
3. Cut out any foods that have a lot of added sugar or any artificial sweeteners such as cookies, cake, candy, yogurt, soy or almond milk, breakfast cereals, energy bars, or other foods. Read labels! Aim for food with 5 g or less of *added sugar*. Look at the ingredient lists of foods you eat for other names for sugar such as the following:

Sucrose	High-fructose corn syrup	Honey
Corn syrup	Maple syrup	Molasses
Agave	Evaporated cane juice	Barley malt
Dextrose	Coconut palm sugar	Cane sugar
Grape sugar	Turbinado sugar	Raw sugar
Brown sugar	Powdered sugar	Brown rice syrup
Date sugar		

Note: Plain unsweetened milk and yogurt and fruit contain natural sugar, which is fine because it is not added sugar. Limit dried fruits to 2 servings per day and fresh fruits to 4 to 5 servings per day.

Survey Results of the Two-Week Challenge

Participants craved sugar after cutting it out, but cravings went away for

- 53.3% of participants after 3 days (8 out of 15 people responding)
- 86.6% of participants after 6 days (13 out of 15 people responding)

After the 2-week challenge:

- 95% of participants found that sweet foods and drinks tasted sweeter or too sweet (18 out of 19 people responding)
- 75% found that other foods, such as baby carrots, apples, or crackers, tasted sweeter (15 out of 20 people responding)
- 95% said moving forward, they would use less or even no sugar (19 out of 20 people responding)
- 35% said they lost weight (7 out of 20 people responding)

Eating out and social events were identified as problematic, so creating a plan of action to deal with these situations, including bringing a healthy dessert such as fresh fruit, was recommended.

Because many of the foods participants regularly ate contained more sugar than they anticipated, taking a look at food items such as breakfast cereals, alternative milk drinks, sauces, and drinks and finding lower- or no-sugar options before the challenge was also recommended.

CONCLUSION

Eating fewer processed foods and choosing more real, whole, and plant-based foods make it easy to consume less sugar. These changes will also improve the overall quality of our diet, which is important for optimal health.

In a very real sense, we are being set up to desire and consume more and more sugar. Using a two-week challenge to reset our palates can help our patients—and us—more easily transition to a healthier diet with less sugar and alternative and artificial sweeteners. Physicians should consider recommending a sugar

and artificial sweetener challenge to all their patients to help them limit or avoid added sugars, especially those with obesity, diabetes, or cardiovascular disease. ❖

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Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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Banana Cream Pie (adapted with permission from *Living on Live Food* by Alissa Cohen)

Submitted by Ed Hernandez, Kaiser Permanente, Senior PC/LAN Analyst, Regional Offices, Pasadena, CA

Ingredients

Crust

- 1 cup raw almonds
- 1 cup dates (soaked)
- 1 cup shredded coconut

Filling

- 6 small ripe bananas
- 1 cup shredded coconut
- ½ peeled apple
- 1 teaspoon pure vanilla
- ½ teaspoon carob powder (you can also use unsweetened cocoa)

Instructions

1. Mix crust ingredients in a food processor and form into a pie plate.
2. Mash 2 bananas and place in a blender with the apple, 3/4 cup of coconut, and vanilla. Blend until smooth.
3. Remove and place in bowl, slice the remaining bananas, and mix into the filling.
4. Pour into pie crust and sprinkle with carob and the remaining coconut.

Watermelon and Berry Skewers

Submitted by Darin Kliem, Kaiser Permanente, Senior Consultant, QRM/Quality Operations, Regional Offices, Pasadena, CA

Ingredients

- 1 small bottle balsamic vinegar reduced over low heat until it has reduced to 25% of its original volume. Let cool.

Mint leaves

Assorted berries (blueberries, strawberries, and/or raspberries)

Watermelon cut into 1-inch cubes

Instructions

1. Skewer berries from smaller to larger, then skewer 1 mint leaf, and lastly the watermelon.
2. Drizzle a plate with the balsamic vinegar and place the skewered fruit over the balsamic vinegar.