## Sugart i few things we think you'd like to know about

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# the <br> ug <br> association 

Established in 1943, our members are U.S. sugar beet and cane growers, processors and refiners.


The Sugar Association is the scientific voice of the U.S. sugar industry. We make a difference by responsibly supporting scientific research and sharing our knowledge to enhance consumer understanding and confidence in the role that real sugar plays in a nutritious, balanced and enjoyable diet.

## OUR GOAL

Sugar is recognized as a positive part of a balanced diet and aids in the enjoyment of a wide range of foods.

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## For Today:

## 1. Sugar Basics

2. Consumption Trends
3. Sugar and Nutrition Policy
4. Sugar and Health
5. Resources

What is sugar?

Sugar molecule

## Sugar is Sucrose Sucrose is Sugar

```
Glucose ring
```

$\mathrm{C}_{12} \mathrm{O}_{11} \mathrm{H}_{22}$


Sutgar



Sutigare

## Where does

 sugar come from?
## Sugar Beet

Root crop
Flourish in cooler climates

Weigh 3-5 pounds when harvested

Much larger than the beets you find at the grocery store, in backyard gardens

[^0]

## Sugar in the U.S.

Sugar is grown and/or refined in 17 states in the U.S.


## Sugar is a minimally processed ingredient



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## MYTH

## White sugar is bleached.



## FACT

Sugar is naturally white. It is simply removed from the sugar beet or sugar cane plants and washed to remove the naturally present

The same pure sugar found in the plant is what ends up in your pantry. The sugar juice extracted from the plant is filtered to remove the non-sugar plant materials like soil and plant fibers and then crystallized. The crystals go through a few cycles of washing and spinning in a centrifuge to remove the naturally present brown molasses, resulting in white sugar.

## There are so many types of sugar

## *

A variety of types of sugar can be produced with slight adjustments in the process


Factors that determine sugar type:<br>Crystal size<br>Level of molasses



Different crystal sizes produce unique functional characteristics

Granulated sugar vs. powdered sugar
$\circlearrowleft$
Amount of molasses remaining on or added to the crystals alters the flavor and the moisture

Brown sugar vs. Turbinado


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MYTH
"Raw" sugar is healthier
than table sugar.

## FACT

All sugar is the same: one part fructose and one part glucose, a simple sugar that provides energy to your brain and other organs.


Your body handles sugar the same regardless of what color it comes in. Raw sugars, brown sugars and any white sugars are all processed the same in the body. Darker colors are due to varying but small amounts of molasses left on the sugar crystals. The nutrients that are contained in this amount of molasses are so small that they offer no real nutritional value.

Glucose, which makes up half of each sugar molecule, is a key fuel source for the body and essential to the function of the brain, muscle and other organs.


## Important definitions

## Total sugars

Includes the total of both naturally occurring sugars and added sugars in a product

## Added sugars

Includes caloric sweeteners that are:

- added to foods and beverages during preparation or processing, or are packaged as such
- Free mono- and disaccharides
- Sugars from syrups and honey
- Sugars from concentrated fruit or vegetable juice in excess of what would be expected from the same volume of 100\% fruit or vegetable juice of the same type.


## Sugars

Refers to a broad category of all mono- and disaccharides (the simplest carbohydrates). Sugar can be found naturally occurring, can be extracted from plants and dairy and added to foods; or they can be made using various plant or dairy ingredients as a starting point

## Sugar

Refers only to sucrose (a disaccharide) that is naturally made and found in all green plants. Sugar found in the food supply is harvested from sugar beets and sugar cane.

## Added Sugars Definition

Includes sugars that are either added during processing of foods, or are packaged as such, and includes:

| -syrups | -honey |
| :--- | :--- |
| -brown sugar | -molasses |
| -high fructose | -sucrose |
| corn syrup | -lactose |
| -invert sugar | -maltose sugar |
| -maltose | -concentrated |
| -trehalose | fruit juice* |

*Sugars from concentrated fruit or vegetable juices in excess of what would be expected from 100 percent fruit or vegetable juice.
Excludes fruit or vegetable juice concentrated from 100 percent fruit juice that is sold to consumers (e.g., frozen concentrated orange juice).

## Trends in added sugars consumption



USDA data show that added sugars intake decreased more than
30\% from 2000 to 2018.

## DECREASE IN DAILY ADDED SUGARS CONSUMPTION



## U.S. per capita caloric sweetener availability, 1970-2021



Notes: Corn sweeteners include high-fructose corn syrup, glucose syrup, and dextrose. Edible syrups include sorgo (sweet sorghum), maple and sugarcane syrup, edible molasses, and edible refiners syrup. Source: USDA, Economic Research Service, Food Availability (Per Capita) Data System data product.


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## Sugar ond

 the dietSưgare

## Sugar's role in a balanced diet



## 8 <br> Nutrient Delivery

Effective tool to promote the
consumption of
nutrient-dense food and
beverages
"A healthy dietary pattern limits added sugars to less than 10 percent of calories per day. Added sugars can help with preservation; contribute to functional attributes such as viscosity, texture, body, color, and browning capability, and/or help improve the palatability of some nutrient-dense foods. In fact, the nutrientdense choices included in the Healthy U.S.-Style Dietary Pattern are based on availability in the U.S. food supply and include 17-50 calories from added sugars, or 1.5-2 percent of total calories."

| Dairy Products | FLAVOR <br> ENHANCER/ <br> BALANCER, AROMA | BULK | TEXTURE/ MOUTHFEEL | SHELF-LIFE/ MICROBIAL STABILITY | FERMENTATION | $\begin{array}{\|c} \text { FREEZING } \\ \text { POINT } \\ \text { DEPRESSION } \end{array}$ | COLOR | moisture RETENTION |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Whole-Grain, Fiber-Rich Breads \& Cereals | ) | $\bigcirc$ | - |  | 0 |  | 0 | - |
| Breads | 0 | 0 | 0 | 3 | 0 |  | () | 0 |
| Bakery Products |  | ) |  |  |  |  | - | * |
| Salad Dressings, Rubs and Sauces | - | O | - | - |  |  |  |  |
| Preserves \& Pickling |  |  |  |  |  |  |  |  |
| Jams \& Jellies | ) | 0 | - | - |  |  | - |  |
| Canned Fruits \& Vegetables \% |  | - |  |  |  |  | - |  |
| Prepared Foods | - | 0 | - | - |  |  | 0 | - |
| Beverages 1 \% |  | - |  |  |  |  |  |  |
| Frazen Beverages 濐 | - | 0 | ) |  |  | D |  |  |
| Fermented Beverages $=0$ |  |  |  |  | O |  |  |  |
| Ice Cream | ) | 0 | ) |  |  | - |  |  |
| Confectionery |  | I | - | - |  |  | - | - |



# When sugar is removed, new ingredients need to take it's place. 

There is
no substitute
for sugar.

## MYTH

"Reduced sugar" always means reduced calories.

## FACT

When sugar is removed from a food, there are new ingredients that need to take its place.

Because of the many functional roles sugar can play in a product, reducing sugar in a food product often isn't as simple as just cutting the sugar in the recipe. For example, sugar may be added to a cereal to mask the bitter taste of fiber or added vitamins, increase bulk and lengthen the shelf life. Several ingredients will need to be added to replace all of those functions if you take the sugar out.

Nutrition Facts
About 13 servings per container Serving size 2 tbsp (32g)
Amount Per Serving
Galories 190

| Total Fat 16 g | $\mathbf{2 1} \%$ |
| :--- | ---: |
| Saturated Fat 3.5 g | $\mathbf{1 8} \%$ |
| Trans Fat 0 g |  |
| Cholesterol 0 mg | $\mathbf{0 \%}$ |
| Sodium 150 mg | $\mathbf{7 \%}$ |
| Total Carbohydrate 6 g | $\mathbf{2 \%}$ |
| Dietary Fiber 2g | $\mathbf{7 \%}$ |
| Total Sugars 3g |  |
| Includes 3g Added Sugars | $\mathbf{6 \%}$ |
| Protein 7g |  |
| Vitamin D 0 mog | $\mathbf{0 \%}$ |
| Calcium Omg | $\mathbf{0 \%}$ |
| Iron 0.4 mg | $\mathbf{2 \%}$ |
| Potassium 94 mg | $\mathbf{2 \%}$ |
| Vitamin A 0 mcg | $\mathbf{0 \%}$ |
| Vitamin C Omg | $\mathbf{0 \%}$ |
| Vitamin E 1.5 mg | $\mathbf{1 0 \%}$ |
| Niacin 3.2mg | $\mathbf{2 0 \%}$ |

Copper Omg
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## Original Peanut Butter



Despite the "1/3 Less Sugar" claim, Calories have increased by 20

## Nutrition Facts

About 13 servings per container Serving size 2 tbsp (32g)


## Sugar and Nutrition

 Policy
# Dietary Guidelines: History of Sugars Recommendations 

1980 Avoid too much sugar
1985 Avoid too much sugar
1990 Use sugars only in moderation
1995 Choose a diet moderate in sugars
2000 Choose beverages and foods to moderate your intake of sugars

2005 No specific sugars guideline
2010 Reduce intake of calories from added sugars
2015 Limit calories from added sugars to < 10\%
2020 Less than 10\% of calories from added sugars for
2yrs+ Avoid added sugars < 2yrs
*10\% of calories $=200$ calories or 50 grams or 12 tsp based on a 2000 calorie diet. Note: There are 15 calories in 1 teaspoon of sugar.


## I 992 Food Guide Pyramid <br> Food Guide Pyramid <br> A Guide to Daily Food Choices

| TABIE 2A. SAMPIE FOOD PAIIERN FOR A DAY AI 2,000 CALORIES |  |
| :--- | :---: |
| Bread Group Servings | 8 |
| Frult Group Servings | 2 |
| Vegetable Group Servings | 4 |
| Meat Group | 6 ounces |
| Milk Group Servings | $2-3^{*}$ |
| Total fat (grams)" | 65 |
| Total added sugars (teaspoons) ${ }^{*}$ | 10 |

*Women who are pregnart or breastreeding, teenagers, and young adults to age 24 need 3 servings

* Vaiues for tatal fat and added sugars include fat and added sugars that are in food choices from the five maja food groups as wel as fat and added sugars from foods in the Fats, Ois, and Sweets group.
" Note that the Nutrtion Facts panel on food labeis iists values for "Iotal sugars," not added sugars. Total sugars include both the sugars that occur naturally in fruts, vegetables, and milk and resined sugars that are added in processing. such as the sugar added to thut canned in heavy syrup. The Diedary Gurdelines suggest using added sugars in moderation because they contibute calones but few nutrient to diats.



## Dietary

## Recommendations

Added sugars intake can be presented in teaspoons (tsp), grams (g), calories (kcals) or \% of total calories. The 2015 Dietary Guidelines for Americans recommends daily intake of added sugars make up no more than $10 \%$ of total calories. In a 2,000 calorie diet, this translates to: 12 tsp, $50 \mathrm{~g}, 200 \mathrm{kcals}, 10 \%$ of total calories.


## Dietary Guidelines | Why 10\%?

Added sugars include syrups and other caloric sweeteners. When sugars are added to foods and beverages to sweeten them, they add calories without contributing essential nutrients.

Consumption of added sugars can make it difficult for individuals to meet their nutrient needs while staying within calorie limits.

The recommendation to limit added sugars to no more than 10 percent of calories is a target that applies to all calorie levels to help individuals move toward healthy eating patterns within calorie limits.

## The U.S. Food \& Drug Administration's Nutrition Facts Label

## Original Label

## New Label

| Mutrition Eacts |  |  |  |
| :---: | :---: | :---: | :---: |
| Serving Size 2/3 cup (55g) <br> Servings Per Container About 8 |  |  |  |
|  |  |  |  |
| Amount Per Serving |  |  |  |
| Calories 230 | Calories from Fat 72 |  |  |
| \% Daily Value* |  |  |  |
| Total Fat 8 g |  |  | 12\% |
| Saturated Fat 19 |  |  | 5\% |
| Trans Fat 0g |  |  |  |
| Cholesterol 0mg |  |  | 0\% |
| Sodium 160mg |  |  | 7\% |
| Total Carbohydrate 37 g |  |  | 12\% |
| Dietary Fiber 4g |  |  | 16\% |
| Sugars 1g |  |  |  |
| Protein 3g |  |  |  |
| Vitamin A |  |  | 10\% |
| Vitamin C |  |  | 8\% |
| Calcium |  |  | 20\% |
| Iron |  |  | 45\% |
| ${ }^{\text {x }}$ Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on |  |  |  |
| your calorie needs. | Calories: | 2,000 | 2,500 |
| Total Fat Sat Fat Cholesterol Sodium <br> Total Carbohydrate Dietary Fiber | Less than | 65 g | 80 g |
|  | Less than | 20 g | 25 g |
|  | Less than | 300 mg | 300 mg |
|  | Less than | $2,400 \mathrm{mg}$ 300 g | ${ }_{3}^{2,400 \mathrm{mg}}$ |
|  |  | 25 g | 30 g |


| Mutrithor Facts |  |
| :---: | :---: |
| 8 servings per container |  |
| Serving size 2/3 cup | 2/3 cup (55g) |
| Amount per serving Calories | 230 |
|  | \% Daily Value ${ }^{\text {* }}$ |
| Total Fat 8 g | 10\% |
| Saturated Fat 1 g | 5\% |
| Trans Fat 0g |  |
| Cholesterol 0mg | 0\% |
| Sodium 160 mg | 7\% |
| Total Carbohydrate 37 g | 37 g (3\% |
| Dietary Fiber 4 g | 14\% |
| Total Sugars 12g |  |
| Includes 10g Added Sugars | 20\% |
| Protein 3g |  |
| Vitamin D 2mcg | 10\% |
| Calcium 260 mg | 20\% |
| Iron 8 mg | 45\% |
| Potassium 235mg | 6\% |
| *The \% Daily Value (DV) tells you how much a nutrient in a serving of tood contributes to a daily diet. 2,000 calories a day is used for general nutrition advice. |  |

- Released May 20, 2016
- Implemented in 2020
- Based on the 2015

Dietary Guidelines

- Daily Value of $10 \%$ based on 50 g (adults) and 25 g (children $<4 \mathrm{yrs}$ )
- $<5 \%=$ "LOW"
- $>20 \%=$ "HIGH"
- Serving size for sugar was also increased from 1 tsp (4 grams) to 2 tsp (8 grams)


## 

## for FDA's added sugars declaration

We (FDA) are proposing mandatory declaration of added sugars on all foods because of:

- the variability in ingredients used,
- the need for consumers to have a consistent basis on which to compare products,
- the need for consumers to identify the presence or absence of added sugars, and
- when added sugars are present, the need for consumers to identify the amount of added sugars added to the food.

- The mandatory declaration of added sugars may also prompt product reformulation of foods high in added sugars like what was seen when trans fat labeling was mandated.



## Since 1974: U.S. Adult Obesity Has Tripled, Child Obesity Nearly

 Quadrupled;
1974-2020:

- Childhood obesity up $45 \%$; adult obesity up 37\%
Since 2000:
Caloric sweeteners down 16\%

Source: Caloric Sweetener (Sugar + High Fructose Corn Syrup) data -- Economic Research Service/ USDA, Tables 51 \& 52. Obesity Data -- Centers for Disease Control and Prevention/HHS.
Note: Official obesity data available only for years shown.

Exhibit 12: US Per Capita Consumption of Soft Drinks (Gallons)


## Effect of fructose-containing sugars on Metabolic Disease Risk Factors: 2021 Evidence Summary



## Substitution Trials - Energy Matched

Energy from sugars is substituted for other sources of energy in the habitual diet. (energy-matched conditions where total energy intakes remain the same)

No Effect on:

- Body weight
- Blood cholesterol (LDL-C. apolipoprotein B, non-HDL-C, HDL-C) ${ }^{2}$
- Triglycerides (fasting and postprandial) ${ }^{23}$
- Fasting blood glucose
- Insulin sensitivity (HOMA-IR) or fasting blood insulin ${ }^{4}$
- Systolic blood pressure ${ }^{5}$
- Uric acid ${ }^{6}$
- Markers of non-alcoholic fatty liver disease (liver fat, liver enzymes)


## DECREASE in:

Glycated blood proteins tike HbA1c (improved blood glucose control) ${ }^{4}$
Diastolic blood pressure mean arterial pressure ${ }^{5}$


Addition Trials - Excess Energy
Energy from sugars is added to the diet (the effect of excess energy where the intervention is providing calories in addition to the habitual diet)

NO EFFECT on:

- Blood cholesterol (LDL-C, non-HDL-C, HDL-C) ${ }^{2}$
- Blood glucose control (glycated blood proteins, like HbA1c) ${ }^{4}$
- Fasting blood insulin ${ }^{6}$
- Mean arterial pressure

INCREASE in:

- Body weight ${ }^{2}$

Fasting apolipoprotein B

- Triglycerides (fasting, postprandial) ${ }^{23}$
- Fasting blood glucose ${ }^{6}$
- Insulin sensitivity (HOMA-IR) ${ }^{4}$
- Uric acid ${ }^{6}$

Markers of non-alcoholic fatty liver disease (liver fat, liver enzymes)

## Key takeaways from all reviews:

I. Any adverse effect of fructose-containing sugars appears highly dependent on whether sugars are a source of excess energy.
2. When fructose-containing sugars are consumed in energy-matched conditions there are no harmful effects on key risk factors of major chronic diseases.

## Considerations

- Overall, there were over $\mathbf{5 0}$ trials providing data on over $\mathbf{1 , 0 0 0}$ participants, which included populations of various health status. No differences were found in effects between health status types. Follow-up duration of interventions ranged from 1-52 weeks. Some analyses are limited by small sample sizes, short follow-up, and low-quality of included trials. Analyses on markers of blood glucose control were all conducted in individuals with Type 1 and Type 2 diabetes.
- Substitution trials: The majority of studies tested fructose-containing sugars at doses between 22-213 grams/day
(equivalent to 5-53 tsp, 5-33\% Energy).
- Addition trials: The majority of studies tested fructose-containing sugars as excess energy (predominantly using sugars-sweetened beverages as the source) at high doses, between 153-210 grams/day (equivalent to 38-55 tsp, 24-44\% excess Energy), with some trials providing up to $\mathbf{3 0 0}$ grams/day (equivalent to $\mathbf{7 5}$ tsp, $\mathbf{5 5 \%}$ excess Energy).


## References:

1. Sievenpiper et al. Ann Intern Med 2012;156:291-304
2. 2. Chiavaroli et al. JAHA 2015;4:e001700
1. 3. Wang et al. Atherosclerosis 2014;232:125-133
1. 4. Cozma et al. Diabetes Care 2012;35:1611-20
[^1]
## New Systematic Review and Meta-Analysis

A 2023 systematic review and meta-analysis (SRMA) conducted by researchers from the University of Toronto reviewed evidence from controlled feeding trials on the effect of different food sources of fructose-containing sugars on body weight and other measures of adiposity.


1. Researchers concluded that "energy control and food sources mediate the effect of fructose-containing sugars on adiposity".
2.Findings differed depending on whether sugars-containing foods or beverages were consumed on top of the regular diet (i.e. providing excess energy) or whether sources of sugars were swapped for other foods with no change to energy intake (i.e. energy matched conditions).
3.Food source also mattered - excess energy from SSBs increased adiposity, whereas most other food sources had no effect, and some showed decreases, such as fruits.

## Bottom Line: <br> Sugar is a source of calories seen as easy to cut

"....placing the blame on sugar consumption lacks persuasive evidence and is misguided. Although calories from sugar have been shown to increase weight in a hypercaloric diet and decrease weight in a hypocaloric diet, when consumption is corrected for energy intake, sugar has no effect on body weight. ..... If there are any adverse effects of sugar, they are due entirely to the calories it provides, and it is therefore indistinguishable from any other caloric food. Excess total energy consumption seems far more likely to be the cause of obesity and diabetes."

## Sugar and Health: What the scientific evidence shows

A healthy lifestyle based on moderation, a variety of food choices and physical activity tends to lead to the best outcomes

Adverse outcomes from sugar intake are not found when sugar is consumed in moderation and as part of a diet where calories are not eaten in excess.

The majority of research suggesting an adverse effect of sugar has involved excessive caloric intake, couple with very high intakes of added sugars.

To simplify:
by practicing moderation and portion control, there is room to include an appropriate amount of sugar in a healthful diet

## CONSUMERS INCREASINGLY WANT TO KNOW HOW MUCH SUGAR THEY CAN HAVE IN A BALANCED DIET.

of consumers say it is important to know the $\mathbf{8 1 \%}$ guidelines for sugar intake (up from $75 \%$ in 2021)

## THE DIETARY GUIDELINES ALLOW FOR 12 TEASPOONS OR 50 GRAMS A DAY FROM ADDED SUGARS.



Yet 3 in 4 consumers think the limit is 40 grams per day or less

After learning the actual recommendation:
of consumers are more confident sugar can be
$\mathbf{7 1 \%}$ part of a balanced diet (up from $42 \%$ in 2021)

## Balance Campaign



See what balance looks like at
SUGAR.ORG



## Balance Landing Page and Infograph



## More to Come on the Balance Initiative



## Sound Bites Podcast for 1.25 CEUs




## Educational Materials



## Thank You!

## Visit sugar.org

Get Social with \#MoreToSugar


[^0]:    $-16 \%$ sucrose

[^1]:    5. Ha et al. Hypertension 2012;59:787-95

    6 .Wang et al. J Nutr 2012;142:916-23)
    7. Chiu et al. Eur J Clin Nutr. 2014;68:416-423

