

Sugar



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History of Consumption

640 AD cane and techniques for extracting sugar spread

13th and 14th C. sugar changes from remedy to luxury item

17th C. 4 pounds per person per year

12 C. Crusaders visiting Holy Lands brought sugar to England

1500's Spain began cultivating sugar in West Indies and Cuba.

Prior to 1900, Americans consumed approximately **15** grams/day of fructose, mainly through fruits and vegetables.

History of Consumption



Before World War II this amount increased to **24** grams/day

By 1977 fructose intake was **37** grams/day

By 1994 intake increased to **55** grams/day.

Currently (Vos et al. estimates) adolescents average **72.8** grams/day

American Sugar Consumption

(2010)

- Sugar currently constitutes around **19%** of our total daily calories.
- **One hundred and forty pounds.** That's how much added sugar each American consumes per **year** (according to the U.S. Department of Agriculture).



Imagine it:
31 five-pound
bags for each
of us.

How is refined sugar made?

Cane stalks crushed and pressed

Juice extracted

Heat and lime used to clarify juice

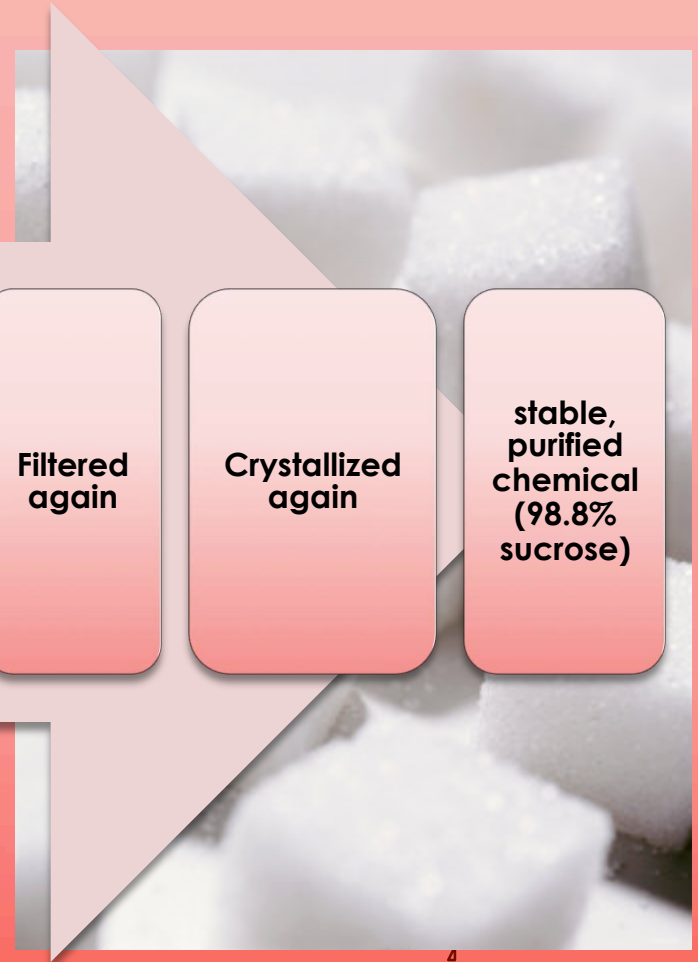
Centrifuged to spin off liquid

Crystallized and made colorless with carbon

Filtered again

Crystallized again

stable, purified chemical (98.8% sucrose)



High Fructose Corn Syrup

In the 1970s when sugar prices soared to \$.50/lb. (due to expiration of the U.S. Sugar Act) food producers began converting to HFCS which could be purchased at \$.05/lb.

HFCS is sweeter, cheaper and lasts longer than sucrose.

HFCS accounts for 83 pounds of the 149 pounds of sugar consumed per person per year.

In 2000 the average American consumed 53 gallons of soft drinks.

When we eat sugar



- Quickly dissolves into bloodstream
- Creates acidic environment; requires mineral leaching to achieve balance
- And what else?

60 MINUTES EPISODE (2012): Is Sugar Toxic?

<http://www.cbsnews.com/video/watch/?id=7403942n&tag=contentBody%3BstoryMediaBox>

According to recent research, current consumption rates are related to:

- Obesity
- Heart disease
- Type 2 diabetes
- Hypertension
- Cancer
- Dopamine response

Quality and Quantity

- There are less refined sweeteners that can be consumed.
- In general they are more flavorful.
- Replacing the same QUANTITY of sugar or HFCS with honey or sucanat will **not make you healthier**.



Alternative Sweeteners

Dry granulated products

- Date sugar
- Unrefined cane sugar
 - Sucanat
 - Rapadura
 - Florida Crystals
- Coconut Sugar
- Palm Sugar
- Stevia



Alternatives Sweeteners

Thick-Liquid or Syrups

- Honey
- Maple Syrup
- Malt syrups (Barley Malt, Brown Rice Syrup)
- Pureed bananas or dates
- Agave nectar
 - ❖ mainly composed of fructose (70-75%) and dextrose (20-26%).
- Concentrated Fruit Sweetener



Substitution

- **When replacing a granulated sweetener with a liquid sweetener** (i.e. replacing white sugar with maple syrup) reduce liquid content in the recipe by 1/4 cup. If no liquid is called for in the recipe, add 3-5 tablespoons of flour for each 3/4 cup of liquid concentrated sweetener.
- **When replacing a liquid sweetener with a granulated sweetener** (i.e. replacing honey with sucanat) increase the liquid content of the recipe by 1/4 cup or reduce the flour by 3-5 tablespoons. The dried or granulated natural sweeteners tend to absorb liquid. Check your dough or batter to see if it resembles the texture you are used to and consider adding an extra tablespoon of water or fat if it seems dry.

From *Feeding the Whole Family* by Cynthia Lair (Sasquatch Books, 2008)

Outcome with Alternative Sweeteners



Honey and maple syrup add moistness and softness



Malt syrups can create a hard or crunchy texture

Other sweeteners we eat

- Acesulfame
- Aspartame (aka Equal, NutraSweet)
- Crystalline Fructose
- Truvia
- Saccharin
- Sucralose (aka Splenda)
- Xylitol

What is Splenda?



- Synthetic compound discovered by scientists in Britain seeking a pesticide formulation.
- It is made by replacing hydroxyl groups in the sugar molecule with chlorine.
- No long term studies done. Short term (by manufacturers) showed shrunken thymus and enlarged kidney and liver in rodents.
- According to market research firm IRI Splenda sold \$212 million in 2006 in the U.S. while Equal sold \$48.7 million.^[6]

Recent Splenda Study

- Journal of Toxicology and Environmental Health, Part A Abou-Donia, Mohamed B., El-Masry, Eman M., Abdel-Rahman, Ali A., McLendon, Roger E. and Schiffman, Susan S. (2008) 'Splenda Alters Gut Microflora and Increases Intestinal P-Glycoprotein and Cytochrome P-450 in Male Rats', Journal of Toxicology and Environmental Health, Part A, 71:21, 1415 — 1429
- **Rats fed Splenda showed decrease in beneficial intestinal bacteria.** Disruption in the number and state of balance of intestinal microflora may potentially interfere with many essential gut functions, including nutrient metabolism, normal immune system functioning, gastrointestinal mobility, inhibition of pathogens (Cummings & Macfarlane, 1997; Holzapfel et al., 1998; Hart et al., 2002), vitamin synthesis (B group and K) (Albert et al., 1980; Hill, 1997; Shearer, 1995), and metabolism of drugs (Bauer, 1998; Peppercorn & Goldman, 1972; Williams et al., 1971).
- **They also showed increased body weight.** This is in agreement with the recent findings that composition of intestinal bacteria plays a major role in body weight regulation (Bäckhed et al., 2004; Ley et al., 2006; Turnbaugh et al., 2006).

Artificial Sweeteners



Whether the sweet taste cause cravings is still being debated.

- "A Role for Sweet Taste: Calorie Predictive Relations in Energy Regulation by Rats."
Susan E. Swithers and Terry L. Davidson.
Behavioral Neuroscience, Vol. 122, No. 1, February 2008.
- <http://www.hsph.harvard.edu/nutritionsource/healthy-drinks/sugary-vs-diet-drinks/>

But are these ingredients conducive to health?

- COKE ZERO: Carbonated water, colour (caramel E150d), phosphoric acid, sweeteners (aspartame, acesulfame-K), flavourings (including caffeine), acidity regulator (E331). Contains a source of phenylalanine.
- DIET PEPSI: Carbonated water, caramel color, phosphoric acid, potassium benzoate (preserves freshness), aspartame, potassium citrate, caffeine, sodium saccharin, natural flavor, acesulfame potassium, citric acid, calcium disodium edta (to protect Flavor) phenylketonurics: contains phenylalanine.

But I Love it.



Curb Your Enthusiasm

- **Dr. Robert Lustig** (a pediatric endocrinologist at the University of California, San Francisco (UCSF) where he is a Professor of Clinical Pediatrics) **recommends sugar consumption be limited to**
 - ❖ 150 calories/day (men)
 - ❖ 100 calories/day (women)
- **Eat fruit**
- **Make your own desserts that include protein, fiber and fat**
- **Be sure you get enough exercise and sleep**