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Xylitol vs. Aspartame

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Dentist-Friendly Sweetener

Xylitol

vs.

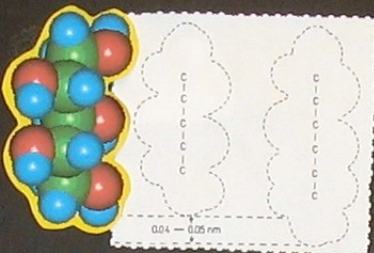
Aspartame

Xylitol is a natural carbohydrate and is classified as a polyhydric alcohol or sugar alcohol. All 5 carbon atoms bind to a hydroxide group; thus, the molecule has no reducing groups. It is as sweet as sugar, with only two-thirds the calories. Xylitol is a normal intermediate of human metabolism and the human body produces about 5g to 15 g daily.

Water soluble

- Does not caramelize at high temperatures
- "Cooling" sensation - dissolving is endothermic
- White crystalline appearance
- Stable in storage
- Molar mass: 152.15 g/mol
- Density: 1.52 g/cm³
- Melting point: 92-95 °C
- Boiling point: 238 °C

xylitol



C₆ vs. C₅

- The Xylitol molecule is a C₅ which is shorter than the C₆ sugars (sucrose, glucose, fructose...)
- Enzymes that bacteria use for C₆ sugars cannot lack with the C₅ molecule.
- Not only can bacteria not use Xylitol for energy, but also the bacteria need to use energy to get rid of the Xylitol they absorb. So Xylitol can indirectly kill bacteria just by weakening them.



Calcium hydroxyapatite dissolves at pH < 5.7

Normal pH of mouth is 6.2-7.4.

C₆: Effect on pH

When oral bacteria consume C₆ sugars, they produce acid, and the pH in the mouth drops rapidly below pH 5.7. This is the critical value for dissolving calcium hydroxyapatite, the building block of teeth. This results in demineralization of teeth enamel and potential cavities.

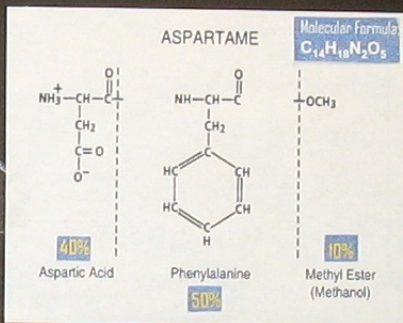
C₅: Effect on pH

Xylitol is a five-carbon sugar alcohol. oral bacteria do not metabolize it - no acid is produced, and the pH of the mouth stays in the normal range of pH 6.2 to 7.4.

Aspartame: Artificial Sweetener

(AminoSweet, NutraSweet, Spoonful, Equal)

- Aspartame was accidentally discovered by Dr. Schlatter in 1965
- He was recrystallizing aspartame from ethanol, got some aspartame on his fingers, and licked his fingers in order to pick up a piece of paper
- 200 times sweeter than sugar!
- Used in 6,000 products (over half of them beverages)



Aspartic acid: brain cell killer

- Nerve cells absorb calcium to fire (start sending a signal)
- Aspartic acid is excitatory - causes nerve cells to absorb more calcium than normal, by keeping the calcium receptor open
- Excess calcium causes the nerve cell to keep firing (can lead to seizures)
- Calcium overload in nerve cells triggers apoptosis (cell death leads to microscopic holes in the brain)

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Color scanning electron micrograph of a strand of microtubules (SEM) (Source: SciencephotoLibrary.com)

DANGER
FORMALDEHYDE
 IRRITANT & POTENTIAL
 CANCER HAZARD
 AUTHORIZED PERSONNEL ONLY



Formaldehyde (H₂CO): Carcinogen

- In foods, methanol occurs with ethanol, and the methanol is converted to acetaldehyde
- Methanol in Aspartame is converted to formaldehyde
- Formaldehyde is a cumulative carcinogen - the longer you are exposed to it, the more cancer
- Cancer rate increases with the length of the rat study - highest in the third year

Aspartame approval: corruption, not chemistry

- Aspartame was approved in 1974 by FDA
- Aspartic Acid in Aspartame caused microscopic holes in the brain of rats after each feeding and seizures in monkeys.
- FDA put a hold on Aspartame approval
- In 1980, President Reagan was elected
- Donald Rumsfeld, head of Starke, became Secretary of Defense
- Defense contractor became head of FDA
- He overruled the scientists and renewed the hold on Aspartame, then he resigned and took a high-paying job at Starke.

No Xylitol for Dogs



- In dogs Xylitol is absorbed very rapidly, causing 5 times more insulin release compared to glucose.
- Dose of 100 mg/kg causes hypoglycemia (in 30 to 60 minutes)
- Dose of 500 mg/kg causes liver failure (in 9 to 72 hours).
- A typical stick of chewing gum sweetened with Xylitol contains about 2000 mg of Xylitol.
- One piece of chewing gum is dangerous for a 3 kg (6.6lb) dog.

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