Sweeteners
Timely Topic

Diet Soda and Dementia (April 2017)


Low Calorie Sweetener Intakes In Adults and Children (March 2017)

Outline

• Types
• Safety/Adverse Effects
• Effect on:
  • Weight
  • Appetite/Hunger
  • Energy Intake
  • Metabolic Responses
Terminology

- Artificial Sweeteners = Food additives
- Generally Recognized as Safe (GRAS) vs food additive
- Acceptable Daily Intake (ADI)
- Sugar Alcohols
## Types

<table>
<thead>
<tr>
<th>Artificial</th>
<th>Sugar Alcohol</th>
<th>Novel</th>
<th>Natural/Nutritive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acesulfame-K (sunett, sweet one)</td>
<td>Erythritol</td>
<td>Stevia extracts (Pure Via, Truvia)</td>
<td>Agave Nectar</td>
</tr>
<tr>
<td>Aspartame (Equal, NutraSweet)</td>
<td>Hydrogenated starch hydrolysate</td>
<td>Tagatose (Naturlose)</td>
<td>Date Sugar</td>
</tr>
<tr>
<td>Neotame</td>
<td>Isomalt</td>
<td>Trehalose</td>
<td>Fruit Juice Concentrate</td>
</tr>
<tr>
<td>Saccharin (SugarTwin, Sweet &quot;n Low)</td>
<td>Lactitol</td>
<td></td>
<td>High Fructose Corn Syrup</td>
</tr>
<tr>
<td>Sucralose (Splenda)</td>
<td>Maltitol</td>
<td></td>
<td>Honey</td>
</tr>
<tr>
<td></td>
<td>Mannitol</td>
<td></td>
<td>Maple Syrup</td>
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<tr>
<td></td>
<td>Sorbitol</td>
<td></td>
<td>Molasses</td>
</tr>
<tr>
<td></td>
<td>Xylitol</td>
<td></td>
<td>Sugar</td>
</tr>
</tbody>
</table>
High Fructose Corn Syrup

- **Bottom Line** - Little evidence that it’s different than sucrose (Grade 1):
  - Blood sugar
  - After meal triglycerides / fat
  - Leptin
  - Ghrelin
  - Hunger
  - Energy intake subsequent meals
  - Weight gain
Safety / Adverse Effects

- Acceptable Daily Intake (ADI) Table from FDA [here](#)

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**Evaluating Safety: Data to Determine Risk**

- In Vitro Data
- Related Substances Data
- Animal Data
- Human Data

**Types of Data Used in Comprehensive safety or risk assessment**

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Safety / Adverse Effects (cont)

- **1970s:**
  - studies in rats, saccharin and link to bladder cancer

- **1996:**
  - Suggestion that increase of brain tumors 1975-1992 associated w/ introduction of aspartame; analysis showed that the tumors arose 8 years **BEFORE** aspartame approved

- **2000:**
  - saccharine delisted from US National Toxicology Program’s *Report on Carcinogens*

- **2005:**
  - Lab study w/ rats and increased lymphomas and leukemias by high dose aspartame (8-2083 cans diet soda/d); inconsistencies

- **2006**
  - NCI examined human data from the NIH-AARP Diet and Health Study of over half a million retirees. Increasing consumption of aspartame-containing beverages was not associated with the development of lymphoma, leukemia, or brain cancer
Safety / Adverse Effects (cont)

- **Bottom Line / Current** - NOT associated w/ adverse effects in general population
  - Effects studied include brain cancer, neurological changes
  - EXCEPTION: aspartame in folks w/ rare hereditary disease PKU
  - Aspartame (grade I)
    - Refer to Explanation
  - Neotame, (grade V - to date, no studies from human subject research in peer-reviewed literature were identified to evaluate adverse effects of neotame consumption in the general population)
  - Saccharine (grade III)
Effect on Weight

- **Bottom Line – Likely associated w/ greater wt loss**
  - Aspartame (grade I)
  - Neotame, no studies (grade V)
  - Saccharin (grade III)
  - Sucralose (grade III)
Effect on Weight (cont)

• Studies challenging the evidence

• the concern: we may “unknowingly” or “subconsciously” replace the missed Calories from the artificially sweetened food with real Calories (e.g. from cake or cookies)
Effect on Appetite

• **Bottom Line** - No affect on appetite
  • Aspartame, grade I
  • Neotame, grade V (no studies)
  • Saccharine & Sucrulose, grade III
Effect on Energy Intake

• Nonnutritive Sweeteners: Current Use and Health Perspectives A Scientific Statement From the American Heart Association and the American Diabetes Association
  • See table 2 “potential mechanisms of effects on compensatory appetite and food intake”
  • Conclusion of the research for these mechanisms
Effect on Metabolic Response

• **Bottom Line** – no significant difference
  • Specifically to stevia (grade II):
    • Blood glucose
    • Blood insulin
    • Blood Pressure
Additional References/Resources

- Mayoclinic
- Academy of Nutrition and Dietetics; Evidence Analysis Library (EAL)
- Cancer.gov
- International Food and Information Council (IFIC)
  - [http://www.foodinsight.org/Content/6/gestationaldiabetes.pdf](http://www.foodinsight.org/Content/6/gestationaldiabetes.pdf)
- 2015 Dietary Guidelines

- For more information about artificial sweeteners, contact the FDA at:
  10903 New Hampshire Avenue
  Silver Spring, MD 20993
  1–888–INFO–FDA (1–888–463–6332)
  [http://www.fda.gov/](http://www.fda.gov/)