FDA/NSTA Web Seminar:
Teach Science Concepts and Inquiry with Food: Focus on Salt

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Topics Covered

• Salt “defined”
  – What is salt? Where is it found? How is it made?

• Brief discussion of salt’s history

• Salt and Health

• FDA activities related to salt
Salt “defined”:

What is salt?
Where is it found?
How is it made?
Salt: Definitions

• What is salt?

1. Use the “hand-raise” button to volunteer to answer this question.
Salt Definition

• NaCl (table salt)
  – Ionic combination of the cation (Na+) and anion (Cl-).

-or-

• Chemical definition: Any combination of an acid and base resulting in formation of an ionic compound (examples KCl, KBr, NaSO4, etc.)
Salt

- Salt exists in nature as a cubic crystal (halite).

Images from: U.S. Naval Research Laboratory, US Geologic Survey
Salt in Nature

- Salt is found naturally in seawater (around 3%)
- In mineral deposits (halite)
- In natural bodies of water (lakes, streams)
Salt Production

• Salt can be mined from underground deposits, either by rock salt mining or vacuum evaporation.

• It can be evaporated from seawater (sea salt, fleur de sel) or other bodies of water.

• Varying particle size depending on use.

• Additives (potassium iodide, anti-caking agents)
Let’s Pause for Two Questions from the Audience
The History of Salt and Salt and Health
History of Salt

• Used in foods throughout and before history.

• Politically and economically important in human history.

• Scarce in most areas until recently and important as a traded commodity – also used as currency.

History of Salt

Question: Which word we use today was derived in part from forms of the word “salt” in other languages?

A. Salad
B. Soldier
C. Salary
D. Salacious
E. All of the above
Salt and Health

- Sodium is necessary for life
  - Important for osmoregulation – maintaining “water balance”
  - Nerve transduction and other biological functions.

- Human body contains about 250 grams of salt (3 or 4 full salt shakers)
Salt and Blood Pressure

• Blood pressure rises with salt intake in most people. Blood pressure is strongly associated with heart disease and stroke.

• The body tends to keep salt in the body, likely because it is necessary for life and was often scarce in the prehistoric diet.

• Excess salt in the diet causes water retention and excess fluid can be a cause of the rise in blood pressure.
Intracellular (27L)  
Extracellular (13L) (including blood/plasma)  

Phos  
K+  
Protein  

Na+  
Cl-  

Urine  
Hormones  

Intracellular Extracellular
(including blood/plasma)

Salt sensitivity

- Blood pressure response to salt in the diet isn’t uniformly consistent.
- Certain populations seem to be more sensitive to salt.
- Who are usually more sensitive?

<table>
<thead>
<tr>
<th>African Americans</th>
<th>Middle-aged or older adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those who already have hypertension</td>
<td>All three answers are correct</td>
</tr>
</tbody>
</table>
Recommendations for sodium intake

• Current Dietary Guidelines (2005)
  – Consume no more than 2,300 milligrams of sodium per day.
  – African Americans, hypertensives, middle-aged consume no more than 1,500 milligrams
How much sodium are Americans consuming

- Sodium intake data:
  NHANES consumption data (3,400 mg/d, 1999-2000)

- Sodium excretion studies: 4,000 mg/d (Zhou et al., 2003 INTERMAP)
Sources of Dietary Sodium

(62 adults who completed 7 day dietary records)

What functions does salt serve in food?

- Preservative (reduces water activity and thus spoilage microorganisms)
- “Processing Aid” in breadmaking, cheesemaking, other fermented foods.
- Taste – the primary reason. We have an innate preference for salty foods.
Which food contains more salt?

<table>
<thead>
<tr>
<th>A. Cereal “toasted O”-shaped (1 cup)</th>
<th>B. Potato chips (1 small bag)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Peanut Butter (2 tbsp)</td>
<td>D. Ranch Salad Dressing (2 tbsp)</td>
</tr>
</tbody>
</table>
Salt content of common foods

A. Cereal “O”s w/no milk (1 cup) – 190 mg
B. Potato chips (1 small bag) – 95 mg
C. Peanut Butter (2 tbsp) – 150 mg
D. Ranch salad dressing (2 tbsp) – 325 mg

Other foods: Canned soups: 480 – 1000 mg
Frozen dinners: 1000-2000 mg
Cheese: 200 mg/ounce

Source: My cupboard and USDA nutrient database:
http://www.nal.usda.gov/fnic/foodcomp/search
Let’s Pause for Two Questions from the Audience
FDA Activities Related to Salt
FDA Activities Related to Salt

- Salt is considered to be “Generally Recognized as Safe” or “GRAS” without express limits on use.

- FDA primarily activities regarding salt/sodium has been primarily labeling-based.

- Sodium declaration is required on packaged foods as part of the “Nutrition Facts Panel”
Nutrition Facts

- Sodium will be declared on the Nutrition Facts Panel
- Other sodium labeling:
  - “Healthy” (requires less sodium)
  - Definitions for “low”, “reduced”, “no”, sodium label claims.
Food Labeling

• For more information about how to read food labels, see our “Labelman” webpage.

• www.cfsan.fda.gov/labelman.html
Citizen Petition and Public Hearing

- Revoke GRAS status for added salt and require manufacturers to reduce salt in processed foods
- Require labeling on packages of salt larger than $\frac{1}{2}$ ounce
- Reduce the Daily Value (DV) on nutrition labels from 2,400 mg/d to 1,500 mg/d
Public Hearing

• FDA held a public hearing November 29, 2007, to discuss regulatory policies for salt and sodium and to discuss proposals in the citizen petition.

• FDA is reviewing comments received and will ultimately respond to the original citizen petition.
Let’s Pause for Two Questions from the Audience
Thanks to our presenter, Richard Bonnette, and to the FDA
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