

I Eat Nails for Breakfast

Purpose:

Show that prepared breakfast cereals which are fortified with iron contain elemental iron.

Equipment and Materials:

Special K cereal or Total cereal (cereal should contain 100% RDA of iron)

bowl

Pencils

Strong magnet

Sandwich bags

Tape

Water

Lots of white paper towels

Safety:

Goggles are necessary to ensure eye safety.

Overview:

Iron is an important element in human nutrition. It is said that iron deficiency is the most common form of malnutrition in the United States. The adult body contains a total of about 5 g of iron, 80% of which is in the hemoglobin, and requires a daily intake of approximately 18 mg per day to maintain this level. Several foods, such as breakfast cereals, are “fortified” with powdered (reduced) elemental iron as a food supplement.

The theory is that iron reacts with stomach acid to yield the iron(II) ion (Fe^{2+}) which is absorbed by the digestive tract. There is some question about how completely the iron reacts with the stomach acid. One study shows that cooking acidic foods as spaghetti sauce and apple butter in cast iron pots and pans multiplies their iron content factor of 30 to 100.

Procedures:

1. Measure one cup of the cereal and place in sandwich bag.
2. Crush the cereal and pour into a bowl.
3. Add one cup of water and stir to make slurry. Add more water if necessary.
4. Tape a magnet to the eraser end of a pencil, and seal it inside a plastic bag.
5. Stir the cereal mixture with the magnet.
6. After ten minutes, examine the metal filings attracted to the magnet. Do this activity by wiping the magnet on a white paper towel.
7. Stir for another five minutes and examine again.

8. Complete report sheet and make picture of completed lab.

References

“I Eat Nails for Breakfast.” Chem-Pacs. Flinn Scientific. ISBN 1-978-877991-94-3.

“Iron for Breakfast.” Fun With Chemistry, vol. 1. pp. 49-52.

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Report Sheet

Name _____

You may need some help with the internet to answer these questions.

1. Is the iron in cereal already part of a compound like iron chloride, or is this iron the same kind of elemental iron that is used to make hammers and nails?
2. If it is elemental iron in the cereal, why do we not see it or at least feel it when we bite into the cereal?
3. Can our cereal rust if it's left out long enough?
4. Will the iron travel through the intestinal tract as coins and nails do? Explain.