

Understanding Acrylamide

Acrylamide may not be a familiar name to many, but it does play a large role in our lives which we may not be aware of. According to the World Health Organization, acrylamide is “a chemical that is used to make polyacrylamide materials” (n.d. b). It is a “white crystalline, odorless solid” (NIOSH, 2005).

The main use of acrylamide is in treating water, both drinking and waste. When used in the water treatment process it enables employees to easily remove unwanted material from the water. After this process is completed some of the acrylamide still remains (EPA, 2006). Other uses include thickeners, permanent-press fabrics, paper making, textile coating, adhesives, dyes, contact lenses and even the construction of dams and tunnels. Appliances and automotive parts are coated with acrylamides (NPI, n.d.).

Acrylamide appears to have a fairly high demand. It is used in many different fields for many different purposes. The demand most likely derives from an increase in the margin productivity, most likely of labor, due to its use. For example, it is used during water treatment to ease the removal of unwanted material. The use of acrylamide enables employees to accomplish larger tasks with the same amount of time and effort. Increasing productivity is always a plus in the eyes of a business since it allows for more employees to be hired and for a higher rate of output.

Although the benefits are clear, the drawbacks may be a bit more uncertain. During the water treatment process acrylamide does its job and does it well. But when the job is finished and the acrylamide is removed, some stays behind. So, what kind of threat does this remaining chemical compound pose? The truth is that it poses a considerable threat to consumers and employees alike.

According to the National Institute for Occupational Safety and Health, Acrylamide has been linked with several different symptoms, including irritated eyes and skin, numb limbs, drowsiness and weakness (NIOSH, 2005). It is said, by the U.S. Environmental Protection Agency, to damage the nervous system and cause cancer (2006). Focus has also been placed on those who smoke (WHO, n.d. b). Apparently, acrylamide is another risk added on top of the others linked to cigarette smoke.

As water or other substances containing acrylamide is emptied into lakes, streams, or other areas, it “does not bind to soil and [moves] into soil rapidly” (EPA, 2006). This means that the chemical compound, which is known to hold a risk to people and animals, is transported into soil, thus posing as an even greater risk. If any harmful substance is able to move into soil it has the potential to move into plant life, local water systems and animals. Acrylamide is “highly mobile in aqueous environments,” meaning that the chemical compound can travel through water, ice and fog (NPI, n.d.).

According to the U.S. Environmental Protection Agency, a regulation ensuring that water suppliers keep acrylamide at low risk levels became effective in 1992. Furthermore the agency states that if “the treatment technique for acrylamide fails, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health” (2006).

If the U.S. Environmental Protection Agency is correct with their statistics, Michigan is responsible for releasing the most of the chemical compound into water and soil between 1987 and 1993. Connecticut holds third place for such doings. Since there are so many factors including but not limited to acrylamide that could possibly be in a

drinking water supply, most people would benefit from spending a brief moment researching their drinking water and what effects to their health it may have.

Recently, the threat of acrylamide has been extended as there are developing studies focused on food. According to the World Health Organization, the Swedish National Food Authority reported “the presence of elevated levels of acrylamide in certain types of food processed at high temperatures. Since then, acrylamide has been found in a range of cooked and heat-processed foods in other countries, including The Netherlands, Norway, Switzerland, the United Kingdom and the United States” (n.d. b). The World Health Organization explains that “the levels appear to increase with the duration of heating” and that “the highest levels found so far were in starchy foods” (n.d. b). According to the Harvard School of Public Health, “acrylamide appears to form as a result of a reaction between specific amino acids and sugars found in foods when heated to high temperatures” (2005b).

One research study conducted at Harvard revealed that women who eat larger quantities of potato chips are more likely than those who do not to develop breast cancer (Hawkes, 2005). This study was linked with the effects of acrylamide. To counteract these results women are encouraged to eat healthier diets consisting of more fruits and vegetables. Then, to confuse matters further, Harvard published two press releases stating that additional research showed no link between foods containing acrylamide and breast cancer in women, or cancer at all.

As with most research based on population data, research involving acrylamide determines trends seen in people, animals and plant life when coming in contact with the chemical compound. It is extremely difficult to determine if these trends are actually

caused by the chemical compound, or if it is another unseen factor. Such research has an accuracy paradox; although the accuracy may be high, it may not be valid at all. Only time and continuing research can tell.

There are many plans of action regarding this topic. One such plan is the U.S. Food and Drug Administration's Action Plan for Acrylamide in Food. This plan is intended to develop suitable screening methods to identify the chemical compound, determine how and why acrylamide is formed within food and how to reduce its formation and inform the public about the risk.

Another such plan is the FRI Acrylamide Program. This program reveals further relationships between darker-cooked potato chips with acrylamide. The program discusses several correlations as well as many statistics. Suggestions are made about certain mitigation methods to be used to reduce levels of acrylamide.

The overall risk associated with acrylamide is questionable, yet undeniably worth attention. There are heavy links, although sometimes said to be non-existent, formed between the chemical compound and cancer, as well as other symptoms. Acrylamide is a public health concern and will remain a concern until either a firm solution is found reducing the risk or a plan of action has the same affect. This outcome would be ideal, but not probable. It is a risk that the government, producers and consumers must analyze and manage.

| | |
|---|---|
| Back to Betty C. Jung's Web site | http://www.bettyjung.net/ |
| Back to Fact Sheet Directory | http://www.bettyjung.net/Pch202fs.htm |

Bibliography

- Australia's National Pollutant Inventory (NPI). (n.d.) *Acrylamide Fact Sheet*. Retrieved November 5, 2006, from <http://www.npi.gov.au/database/substance-info/profiles/5.html>
- Harvard School of Public Health (HSPH). (2005, March) Harvard School of Public Health: Press Release [Electronic version]. *Study Shows Acrylamide in Baked and Fried Foods Does Not Increase Risk of Breast Cancer in Women*. Retrieved November 5, 2006, from <http://www.hsph.harvard.edu/press/releases/press03152005.html>
- Harvard School of Public Health (HSPH). (2005, March) Harvard School of Public Health: Press Release [Electronic version]. *Study Shows Acrylamide in Baked and Fried Foods Does Not Increase Risk of Certain Cancers in Humans*. Retrieved November 5, 2006, from <http://www.hsph.harvard.edu/press/releases/press01282003.html>
- Hawkes, Nigel. (2005, August) The Times [Electronic version]. *Girls Who Eat Chips More Likely to Get Breast Cancer*. Retrieved November 5, 2006, from <http://www.timesonline.co.uk/article/0,,8122-1740864,00.html>
- National Institute for Occupational Safety and Health (NIOSH). (2005, September) *NIOSH Pocket Guide to Chemical Hazards (2005-151)*. Retrieved November 5, 2006, from <http://www.cdc.gov/niosh/npg/npgd0012.html>
- Pariza, Michael W. (2004, May) *Mitigation Option: The FRI Acrylamide Program*. Retrieved November 5, 2006, from University of Wisconsin-Madison website, http://www.jifsan.umd.edu/presentations/acry2004/acry_2004_pariza.pdf
- U.S. Environmental Protection Agency (EPA). (2006, February) *Consumer Factsheet on: ACRYLAMIDE*. Retrieved November 5, 2006, from http://www.epa.gov/safewater/contaminants/dw_contamfs/acrylami.html
- U.S. Food and Drug Administration (FDA). (2004, March) *FDA Action Plan for Acrylamide in Food*. Retrieved November 5, 2006, from <http://www.cfsan.fda.gov/~dms/acrypla3.html>
- World Health Organization (WHO). (n.d.) *Acrylamide*. Retrieved November 5, 2006, from <http://www.who.int/foodsafety/chem/chemicals/acrylamide/en/>
- World Health Organization (WHO). (n.d.) *Frequently Asked Questions – Acrylamide in Food*. Retrieved November 5, 2006, from http://www.who.int/foodsafety/publications/chem/acrylamide_faqs/en/