

## Other Hazardous Chemicals in Plastic

Previously, we discussed the health hazards of the synthetic compound BPA in Polycarbonate Plastics. This article I will take a broader view and a step further and will discuss other hazardous chemicals that may be found in plastics and the risks they pose due to continuous exposure. There are a few kinds of plastics that are manufactured with chemical compounds that when leached or released into the food or liquid held inside the container, can cause harmful effects on human health. The quantities leached might be small, but they can build over time and the hazards that they cause are too risky to ignore. In other words, harmful chemical exposure is cumulative and long-standing.

### Plastics to Avoid

The three plastics that you should definitely avoid using, if at all possible, are:

**Polycarbonates** – leaches Bisphenol A.

**Polystyrene** – leaches Styrene.

**Polyvinyl Chloride (PVC)** – breaks down into vinyl chloride and can leach dangerous phthalates.

All these plastics are known to emit toxic chemicals if heated or pressurized because the plastics are not specially engineered to withstand these extreme conditions. Most plastics will melt and break down when exposed to heat, unless they are designed for those conditions in mind. While at room temperature and ordinary atmospheric pressure, they might not be as dangerous, but even a slight rise in temperature can cause the leaching to increase exponentially.

### Hazardous Chemicals

**Bisphenol A (BPA)** – as discussed and explained in previous articles, BPA can be dangerous to humans in many ways. It is used in the manufacture of polycarbonate plastic and is used widely for a huge number of purposes. The chemical can imitate a human hormone, estrogen, and can

cause endocrine disruption, by attaching to its receptors. BPA can cause a number of diseases and problems including cancer, genetic disorders, infertility and neurological problems.

**Styrene** – styrene is released from the plastic polystyrene when that plastic starts to break down. The common consumer items made out of polystyrene are disposable plates, cups and bowls, Styrofoam food trays, egg cartons and plastic (opaque white) cutlery. Short-term exposure to styrene can result in mucous membrane and eye irritation, gastrointestinal effects and in the long term, it can have negative effects on the central nervous system, cause neuropathy, leukemia and lymphoma.<sup>1</sup> It has also been classified as a possible carcinogen. That's why it's important not to heat up in your microwave the left over Chinese food in that came in the polystyrene container. Always try to use ceramic cooking containers in the microwave as much as you can.

**Vinyl Chloride** – vinyl chloride is one of the essential components of the manufacture of polyvinyl chloride (PVC). Vinyl chloride can be released from PVC upon melting and is the first known human carcinogen to date. Apart from being a carcinogen, the negative effects of the chemical include severe impacts on central nervous system, eyes and respiratory tract irritation, liver damage, peripheral neuropathy, Testicular damage and decreased male fertility.<sup>2</sup> Humans are at risk from vinyl chloride through oral intake and inhalation, which would occur if PVC pipes were to burn in a fire. PVC is used for common pipes and tubes, and covering for electrical wiring, but interestingly it was also used for thin plastic food wrap because it was so clingy. In 2004 food plastic wrap was changed to LDPE (low density polyethylene). If you've noticed that your plastic food wrap is not as clingy as it once was – that's because it's made from a different plastic now. LDPE is not as effective as PVC in clinging to containers or protecting food because LDPE does not possess the same barrier protection against oxygen as PVC does. But LDPE is much safer when heated than PVC.

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<sup>1</sup> Styrene. Technology Transfer Network - Air Toxics Web Site. <http://www.epa.gov/ttnatw01/hlthef/styrene.html>. Accessed 24 October 2013.

<sup>2</sup> Vinyl Chloride. Transfer Network – Air Toxics Web Site. <http://www.epa.gov/ttnatw01/hlthef/vinylchl.html>. Accessed 24 October 2013.

**Phthalates** – phthalates are most commonly found in PVC along with vinyl chloride. The word phthalates refer to *ortho-phthalates* NOT PET (**Polyethylene terephthalate**). I will review the different types of phthalates in later articles as not all phthalates react in the human body.

As the plastic ages, is heated, chipped or cracked and breaks down, phthalates are released at a faster rate. The chemical is known to cause asthma, decrease the number of sperms, damaged sperms, and high chances of behavioral problems, premature birth and reduced male fertility.<sup>3</sup> The phthalates can also cause early puberty in girls and later result in breast cancer. We will discuss the types of Phthalates and their effects in further detail in the next article.

**Dioxin** – dioxin is another chemical released by PVC. This chemical is among the worst and the most persistent organic pollutants. Dioxins stay in the environment and the human body once entered for a long period time due to their inability to break down easily and 7-year half-life. Dioxin is one of the known carcinogens and can act as an endocrine disruptor. It's very dangerous.

Plastics are around us everywhere and their usage is difficult to control in a safe manner, but plastics can be used safely in many consumer plastics. Therefore, it is necessary to find alternatives for these plastics and prevent life-threatening diseases.

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<sup>3</sup> Avoid Potential Health Risks Associated with Phthalates. Healthy Child. <http://healthychild.org/easy-steps/avoid-phthalates-find-phthalate-free-products-instead%E2%80%A8%E2%80%A8/>. Accessed 24 October 2013.