

The Dangers Of Polystyrene



Many people are not aware of the harmful effects of Polystyrene, (including myself until very recently). This article aims to highlight some of the dangers, both to our health and to the environment.

Polystyrene is one of those materials that's everywhere around us. Polystyrene is an inexpensive and hard plastic and probably only polyethylene is more common in your everyday life.

Did you know that the outside housing of your computer is probably made of polystyrene, as well as the housings of things like hairdryers, TVs and kitchen appliances? Model cars and airplanes are made from polystyrene, as well as many other toys. There's also foam packaging and insulation, and a lot of the molded parts on the inside of your car, like the radio knobs.

Polystyrene is also used to make drinking cups and food containers – the hard plastic ones and also the soft foamy ones. A popular brand of polystyrene foam is called Styrofoam™.

It takes at least 500 years to decompose

When polystyrene is sent to the landfill, it is quickly covered and this process deprives it of water and oxygen, which would normally help it to break down.

Much of the disposable packaging that we eat from today will therefore still be around in 500 years. If the first settlers in Barbados in 1625 had been able to eat from polystyrene and the containers had been put into a landfill, the same containers would still be around today, (luckily they couldn't – it was only invented in 1839).

By volume, the amount of space used up in landfills by all plastics is between 25 and 30 percent [1]. This could be a lot higher in Barbados.

What happens when we add hot food or drinks to Polystyrene?

Polystyrene contains the toxic substances Styrene and Benzene, suspected carcinogens and neurotoxins that are hazardous to humans. Hot foods and liquids actually start a partial breakdown of the Styrofoam, causing some toxins to be absorbed into our bloodstream and tissue.

Polystyrene food containers leach the toxin Styrene when they come into contact with warm food or drink, alcohol, oils and acidic foods causing human contamination and pose a health risk to people. Avoid drinking tea with lemon, coffee with dairy cream, fruit juices, alcoholic beverages and wine from Styrofoam cups. Red wine will instantly dissolve the Styrene monomer. Do not eat oily foods from Styrofoam containers.

Most interesting is the degradation of food that contains vitamin A (beta-carotene). In packaged foods with the addition of heat (such as microwave temperatures), vitamin A will decompose and produce m-xylene, toluene, and 2,6-dimethylnaphthalene. Toluene will aggressively dissolve polystyrene. This renders polystyrene as an unsuitable package for containing or micro waving products that contain vitamin A.

Do not microwave food in Polystyrene containers

The Canadian Food Inspection Agency is quite direct about micro waving in plastics: "Remove food from plastic wrap, freezer cartons, and/or Styrofoam trays before defrosting and cooking. They are not heat stable and could leak hazardous compounds from the container or plastic wrap to the food." Food Inspection Agency website.

Over 100 US and Canadian, as well as some European and Asian cities, have banned polystyrene food packaging as a result of the negative impacts to humans and the environment.

If containers you use for the storage of food are not labeled "Microwave-safe", then they are probably not.

Effect on Global Warming:

A 1986 EPA report on solid waste named the polystyrene manufacturing process as the fifth largest creator of hazardous waste in the United States. In the product manufacturing process as well as the use and disposal of the products, energy consumption, greenhouse gas effect, and total environmental effect, polystyrene's environmental impacts were second highest, behind aluminium, according to the California Integrated Waste Management Board.

Polystyrene products are made with petroleum, a non-sustainable and heavily polluting resource.

Extruded polystyrene is usually made with hydro chlorofluorocarbons blowing agents which have effects on ozone depletion and on global warming. Their ozone depletion potential is greatly reduced relative to chlorofluorocarbons which were formerly used, but it still has 1000 times greater effect on global warming than carbon dioxide.

Do not burn polystyrene with your garden rubbish

Burning polystyrene on bonfires releases Carbon Monoxide and styrene monomers into the environment, which can be extremely hazardous to our health.

Marine Pollution:

The United Nations Environment Program estimated in 2006 that every square mile of ocean hosts 46,000 pieces of floating plastic.

Polystyrene foam presents unique management issues because of its lightweight nature, floatability, and likelihood to be blown from disposal sites even when disposed of properly. The lightweight and buoyant polystyrene travels easily through gutters and storm drains, eventually reaching the ocean. Plastic from urban runoff is the largest source of marine debris worldwide. Pollution of waterways and waterfront negatively affects tourism and quality of life. When polystyrene travels down waterways and storm drains into the ocean, it breaks down into smaller, non-biodegradable pieces that are ingested by marine life and other wildlife thus harming or killing them. In one Californian study, at least 162 marine species including most seabirds were reported to have eaten plastics and other marine litter.

As a result of the impacts on marine pollution and adverse effect to marine wildlife, several coastal cities across the United States, have banned the use of polystyrene food packaging altogether.



Public Contamination

Because polystyrene products are so common, many people assume they are safe, and that a government agency, such as the Food and Drug Administration (FDA), would not allow a health-threatening product to be marketed to the public. But the EPA National Human Adipose Tissue Survey for 1986 identified styrene residues in 100% of all samples of human fat tissue taken in 1982 in the US. Styrene is used to make polystyrene plastic and is a contaminant in all polystyrene foam packages. But the migration of styrene is nothing new. It was first documented in 1972 and then again in 1976.

A 1988 survey, published by the Foundation for Advancements in Science and Education also found styrene in human fatty tissue with a frequency of 100% at levels from 8 to 350 nanograms/gram (ng/g). The 350 ng/g level is one third of levels known to cause neurotoxic symptoms. It determined that Styrofoam drinking cups leach Styrofoam into the liquids they contain. The cups apparently lose weight during the time they are at use.

Health Effects

The fact that styrene can adversely affect humans in a number of ways raises serious public health and safety questions regarding its build-up in human tissue. Although there is evidence that styrene causes cancer in animals, it has not yet been proven to cause cancer in humans. Styrene primarily exhibits its toxicity to humans as a neurotoxin by attacking the central and peripheral nervous systems. The accumulation of these highly lipid-soluble (fat-soluble) materials in the lipid-rich tissues of the brain, spinal cord, and peripheral nerves is correlated with acute or chronic functional impairment of the nervous system.

Can polystyrene be recycled?

Whilst the technology does exist in some countries to recycle polystyrene, the market for recycling it is small and shrinking. Polystyrene can be made into items such as packing fillers and cafeteria trays, but not into cups or food containers. Containers that have previously been used for food storage create a massive food hygiene issue for recyclers. For this reason, and due to the shrinking market for the recycled products, many recyclers do not accept polystyrene.

What can we do

1. Be aware of the harmful effects of using polystyrene products and tell others.
2. Use reusable or compostable cups at work instead of foam cups. When shopping for groceries, select items that are unwrapped, or wrapped in non-polystyrene materials: (e.g. vegetables, eggs, meat).
3. Ask local takeaway restaurants and food suppliers to use a more environmentally friendly form of food packaging other than Styrofoam. Many alternatives are now available made from materials such as post-consumer recycled paper and corn-plastics or sugar cane fiber.