Notes on how to decide what waste to address first in protecting your community

Plastic Bags Versus Styrofoam – Which is worse?

What are the wastes made of?

Both plastic bags and Styrofoam are considered a type of "plastic" – but they are different chemically.

Light **plastic bags** ("snowbirds") are made of: polyethylene "Low Denstiy Polyethylene, or LDPE for short). Polyethylene is made from oil.

Styrofoam containers are made of: polystyrene ("Expanded Polystyrene or EPS). Polystyrene is also made from oil. Some cups or other containers contain additional plastic.

What is the effect on health and environment?

The effect on health and environment depends on **how** they are discarded, and how **much** is discarded of each one.

How are they discarded - Landfilling and covering

Both types are not harmful if they stay in the landfill and are not eaten by animals and not burned. So they are fine if they are buried. Or if one kind does not blow away (if it is not seen much outside landfill)-- then it might be heavy enough to not blow away, or discarded in a way that it does not blow away.

Landfill and blowing away

But if either blows away from landfill they might be eaten. Bears that eat at garbage dumps eat the plastic that has food with it. If the bag or cup does not have food in it, it might depend on if it looks like food or smells like food. People could report if they see any animals or fish with plastic or styrofoam in their stomachs.

Plastic in the water: Plastic bags might have a worse effect on some marine mammals if they are swallowed whole or otherwise. Bags might also choke waterways and small channels more. Plastic bags make up most of the plastic trash in the ocean – but it might be because they blow around more or it might be because more is thrown out or another reason. But both kinds of plastic can accumulate in fish and animal's stomachs so that they can starve. It might depend on the animal and the plastic piece size and the way the plastic is eaten.

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"Plastic in water (http://en.wikipedia.org/wiki/Plastic_shopping_bag) "Aquatic life can be threatened through entanglement, suffocation, and ingestion. [4] One animal dissected by Dutch researchers contained 1,603 pieces of plastic. All sea creatures are threatened by floating plastic, from whales down to zooplankton. Research proves the "Great Pacific Garbage Patch" in the North Pacific Gyre contains six times as much plastic as it does plankton. [5]

Sea turtles mistake clear plastic bags for jellyfish. The reason that turtles ingest marine debris is not known with certainty. It has been suggested that debris, such as plastic bags, look similar to, and are mistaken for jellyfish. [6] Birds swoop down and swallow indigestible shards of plastic. The petroleum-based plastics take decades to break down, and as long as they float on the ocean's surface, they can appear as feeding grounds. "These animals die because the plastic eventually fills their stomachs," Ocean Conservancy vice president Warner Chabot said. "It doesn't pass, and they literally starve to death." [7] A study of the seafloor using trawl nets in the North-Western Mediterranean around the coasts of Spain, France and Italy in 1993/4 reported a particularly high mean concentration of debris (1935 items/km2 or 19.35 items/hectare) (Galgani et al. 1995). 77% of the debris was plastics and of this, 92.8% were plastic bags. [8]"

How are they discarded? Burning…

Burning plastic bags: Burning polyethylene emits fumes that include compounds such as methane, ethane, aldehydes, ketones and acrolein, plus additional compounds.

Burning styrofoam containers emits styrene, benzene, benzaldehyde, formaldehyde, plus various poly-aromatic hydrocarbons.

Breathing smoke from either one is bad. There is not a comparison between which is worse. Burning styrofoam is probably worse from the chemicals emitted, but it depends on a lot of things. The exact amount and type of chemicals that burning each one depends on what wastes they are burned with and how hot the fire is.

For burning – which is worst depends some on how much is burned by weight. See the next section.

How much is discarded?

Compare the total weight shipped in to the community of styrofoam and plastic bags by going to the school and stores and looking at the weight of the boxes they come with. Or estimate the total weight by:

Styrofoam:

- Styrofoam containers (dinner size) 0.03 lbs each
- Styrofoam cups (8 oz) 0.0039 lbs each
- Styrofoam peanuts (fitting in a gal. bucket) 0.14 lbs each
- Styrofoam blocks (bread loaf size) 0.2 lbs each

Plastic bags: 0.013 lbs each

If the weight of one type is a lot more than another, then that is the waste type to look at reducing first.

The Bottom Line:

For communities that have open burning or open dumps there is not enough research to show which plastic is worse. Weight by weight, styrofoam might be worse for burning and breathing. Plastic bags don't usually make up a large portion of the weight of plastics in garbage. But they are more noticeable. There is some concern that containers used with hot drinks and foods might release a small amount of their chemical. If the container makes the food taste different, then there is something from the container getting into the food. Both are okay if they are not burned and not eaten. Bags might be worse for animals to eat - they might look like food in the ocean, or they might be more likely to blow long distances and end up in a place where animals and fish and birds eat them. A study in 2002 in two tundra villages showed plastic bags surrounding the dump killed tundra because they blocked out the sun. They are often a bigger litter problem for communities than containers.

"Global" Effects: Both of these plastics use up non-renewable resources in manufacturing them and can create toxic fumes in the communities that make them. They both create greenhouse gases when making them as well. Greenhouse gases can contribute to climate change.