

The Myth of Biodegradation



Myth: Waste simply biodegrades in the landfill.

Reality: Nothing biodegrades in a landfill because nothing is *supposed* to.

Biodegradation 101

Organic matter “biodegrades” when it is broken down by other living organisms (such as enzymes and microbes) into its basic components, and in turn, these molecules are recycled by nature into the building blocks for new life.

This process can occur **aerobically** (with the aid of oxygen) or **anaerobically** (without oxygen). Substances break down much faster under aerobic conditions because oxygen helps break the molecules apart.

Landfills excavations have uncovered some startling facts:

Newspapers are still readable after almost 40 years; ten-year-old carrots are brown on the outside but bright orange on the inside; and 20-year-old steaks still have meat on the bones.

Modern landfills are designed to entomb municipal garbage safely and securely. Most landfills are *anaerobic* because they are compacted so tightly that air cannot get in. Because of this, any biodegradation that does take place does so very, very, very slowly. Trash entering landfills essentially retains its original weight, volume and form for the entire active life of the landfill.

**Why aren't materials – even raw organic debris – rapidly biodegrading in landfills?
The answer is simple: Many people believe that landfills are just big, carefully controlled compost piles. They are not!**

Micro-organisms in a compost heap are *aerobic* and they biodegrade organic matter quickly and efficiently outside. In compost piles, the garbage is chopped, kept moist, oxygenated, and stirred.

The *anaerobic* microorganisms in a landfill just don't receive the proper balance of moisture, nutrients, and temperature to biodegrade organic matter. No one chops garbage in a landfill or stirs it, and no one adds fluids or oxygen- it is stable.

The dry and oxygen-poor conditions found in modern landfills cause organic matter to mummify rather than decompose. The result is very little biodegradation in a landfill.

But what about methane from landfills?

Landfills are the third-largest source of human-related methane emissions in the United States, accounting for approximately 17% of these emissions in 2009. Methane is a potent greenhouse gas.

Uncontrolled biodegradation in a landfill can cause methane gas emissions, ground water pollution, and unstable sub-soil conditions. As a result, modern landfills are kept dry and air-tight to try to prevent biodegradation. Really old organic materials in landfills are slowly releasing methane today as they *anaerobically* degrade, but since we have started managing landfills more responsibly, we are learning that the legacy of poorly managed landfills is not sustainable. Even more importantly, we can capture the methane emissions from landfills and use them as a significant energy resource.

This is why we encourage everyone to divert as much organic waste from landfills today.

Questions? Learn more at www.ecoproducts.com/greenology

The Myth of Biodegradation



All the plastic that has ever been created is still around today

Most plastics are stable in the landfill. The industrial processing they went through prior to their useful days converted them into forms unrecognizable to many microbes and enzymes. Petroleum biodegrades easily and quickly in its *original form* of crude oil. But when petroleum is processed into plastic, it is no longer biodegradable, and will remain in the landfill indefinitely.

Bioplastics like PLA are also stable in the landfill, even though they are made from renewable resources like corn. Once PLA has been created, it is strong and rigid - and is designed to break down aerobically in a compost pile. So PLA will remain stable in a landfill and as far as we know, it does not contribute to landfill methane.

Composting

Composting, on the other hand, is the process of **controlled biodegradation outside a landfill** in an aerobic, outdoor compost site.

By carefully controlling compost inputs such as organics materials, wood chips, yard waste, food scraps, foodservice items, etc., and controlling the moisture content and oxygen levels at the site, composters transform biodegradable materials into useful compost. Compost can be used in farming, landscaping, gardening and soil conservation and is one the simplest and most effective ways to return carbon and structure to soils.

Today, despite national progress on yard waste composting, more than 60 million tons of biodegradable materials (food scraps, wet & soiled paper, leaves and grass) are still being sent to landfills where they will sit in an airless, dry environment to be mummified.

Biodegradable ≠ Compostable ≠ Recyclable

“Biodegradable” simply means that a product will break down into carbon dioxide, water and biomass within a reasonable amount of time in the natural environment. The term ‘biodegradable’ has no legal enforcement or definition. Biodegradable items are not intended to breakdown in landfills, and based on the evidence, they typically do not. They remain entombed and stable in a landfill for a significantly long time.

“Compostable” products are biodegradable, but with an added benefit: when they break down in a compost pile, they release valuable nutrients into the soil, aiding the growth of trees and plants. These products degrade within several months in an industrial composting facility and produce no toxic residues.

Just because a material can biodegrade doesn't mean that it will biodegrade. We can still find legible newspapers from decades ago in landfills— and this is probably a good thing. If those newspapers had biodegraded in a landfill, it would have happened anaerobically (without oxygen), meaning the biodegradation process would have produced methane, a potent greenhouse gas. If instead the newspaper biodegraded in a well-managed composting operation with plenty of oxygen, the biodegradation would likely be carbon neutral. Many products are able to biodegrade, but it's the environment that determines whether they actually will biodegrade and if they will produce unwanted impacts.

Reduce, Reuse, Recycle is Best Solution for Landfills

Getting people to sort their trash accordingly is the new challenge. Plastics need to stay out of the compost and organic matter (and recyclables) need to stay out of the landfills. With landfills around the world reaching capacity, it's time to think about where things go when we throw them “away”.

Questions? Learn more at www.ecoproducts.com/greenology