



**The Truth about
Biodegradables**
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Introduction

- We accessed the criteria in choosing highly used plastic products: biodegradability and recyclability.
- **Are biodegradables the solution?**

Factors:

- Where they are used?
- How do the different types vary?
- What is the method of waste disposal?
- Is this method available?

“Biodegradable” versus “Biobased”

- Not all “biobased” material made from renewable feedstock can be made into biodegradable material
- Some products are “biologically based” but not biodegradable.
- Biologically based may combine both petroleum and natural based material.
- A sure way to check material standards is to see if it was tested by ASTM testing standards



The Biodegradable Product Institute



- The Biodegradable Products Institute (BPI) is an association of government and industrial officials who are promoting the use of biodegradables.
- BPI is a database of information and material that meet ASTM standards.
- Adoption of ASTM based standards and labeling program



COMPOSTABLE

Biodegradable | US COMPOSTING
Products Institute | COUNCIL

American Society for Testing Material(ASTM)



- ASTM is an international voluntary standards development organization
- A trusted source for technical standards for material, products, systems and services
- ASTM standards for compostable material:
 - Established whether plastics made from biodegradable material will compost
 - Criteria for plastics and products made from plastics to be labeled compostable.

Degradable



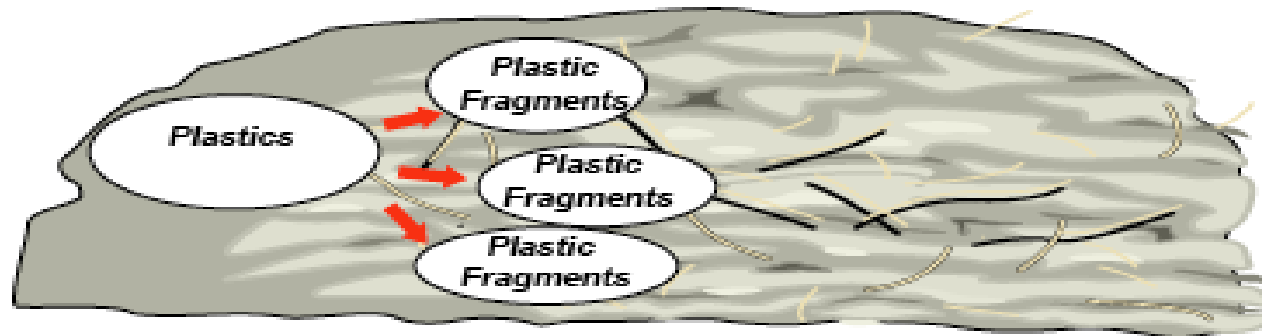
- A plastic that is oil based will break down into smaller fragments of original material.
- Can result in the loss of some properties
- May undergo significant change in its chemical structure under specific environmental conditions
- **There are no requirements that these plastic have to degrade from natural processes**
- A residue is always left behind from degradable plastics.

Biodegradable step1: Fragmentation

Step 1: Fragmentation

- Typically 2 step process
 - **Degradation/Fragmentation:** Heat, moisture, oxygen, sunlight and/or enzymes shorten & weaken polymer chains, resulting in fragmentation

Degradation/Fragmentation →



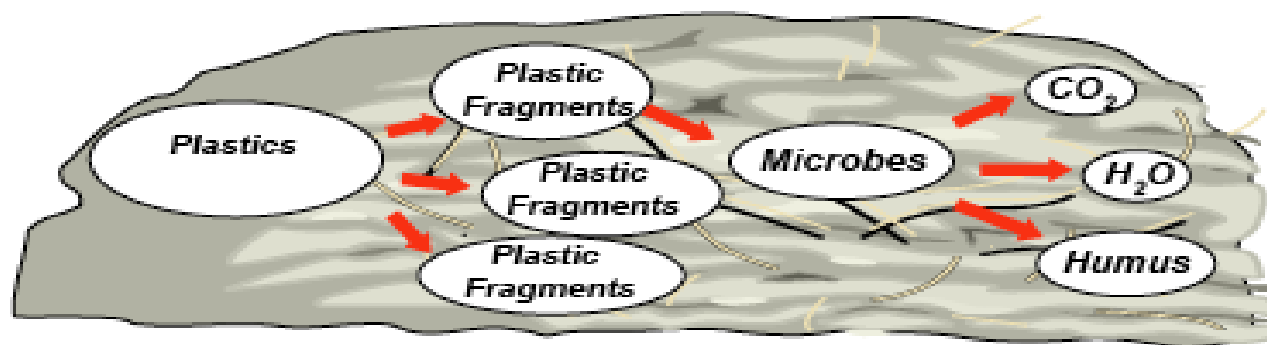
Biodegradable

Step 2: Biodegradation

Step 2: Biodegradation

- Typically 2 step process
 - **Degradation/Fragmentation:** Heat, moisture, oxygen, sunlight and/or enzymes shorten & weaken polymer chains, resulting in fragmentation
 - **Biodegradation:** Fragments consumed by microorganisms as a food & energy source and converted to carbon dioxide at an acceptable RATE.

Biodegradation →



Compostables

Criteria:

- 1) Disintegration, the ability to fragment into non-distinguishable pieces after screening
- 2) Biodegradation, conversion of carbon to carbon dioxide to the level of 60%, over a period of 180 days
- 3) Safety, that there is no evidence of any eco-toxicity in finished compost and soils and it can support plant growth;

Criteria continued..

- 4.) The process should take no more than twelve weeks at 50° Centigrade.
- 5.) Toxicity, that heavy metal concentrations are less than 50% recommended values.



Disposal of Biodegradable and compostable Plastics: Landfills

- Plastics biodegrade when broken down by living organisms.
- The process occurs best in aerobic environments.
- Most landfills are anaerobic.
- The anaerobic microorganisms that thrive in landfills can release methane.



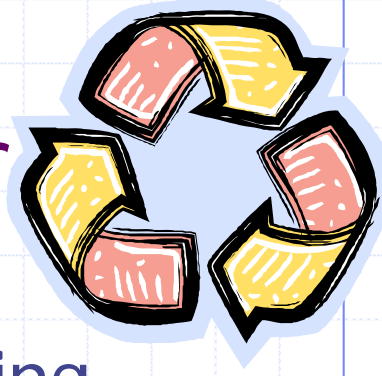
Conventional versus Biodegradables in Landfills



- In the production of plastic materials there are plasticizer and stabilizers, all of which are left behind as residue.
- Biodegradables degrade faster than conventional plastics therefore they affect the environment faster.
- Biodegradables don't have the option of being recycled like conventional plastics.



Important facts to consider



- Biodegradables in conventional recycling streams can hinder results.
- Biodegradables are not a way to reduce amount of liter.
- Biodegradables that dissolve in water create more BOD(biological oxygen demand) spoiling aquatic ecosystems.

What about Biodegradable bags?

There are three main types:

1. Original biodegradable bags are made from resin containing starches, polyethylene and heavy metals
2. Combination of starches and biodegradable polymers such as PLA.
3. EPI's plastic alternatives that use TDPA to speed up the biodegradation process.



Compostable Bags are designed to disintegrate and biodegrade quickly and safely, when composted in a professionally managed composting facility.

Are these bags really environmentally conscientious?



According to Australia Department of Environment and Water Resources there are five important points to consider,

1. Breakdown of starch based plastic results in oxygen depletion
2. Average biodegradable bag takes 18 months to breakdown outside of commercial composting facility.
3. Comparable amount of energy are used for the production and transportation of biodegradable and regular plastic bag.

Are these bags really environmentally conscientious?

4. Mixing biodegradable bags in conventional plastic recycling streams can create sorting issues and render entire batches of recyclable plastics useless.
5. Water, soil, and crop contamination can occur from chemical residues left behind from incomplete biodegradation.



TDPA Plastic Bag Alternative

- EPI's TDPA plastic products do not meet ASTM standards
- EPI claims
 - Product less expensive
 - Biodegrades faster
 - Does not leave toxic residue in composting
- Under ASTM it does not meet Biodegradation, conversion of carbon to carbon dioxide to the level of 60%, over a period of 180 days .
- It is believed that these bags do not always disintegrate completely during composting, meaning residue is often left behind.

Alternatives for single use bags

1. Canvas or other reusable bags

2. Moving bags to front of line at Grab-n- Go locations.

3. Nickel fee program

- Students charged a nickel for using a plastic bag
- Nickels go to Dining Services to fund education and infrastructure programs.

3. Nickel back Program

- Similar to Wild Oats program
- Unique way to support local nonprofits
- Encourages students to recycling and reuse

The “Nickel Back” Program: The way it works

- Bring your own bag or choose not to use a bag at Grab-n-Go locations: Rewarded with wooden nickel.
- Students can choose to deposit nickel in one of several banks
- Each bank represents a different local non-profit organization.
- Three banks will be available for three different causes

Program has shown to be successful at Wild Oats!

