



BASF Biodegradables

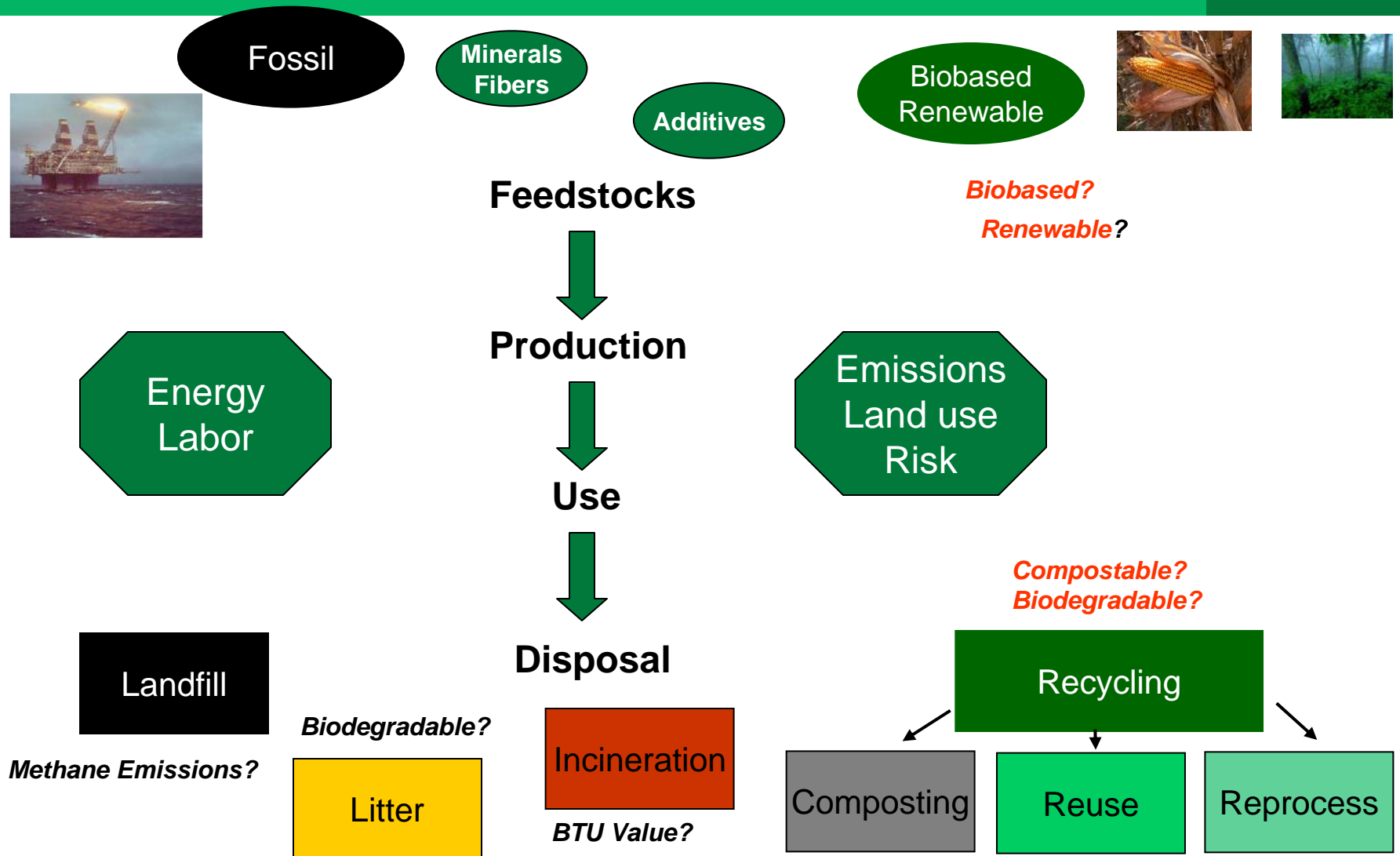
“Bioplastics 101”

Goals of this Presentation

1. *Define terms for proper use*
Biobased, Renewable, Biodegradable, Compostable
2. *Explain the value of Bioplastics*
Why use them?
3. *Inform about BASF Biodegradable Plastics*
What products and applications?
4. *Educate on how Biodegradable Plastics can be used to*
Enable Renewable Materials and Organics Recycling

The Product Lifecycle

How do Bioplastics fit?

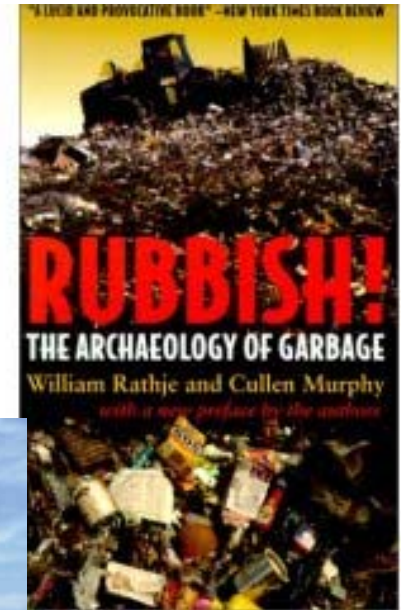


What about the modern Landfill?



Research on Landfills

- W. Rathje, “Garbologist
- Excavated 15 landfills, throughout NA
- Findings
 - 40 % of space comprised of organics
 - 15-40 year old newspapers
 - 5 year old lettuce
 - 15 year old hot dogs



What do we throw away?

Figure 5. Total MSW Generation (by Material), 2006
251 Million Tons (Before Recycling)

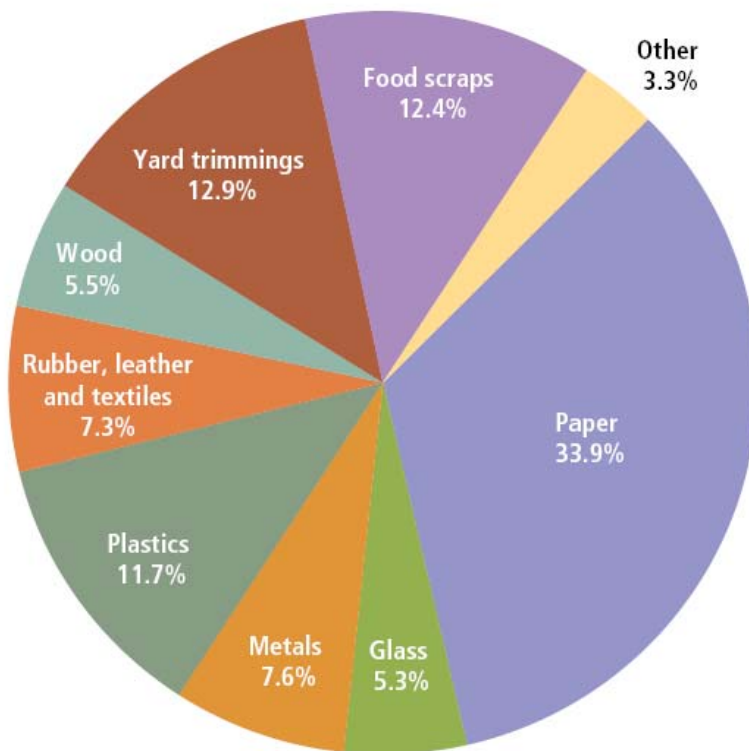
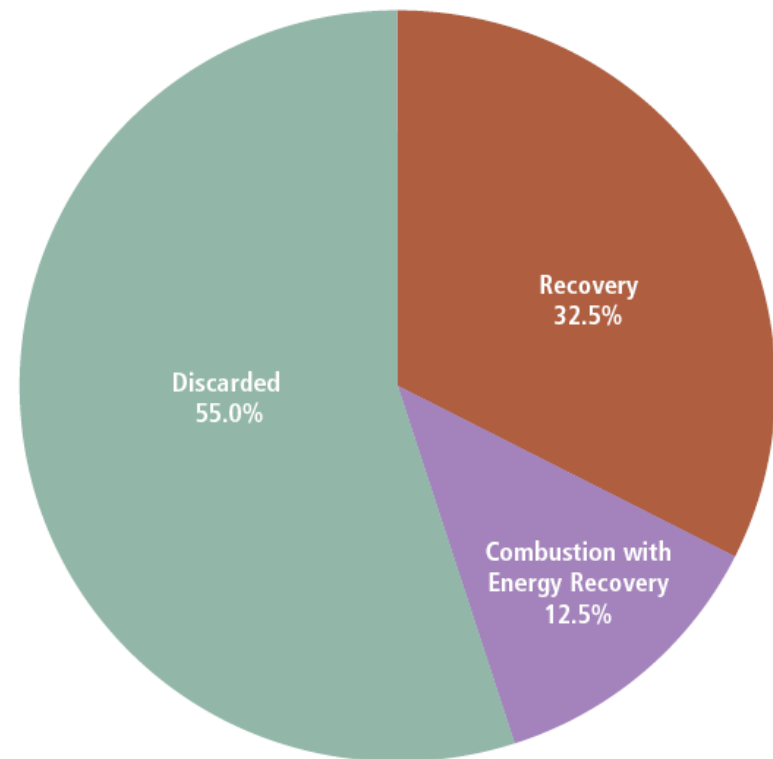


Figure 4. Management of MSW in the United States, 2006

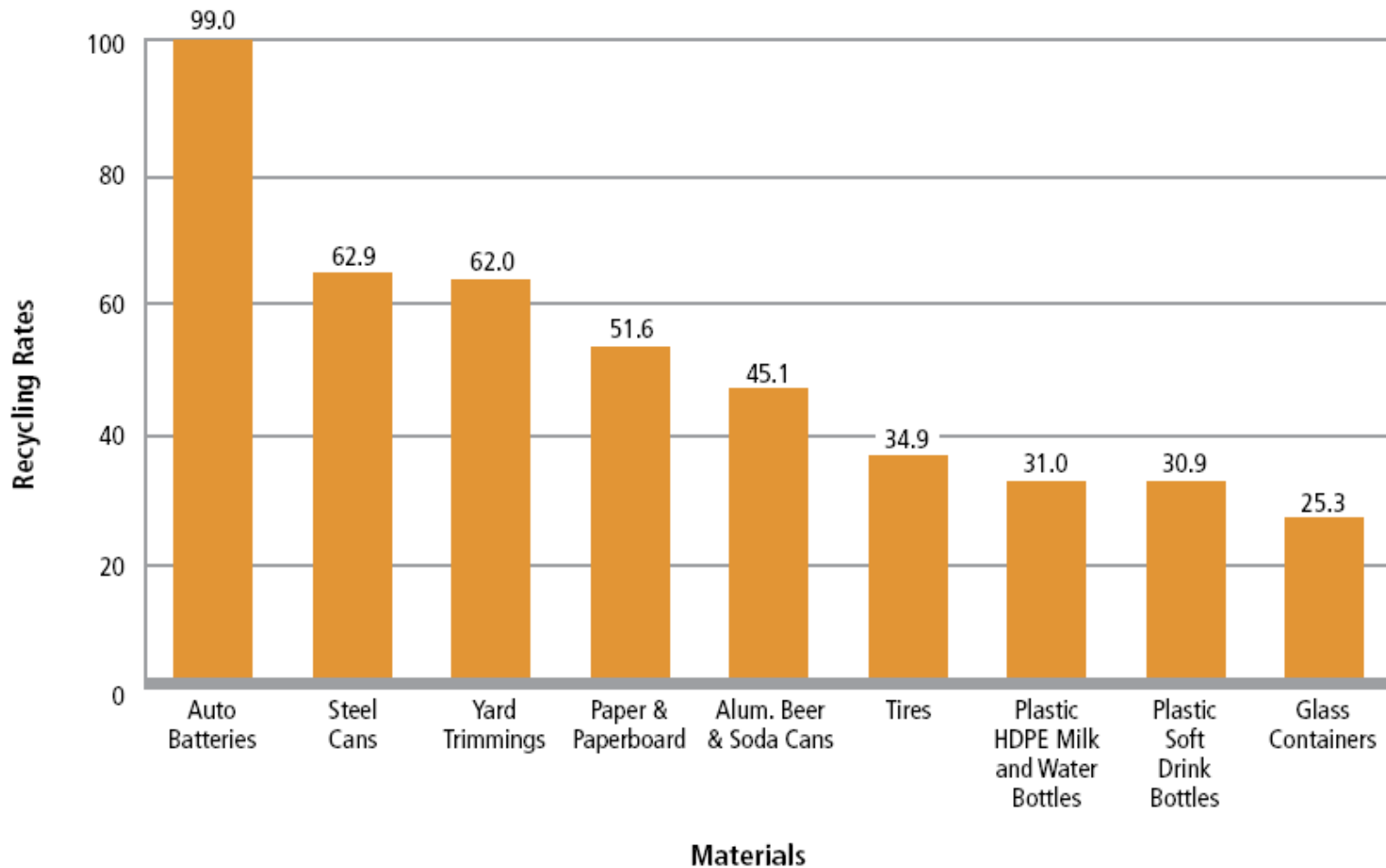


5% typically littered

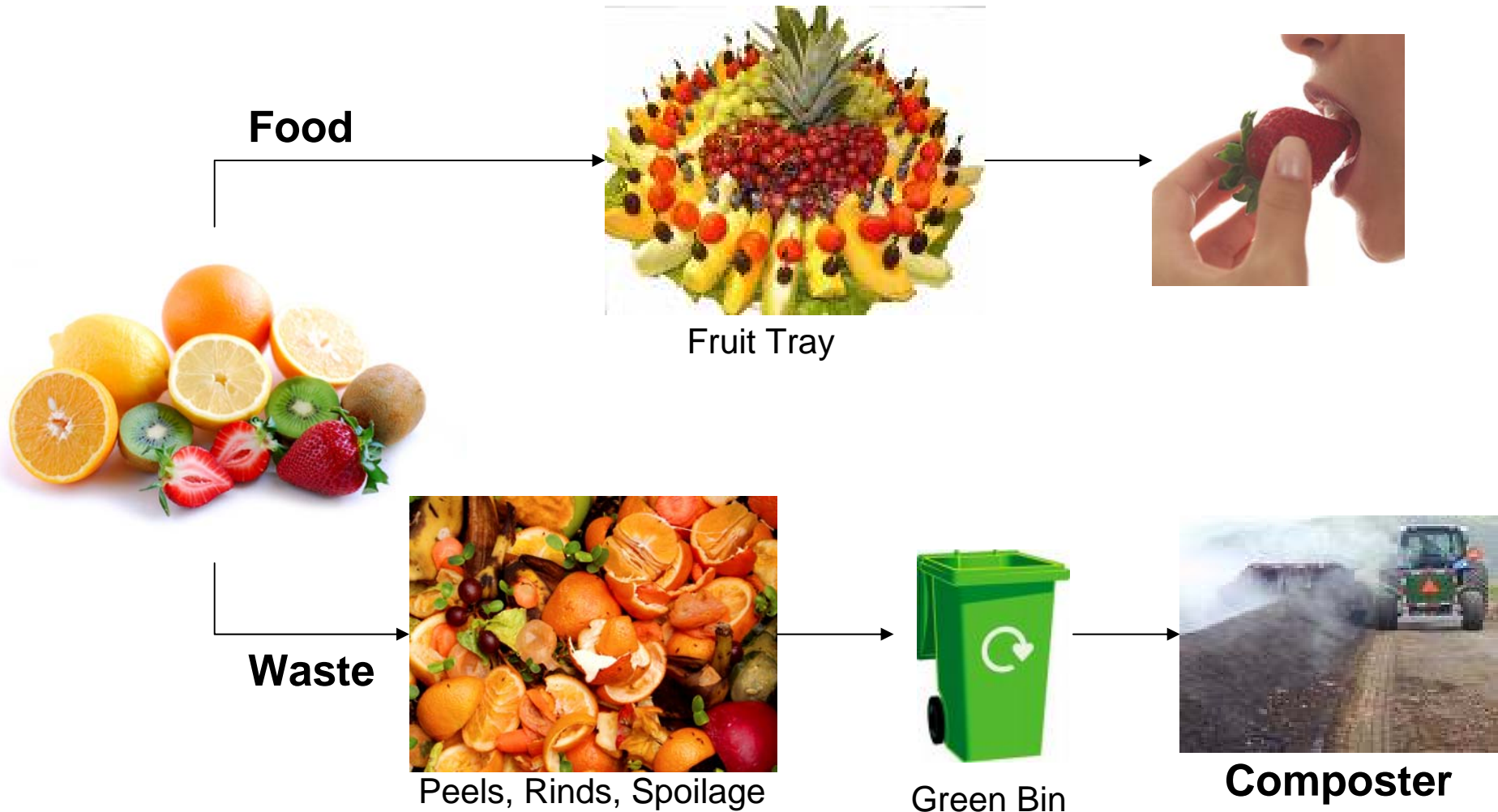
Source: Keep America Beautiful

What do we Recycle?

Figure 3. Recycling Rates of Selected Materials, 2006

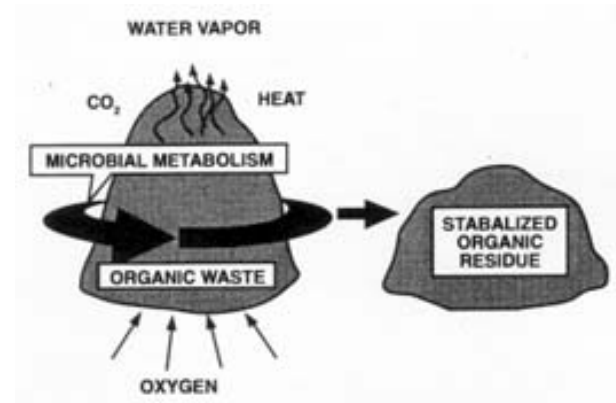
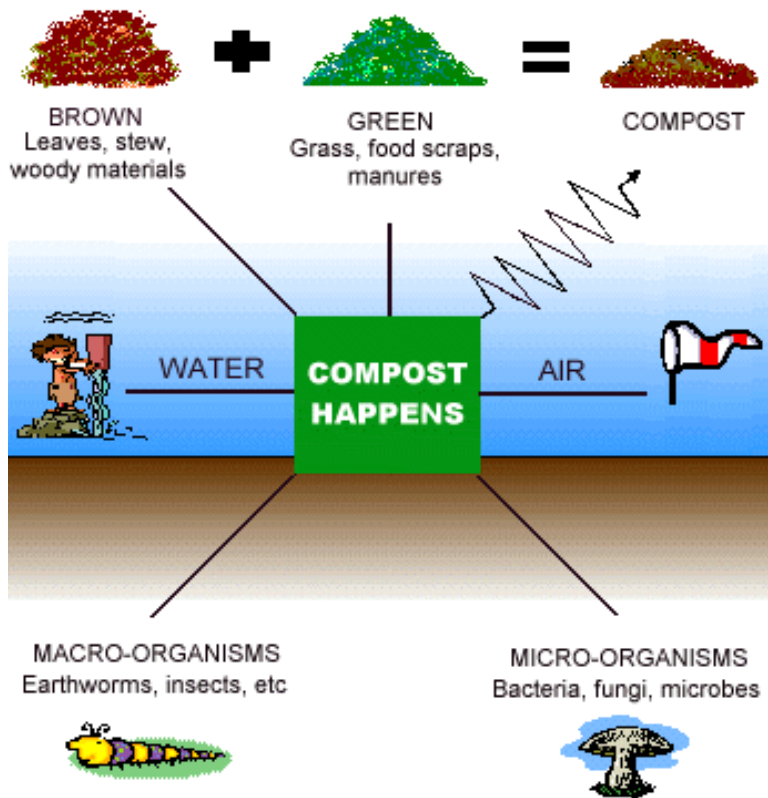


Organic/Food waste is Recyclable via Composting



Composting Defined

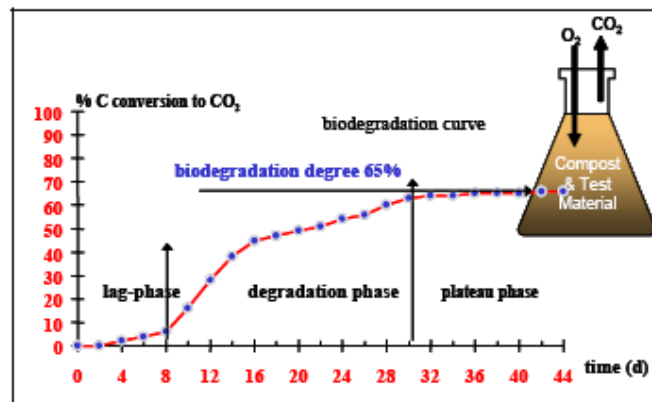
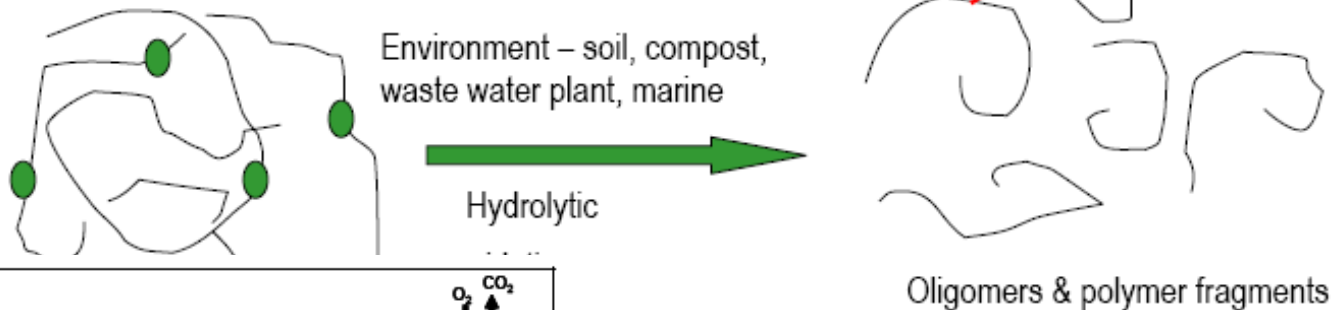
Composting is nature's way of recycling. Composting biodegrades organic waste, i.e. food waste, manure, leaves, grass trimmings, paper, wood, feathers, crop residue etc., and turns it into a valuable organic fertilizer.



What happens in Compost?

What does Biodegradable Mean?

Can the microorganisms in the disposal system (composting, soil, anaerobic digester) assimilate/utilize the carbon substrate as food source completely and in a short defined time period?



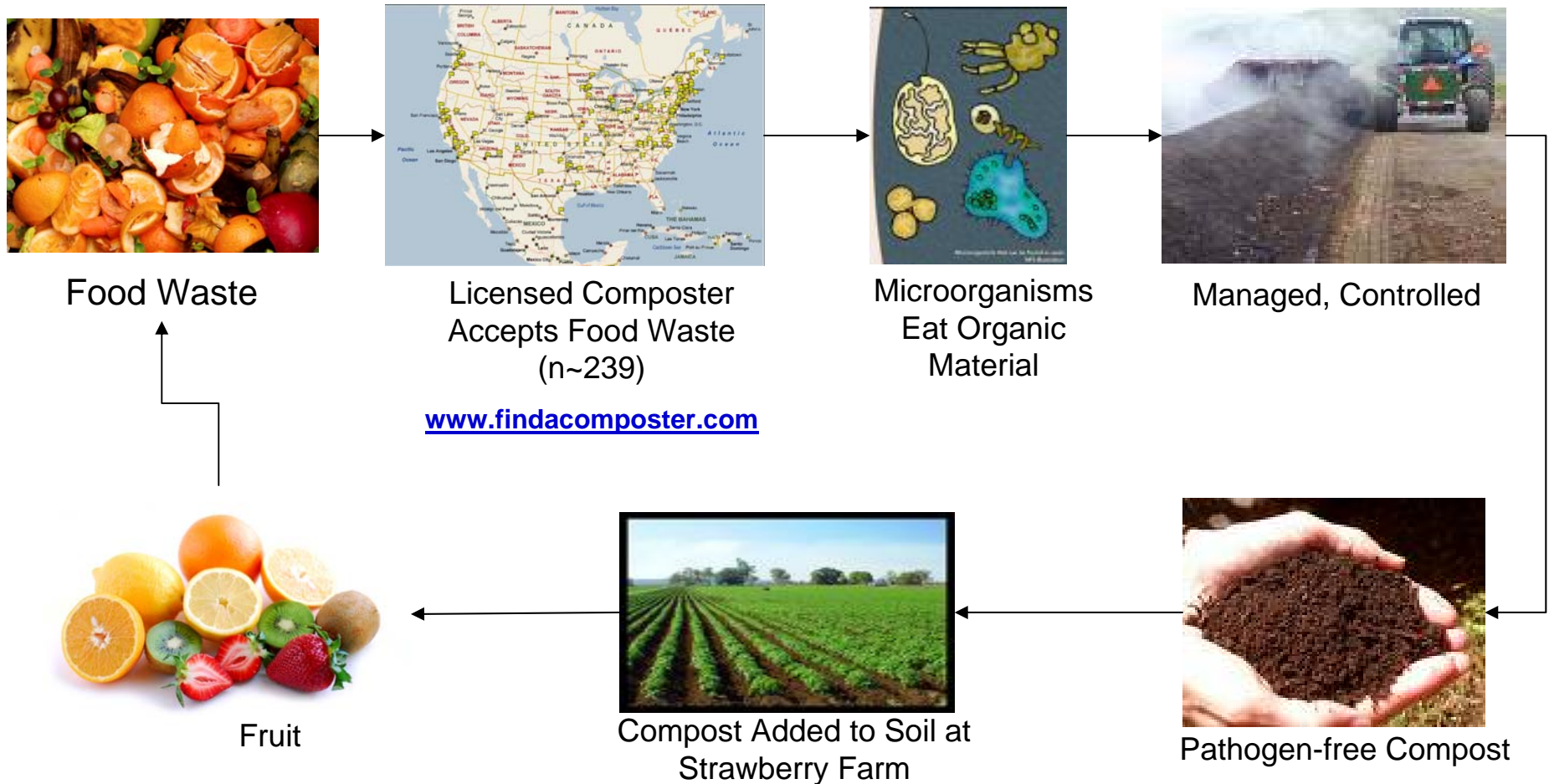
Complete microbial assimilation

defined time frame, no residues!!!

CO₂ + H₂O + Cell biomass

Organics Recycling

■ Composting = Organics Recycling



Compost is Valuable

■ Emerging scientific evidence that use of compost:

- ✓ Increases infiltration and permeability of heavy soils, thus reducing erosion and runoff.
- ✓ Improves water holding capacity, thus reducing water loss.
- ✓ Supplies a variety of macro and micronutrients, thus lowers dependence on fertilizers.
- ✓ May control or suppress certain soil-borne plant pathogens, thus lowers dependence on pesticides.
- ✓ Can bind and degrade specific pollutants.



■ Benefits of Compost

Compost has the unique ability to improve the properties of soils and growing media physically (structurally), chemically (nutritionally), and biologically.

3/9/2009

ASTM – Source for Test Standardization

ASTM – Since 1898 the foremost developer of voluntary consensus standards

Hierarchy of Standards

Test Guides



Details of why to test.

Test Method Standards



Specific Test Methods

Test Standard Specifications



Pass/Fail Criteria

ASTM D6400/D6868 Parts

1. **Mineralization**
- complete conversion to CO₂, water, heat, biomass
2. **Disintegration**
- fragments at the same rate as natural materials
3. **Soil Toxicity**
- supports plant growth, soil life with no toxic residues
4. **Regulated Metals levels**
- Country regulated soil metals by type.

Specifications for Bioplastics

ASTM D6400 or D6868 – Compostable Specification

ASTM D7081 – Marine Biodegradability

Methods for Bioplastics

ASTM D6866 – Biobased Carbon content

ASTM D5988 – Soil biodegradation

ASTM D5526 – Landfill biodegradability

ASTM D6954 – Oxo-degradable additives

How can Bioplastics be used Today?

**An Alternative
for Plastics?
(Durable vs. Disposable)**



**To Market Green
products?
(Value vs. Emotion)**



**To Enable more
Recycling?
(Organics vs. Plastics)**



Applications for Ecoflex[®]/Ecovio[®]

Compostable Plastics

Compostable Can Liners

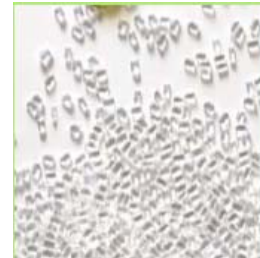


*Your
Brands
Here!*

Binders



Impact Modifier



T-shirt, Retail bags



Mulch Films



Food Packaging



Lawn and Leaf Bags



Netting



Biodegradable Vexar[®]

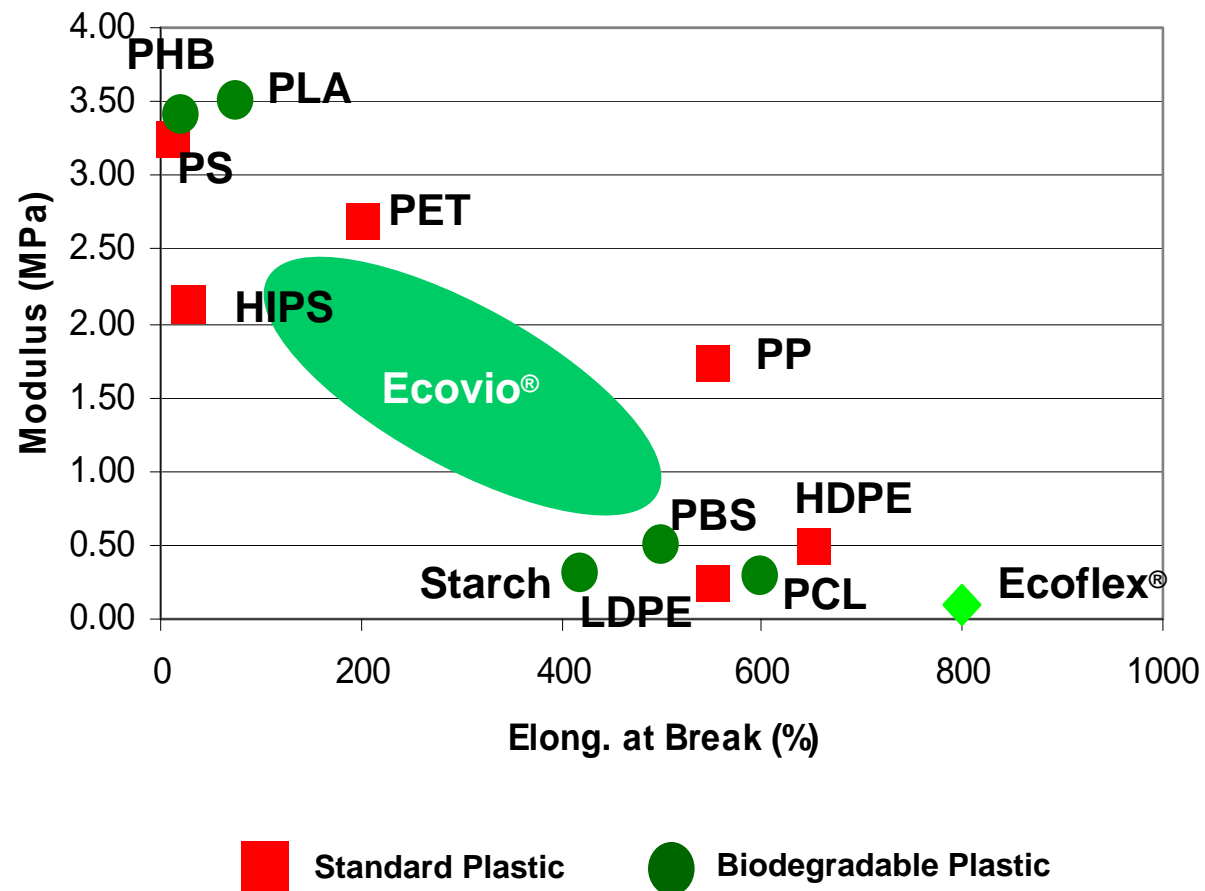
The Major Value Proposition for Ecoflex®/Ecovio® Compostable Plastics

Your products/packaging get to enter the **Organics Recycling stream**, and not the **landfill**



BASF Biodegradable Plastics Ecoflex®/Ecovio® Characterization

Comparison of Polymers



Do you want to get involved? Sponsor a "Zero Landfill Lunch" *Set the Table with Compostable Plastics*



For More Information Contact



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