



Moving Toward Sustainable Biomaterials

Brenda Platt

SBC Co-Chair

Institute for Local Self-Reliance

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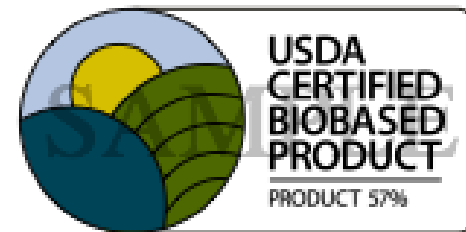
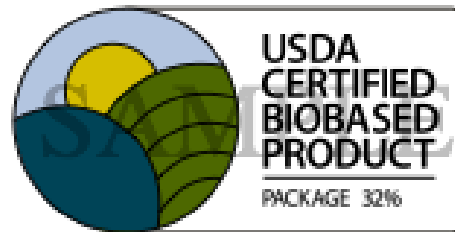
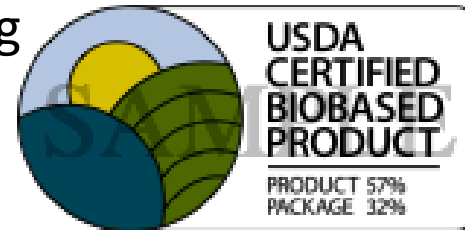
Overview

- Understanding difference between biobased vs biodegradable vs compostable
- Biobased content or recycled content alone \neq sustainable
- Criteria for environmentally preferable biobased products
- Working Landscape Certificates – market-based tool for encouraging sustainably grown feedstocks
- Sample purchasing specifications
- A word about attribute trade-offs

Biobased content

Biobased content - The amount of biobased carbon in the material or product expressed as a percent of weight (mass) of the total organic carbon in the material or product.

Biobased content is determined using ASTM Method D6866, Standard Test Methods for Determining the Biobased Content of Natural Range Materials Using Radiocarbon and Isotope Ratio Mass Spectrometry Analysis.



USDA acknowledges biobased is not necessarily better

Q. Are biobased products safer than non-biobased products for me and my family?

A. Not necessarily. Read the label fully. <snip>

Q. Are biobased products better for the environment?

A. They can be. There is an expectation that the increased use of biobased products will reduce petroleum consumption, increase the use of renewable resources, better manage the carbon cycle, and, may contribute to reducing adverse environmental and health impacts.

Q. Does a higher percentage of Biobased content mean a product is “better”?

A. Not necessarily. There is no guarantee that higher content makes the product perform any better (or is safer for humans or the environment).

Q. Why is a life-cycle assessment (LCA) not required for the certification?

A. The purpose of this certification and label is to verify the presence of biobased ingredients, and to be explicit in just how much biobased content is incorporated into labeled products. **The label is not meant to impart environmental attributes to biobased products**; rather it points to biobased content-- agricultural materials, forestry materials, and marine and animal materials. <snip>

Source: http://www.biopreferred.gov/files/Label_FAQ.pdf

Biobased \neq biodegradable

Mass of biobased **carbon** in the product

\div

Mass of total organic **carbon** in the product



Non-biodegradable biobased plastics are here

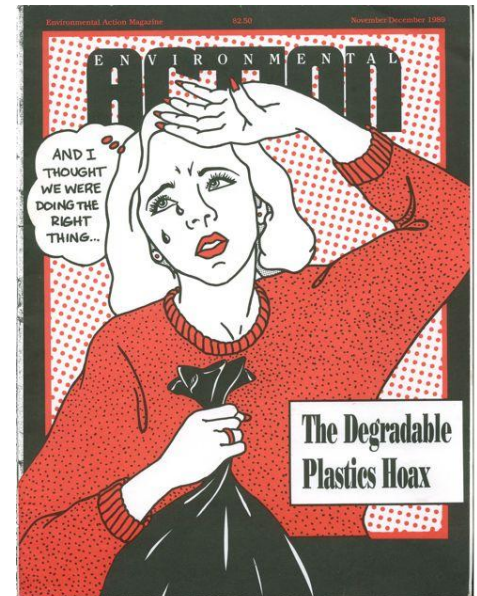
Degradable Vs. Biodegradable

Degradable

- May be invisible to naked eye
- Fragment into smaller pieces
- No data to document biodegradability within one growing season
- Migrate into water table
- Not completely assimilated by microbial populations in a short time period

Biodegradable

- Completely assimilated into food and energy source by microbial populations in a short time period
- Meet biodegradability standards:
 - D 6400 – biodegradation in commercial composting systems
 - D 7081 – biodegradation in the marine environment
 - D 5988 – biodegradation in soil
 - D 5511 – biodegradation in anaerobic digesters



1989 Cover of *Environmental Action*



Source for definitions: Dr. Ramani Narayan, Michigan State Univ.

Biodegradable Products Institute

238 certified products
130 global companies

Note:

Some BPI-certified
resins have zero
biobased content

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Thursday, January 19, 2012

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Home

Get BPI Certified

Directory of Certified Compostable Products

- Certified Compostable Foodservice Items
- Certified Compostable Resins
- Certified Compostable Packaging Materials (films, sheet, roll stock & coatings)
- Certified Compostable Bags
- Compostable Consumer Products and Packaging
- Certificates No Longer Valid

BPI Approved Testing Labs

Information about

Directory of Certified Compostable Products

This directory lists products that have been tested and certified to be biodegradable in a managed composting facility. To be listed on this site, a company must submit its products for testing at a certified laboratory.

Certified Compostable Bags

Certified Compostable Foodservice Items

Certified Compostable Resins

Certified Compostable Packaging Materials

NOT CERTIFIED

Certificates No Longer Valid

Tweet 3

Advanced search...



BPI-certified Products (sample)

Cereplast



Clarifoil



Natur-Bag®



EcoPlastics



The Good News on Biobased Products

- Variety of resins and products available
- Performance improving
- Experience and R&D growing
- Growth expected
- Programs such as the federal biobased procurement will open up new markets
- Standards in place
- Price competitiveness improving
- Demand increasing



Not All Bioproducts Created Equal

- Biobased content
- Material feedstock type
- Feedstock location
- Biodegradability
 - Commercial compost sites
 - Home composting
 - Marine environment
 - Anaerobic digestion
- Additives and blends
- Recyclability
- Performance
- Products

Biobased content alone ≠ sustainable



Challenges with Biobased Products

- ⌘ Concern over genetically modified organisms (GMOs)
- ⌘ Desire for sustainably grown biomass
- ⌘ Need to develop adequate composting programs
- ⌘ Concern with nanomaterials and fossil-fuel-plastic blends
- ⌘ Inconsistencies in and lack of adequate labeling
- ⌘ Concern over contamination of recycling systems
- ⌘ Confusion in terminology



Confusion



Making Plastic Bottles Environmentally Friendly

In an effort to help reduce the tons of discarded plastic bottles accumulating in our nation's landfills, ENSO Bottles™, in partnership with Resilux America is bringing a biodegradable technology to the plastic packaging industry available in specially formulated additive, preforms and blown plastic bottles. ENSO Bottles™ is dedicated to providing earth friendly packaging solutions to customers seeking a [biodegradable](#) packaging alternative.

ENSO bottles are not [Oxo biodegradable](#) or [PLA](#) plastic (corn based) bottles. ENSO bottles are plastic containers that biodegrade in anaerobic (landfill) environments, breaking down through microbial action into biogases and inert humus leaving behind no harmful materials. ENSO bottles are [recyclable](#) and can be mixed into the recycling stream with other plastic bottles.

To learn more about our products check out our Products page or speak on one of our Sales Representatives. We would be happy to assist you.



Source: www.ensobottles.com

Biobased content varies



Recycling? More challenging



Tractor-mounted sorting system, Cal. pilot program



Univ. of WI-Stevens Pt.



Brussels closed-venue PLA recycling



Sustainable Biomaterials Collaborative: Market-based tools

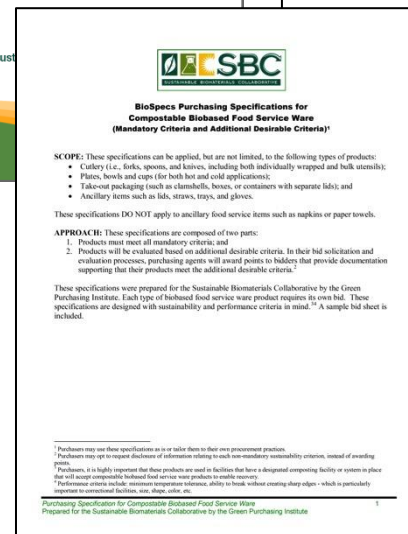
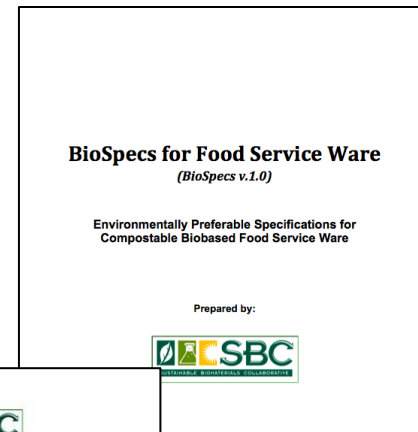
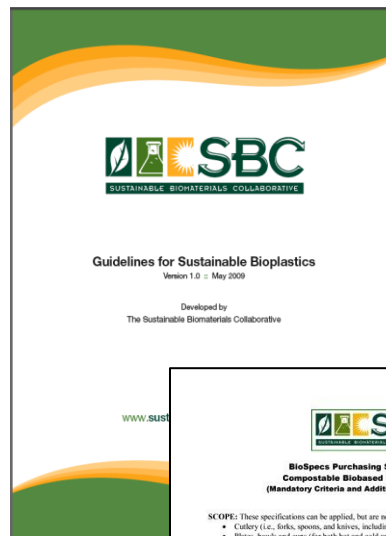
- Sustainable feedstocks / Sustainable agriculture
- Green Chemistry / Clean Production
- Closed Loop Systems / Cradle to Cradle / Zero Waste



**WORKING
LANDSCAPES
CERTIFICATE**



"Just because it's biobased, doesn't make it green"



2011





WORKING
LANDSCAPES
CERTIFICATE




Working Landscape Certificates

- Stonyfield Farm is first major buyer of WLCs
 - Shifted to PLA from PS for multipack yogurt cups
- Supports ~500 acres of more sustainable corn production
 - Equivalent to 200 million cups



Criteria: Biomass Production

Environmentally Preferable Specifications for Compostable Biobased Foodservice Ware (Biospecs)

Criteria	Recognition Level
<p>BIOBASED (ORGANIC) CARBON CONTENT</p> <p>Non-cutlery products must be >90%</p> <p>Cutlery products must be >70%</p> <p>Non-cutlery products must be >95%</p> <p>Cutlery products must be >85%</p> <p>All products must be >99%</p>	 <p>Bronze</p> <p>Bronze</p> <p>Silver</p> <p>Silver</p> <p>Gold</p>
<p>GENETICALLY MODIFIED (GM) PLANTS</p> <p>No plastics may be made directly in plants</p> <p>GM crops allowed in field with offsets</p> <p>No GM biomass allowed in field</p>	 <p>Bronze</p> <p>Bronze</p> <p>Silver</p>
<p>SUSTAINABLY GROWN BIOMASS</p> <p>Forest and brushland-derived biomass</p> <p>Agricultural biomass</p>	 <p>Bronze</p> <p>Gold</p>
FEEDSTOCKS ARE FROM PERENNIAL CELLULOSIC CROPS OR AG CO-PRODUCTS	Gold
PROTECTION OF BIOMASS PRODUCTION WORKERS	Gold

Criteria: Manufacturing

Environmentally Preferable Specifications for Compostable Biobased Foodservice Ware (Biospecs)

Criteria	Recognition Level
NO ORGANOHALOGENS ADDED	Bronze
ADDITIVES AND CONTAMINANTS OF HIGH CONCERN Declare whether nanomaterials present Eliminate use of toxic additives No Proposition 65 chemicals No chemicals of high concern All additives must be tested for hazards	Bronze Silver Gold Gold
PAPER- OR PAPER-BASED PRODUCTS Non-food-contact products: 100% recycled, 40% post-consumer Food-contact products Cups: 10% post-consumer recycled content Other food-contact products: 45% recycled content	Bronze Gold Bronze
NO CHLORINE OR CHLORINE COMPOUNDS	Silver
PROTECTION OF MANUFACTURING PRODUCTION WORKERS	Gold
LOCAL OWNERSHIP AND PRODUCTION	Gold

Criteria: End of Life

Environmentally Preferable Specifications for Compostable Biobased Foodservice Ware (Biospecs)

Criteria	Recognition Level
PRODUCT MUST BE COMMERCIALY COMPOSTABLE	Bronze
PRODUCT LABELED FOR COMPOSTABILITY “Commercially Compostable” if facility exists Verification agency logo on product Distinguishable labeling Additional labeling if facility does not exist	Bronze Bronze Bronze Bronze
COMPOSTABLE AT MESOPHILIC TEMPS / IN BACKYARD OR HOME COMPOSTING	Silver
BIODEGRADABLE IN AQUATIC ENVIRONMENT Marine biodegradable Freshwater biodegradable	Gold Gold



Purchasing Specifications for Biobased Compostable Foodservice Ware



BioSpecs Purchasing Specifications for Compostable Biobased Food Service Ware (Mandatory Criteria and Additional Desirable Criteria)¹

SCOPE: These specifications can be applied, but are not limited, to the following types of products:

- Cutlery (i.e., forks, spoons, and knives, including both individually wrapped and bulk utensils);
- Plates, bowls and cups (for both hot and cold applications);
- Take-out packaging (such as clamshells, boxes, or containers with separate lids); and
- Ancillary items such as lids, straws, trays, and gloves.

These specifications DO NOT apply to ancillary food service items such as napkins or paper towels.

APPROACH: These specifications are composed of two parts:

1. Products must meet all mandatory criteria; and
2. Products will be evaluated based on additional desirable criteria. In their bid solicitation and evaluation processes, purchasing agents will award points to bidders that provide documentation supporting that their products meet the additional desirable criteria.²

These specifications were prepared for the Sustainable Biomaterials Collaborative by the Green Purchasing Institute. Each type of biobased food service ware product requires its own bid. These specifications are designed with sustainability and performance criteria in mind.^{3,4} A sample bid sheet is included.

¹ Purchasers may use these specifications as is or tailor them to their own procurement practices.

² Purchasers may opt to request disclosure of information relating to each non-mandatory sustainability criterion, instead of awarding points.

³ Purchasers, it is highly important that these products are used in facilities that have a designated composting facility or system in place that will accept compostable food service ware products to enable recovery.

⁴ Performance criteria include: minimum temperature tolerance, ability to break without creating sharp edges - which is particularly important to correctional facilities, size, shape, color, etc.

- Bid specs for purchasers
- Presents baseline mandatory criteria
- Bidders can earn points for products meeting beyond baseline desirable criteria.

Parting Thoughts

- Life cycle thinking – taking a “principle-based” approach to sustainable materials
 - Define what we want
 - Set priorities
 - Sustainable feedstocks
 - Green chemistry
 - Cradle to cradle
- Need to expand composting & recycling capacity
 - corporate support for infrastructure and policies
- Transitioning from fossil fuels to renewable, biobased feedstocks
 - Biobased not inherently better
 - Need criteria & standards for defining sustainable biomaterials and plastics across their life cycle
 - No GMOs in field
 - Inherently safer chems
 - Concerns with nano
 - Reuse, recycle, compost



Single use has got to go!

Contact Info

Brenda Platt

SBC, Co-Chair

Institute for Local Self-Reliance, Co-Director

bplatt@ilsr.org

202-898-1610 ext 230