Biobased vs. Recycled Content: Focus on BioSpecs for Food Service Ware

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Overview

- What is biobased content?
- Understanding difference between biobased vs biodegradable vs compostable
- What about compostable vs. recyclable?
- Biobased content or recycled content alone ≠ sustainable
- Criteria for environmentally preferable biobased food service ware
- Sample purchasing specifications
- A word about attribute trade-offs

USDA Biopreferred Program

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 Biopreferred Program

Q. What are biobased products?

A. A biobased product is a product that is determined by the USDA to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products, including renewable domestic agricultural materials forestry materials, and marine and animal materials. Biobased products do not include motor vehicle fuels, heating oil, electricity produced from biomass, or, since the program is designed to stimulate markets for new biobased products, any "mature market" products. Mature market products are those biobased products that had significant national market penetration in 1972. Examples of mature market products include cotton shirts or towels, paper plates, and wood furniture.

Biobased does not = biodegradable

Non-biodegradable biobased plastics are here

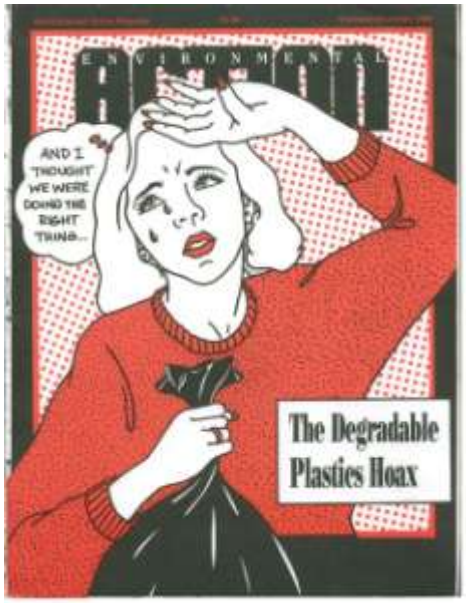
Degradable Vs. Biodegradable

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*

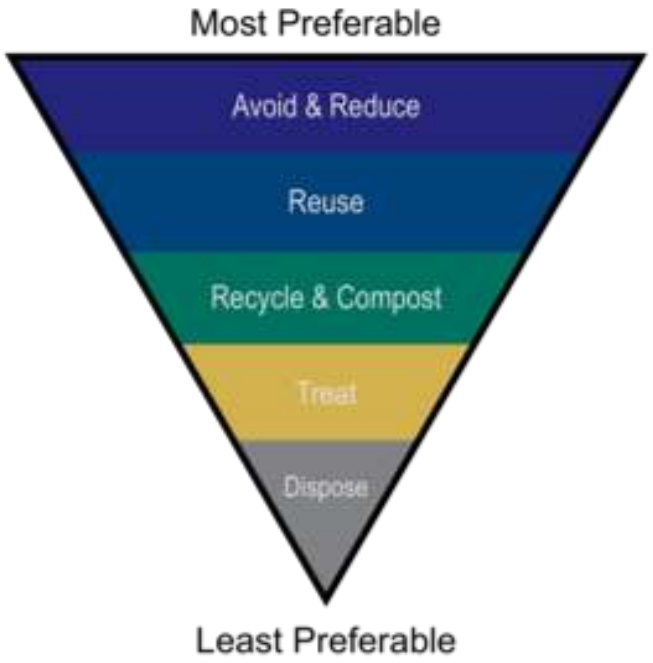
COMPOSTABLE
Biodegradable Products Institute | US COMPOSTING COUNCIL

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

Biodegradability, biobased content, or recycled content alone did not = green

Products should be:

- Reusable
- Recyclable
- Compostable



Recyclable?


Organic


Mother Earth's future
is in your hands
This innovative product is the 1st All Natural Lemonade to be poured into an ALL NATURAL BOTTLE. Noble is simply too good to be poured into a plastic bottle made from oil, so our team of juicologists went to work to find a container worthy of Noble. They explored the world to find the "E Bottle," an eco – friendly bottle made from nature. Not only is our bottle better for our juice, it is better for the environment.
Better Earth.
Better Juice.
Better Bottle.
NatureWorks PLA


NOBLE
USDA
Sweetened with Agave

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

Feedstock types and sources (food pckg)

- Brazil
  - Sugarcane
- China
  - Bulrush
  - Bagasse
  - PSM (Plastarch Material)
  - Corn
  - Chinese PLA
  - PHBV*
  - PBS**
  - Cornstarch
- India
  - Fallen palm leaves
- Thailand/Vietnam
  - Tapioca starch
  - Grass fiber
  - Bagasse
- Malaysia
  - Palm fiber
- USA
  - NatureWorks Ingeo PLA
  - Mirel PHA
  - Chlorine-free pulp
  - Recycled wood fiber

*polyhydroxybutyrate-polyhydroxyvalerate

**polybutylene succinate (petrochemical + succinic acid)

Challenges with Biobased Products

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

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?

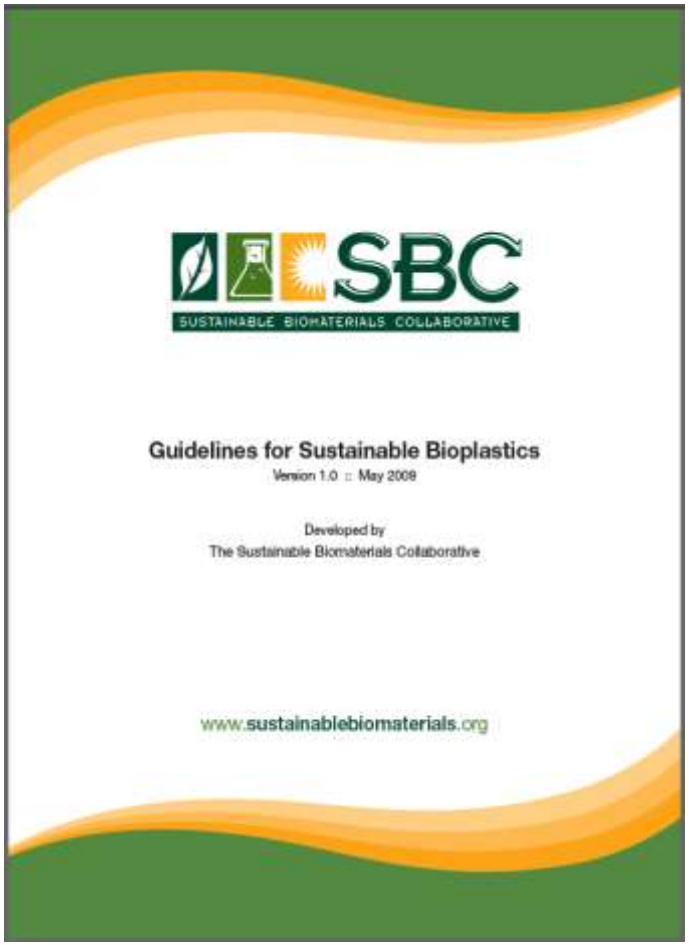
A. The purpose of this certification and label is to verify the presence of biobased ingredients, and to be explicit in just how much biobased content is incorporated into labeled products. The label is not meant to impart environmental attributes to biobased products; rather it points to biobased content--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

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

Defining Sustainable Life Cycles by Principles

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

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



Development of Environmentally Preferable Specifications – BioSpecs

BioSpecs for Food Service Ware

(BioSpecs v.1.0)

Environmentally Preferable Specifications for Compostable Biobased Food Service Ware

Prepared by:

SBC
SUSTAINABLE BIOMATERIALS COLLABORATIVE

2011

Criteria: Biomass Production (food service ware)

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

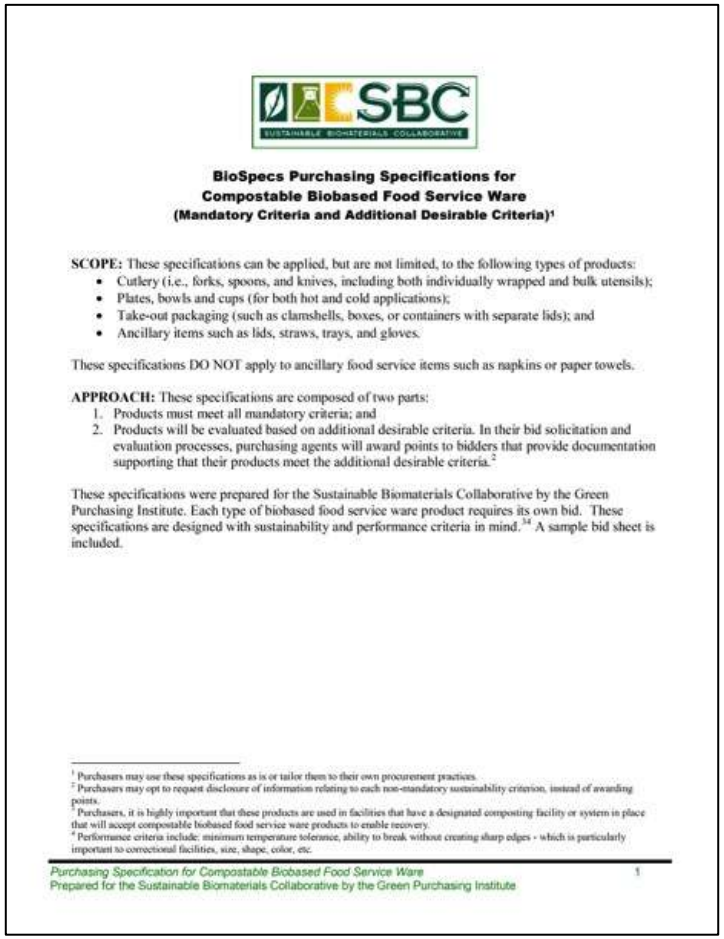
Criteria: Manufacturing (food service ware)

Criteria	Recognition Level
No organohalogens added	Bronze
Additives and Contaminants of High Concern	
Declare whether nanomaterials present	Bronze
Eliminate use of toxic additives	
No Proposition 65 chemicals	Silver
No chemicals of high concern	Gold
All additives must be tested for hazards	Gold
Paper- or paper-based products	
Non-food-contact products: 100% recycled, 40% post-consumer	Bronze
Food-contact products	
Cups: 10% post-consumer recycled content	Gold
Other food-contact products: 45% recycled content	Bronze
No chlorine or chlorine compounds	Silver
Protection of manufacturing production workers	Gold
Local ownership and production	Gold

Criteria: End of Life (food service ware)

Criteria	Recognition Level
PRODUCT MUST BE COMMERCIALLY 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



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 biobased 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.

Purchasing Specification for Compostable Biobased Food Service Ware 1
Prepared for the Sustainable Biomaterials Collaborative by the Green Purchasing Institute

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

Purchasing Specs for Food Service Ware

Based on BioSpecs

- For biobased content (max of 10 points):
  - Non-cutlery products receive 1 point per 1% above 90%
  - Cutlery products receive 1 point per 3% above 70%
- Recycled content (max of 4 points):
  - 1 point per 10% post-consumer recycled content
  - 1 point per 25% pre-consumer recycled content

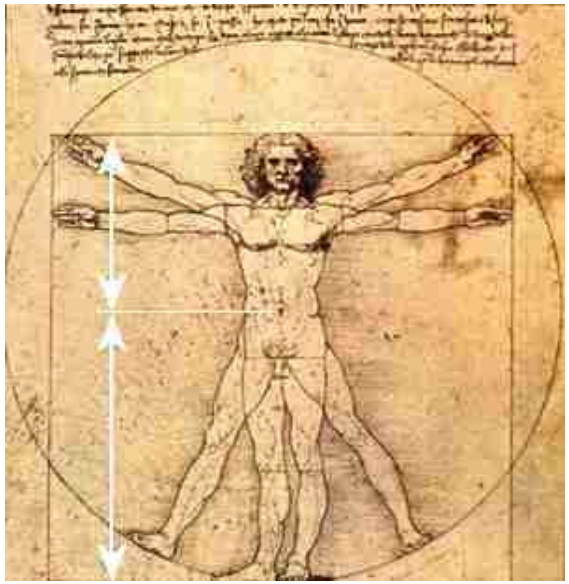
WORKING LANDSCAPES CERTIFICATE

WLCs in 2010

- 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

SBC SUSTAINABLE BIOMATERIALS COLLABORATIVE

How Exposure to Polystyrene Affects the Human Body



- **Polystyrene in made from the monomer styrene (vinyl benzene)**
- **Styrene remains present in polystyrene (no polymerization process is 100% efficient)**
- **Styrene = a neurotoxicant and reasonably anticipated to be a human carcinogen**
- **Styrene impairs the central and peripheral nervous systems.**
- **Exposure to styrene in the workplace has also been associated with chromosomal aberrations, thus is considered a mutagen.**
- **Carcinogenic Effects: Proven that it causes cancer in animals, but there are no long-term studies showing that PS causes cancer in humans.**
- **Polystyrene contains alkylphenols, an additive linked to breast cancer.**

Better than paper claim

WORLD CENTRIC
For a better world

WHAT DOES YOUR PLATE SAY ABOUT YOU?

Our certified compostable plates made from discarded plant fibers say a lot. They say you care about the environment because they are made from annually renewable resources, unlike plates made from trees. They also compost in 3-6 months in a commercial composting system*, which says you care about properly disposing of waste. With small steps like these, we can make a big impact.

OUR PLATES TAKE LESS ENERGY TO MAKE
Our ecoprofile analysis shows we make 3 plates using the same total energy it takes to make one from styrofoam!

WE DONATE 25%
of net profits to grass roots social and environmental organizations.

CARBON FOOTPRINT
Our offsets support socio-economic development but are not verified.

OUR PRODUCT LIFE CYCLE
begins and ends in the same place. Made from plant fibers, it breaks down during commercial composting in 3-6 months*, making nutrient rich soil – starting the process all over again.

Please see **www.worldcentric.org** for more information on our sustainability initiatives.

Ultra Green but single-use

Recycled-content cutlery

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!