

Bioplastics Toolkit



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Executive Summary

Have you ever purchased bioplastic products marketed as compostable or biodegradable because they seemed like better alternatives to regular plastic, even if you were not quite sure it was true? You're not the only one! Whether intentionally or unintentionally, these claims can sometimes be a source of greenwashing – that's when a product, action or service is falsely marketed as good for the environment. When in doubt, stick to reusables as the most environmentally-preferred alternative to single-use plastics. **The Surfrider Foundation's ultimate goals are source reduction and shifting away from single-use plastic items toward long-lasting reusable products.**

This toolkit uses the term 'bioplastics' broadly to include bio-based plastics derived from plant materials – which is the strict definition of bioplastics – as well as fossil fuel-based plastic products marketed as biodegradable or compostable. The purpose of this toolkit is to serve as a resource for those looking for information and guidance on bioplastics. It provides a background on why bioplastics

are problematic, what the federal and state governments are doing, policy guidance and recommendations on how to avoid bioplastics. **If reusables are not an option, the next recommended products are single-use items made from minimally-processed, naturally occurring materials,** such as recycled paper-based items, bamboo plates, wooden utensils and straws made completely from paper, hay, pasta, seaweed and bamboo.

Generally, 'compostable' means that a plastic product will measurably break down into its benign natural components within an established time frame, but only in a specific controlled environment. While the whole process takes longer, most industrial composters typically complete their active composting process within 60 - 90 days¹. The term 'biodegradable' means that a plastic product can break down into its individual natural components over time but the exact conditions and timeframe are not specified (meaning it could still take hundreds of years).



The Surfrider Foundation's ultimate goals are source reduction and shifting away from single-use plastic items toward long-lasting reusable products.

Let's further clarify the practical differences between the terms 'compostable' and 'biodegradable:'

Compostable: The term 'compostable' is highly regulated in the U.S. and there are certifications for compostable products governed by various state laws. If you decide to use compostable plastic, look for products that comply with the ASTM D6400 Standard (it will often say it right on the product), which means that the product will break down in a commercial composting facility. Of course, such a facility needs to be operating in your area (they are still rare) and the product needs to make it to that facility.

- **At this time, the Surfrider Foundation does not endorse compostable plastic** because it behaves similarly to traditional plastic as it breaks down into smaller pieces and releases toxic chemicals in marine environments. The majority of products are also only compostable at certain commercial compost facilities. However, exceptions may be made for products, including compostable bags that received ASTM D6400 certification, in jurisdictions where curbside commercial composting programs accept these products.² Consulting with your local waste hauler or manager about what is accepted before using these products is recommended.

Biodegradable: The term 'biodegradable' is essentially banned under "**Truth in Advertising**" laws in some states due to the lack of approved certifications in the U.S.^{3,4} Few companies have been able to show competent and reliable scientific evidence that their entire product will completely break down and return to nature. As a result, be wary of companies that tout their products as biodegradable with little proof, such as showing how long a product takes to biodegrade.

- **At this point, the Surfrider Foundation does not endorse products marketed as biodegradable plastic**, including 'plant-based' biodegradable plastic, due to a lack of approved certification in the U.S.

Check out the **Ocean Friendly Foodware Guide** for more information about sustainable products to use for your home or business. Also, using reusables for dine-in locations and requiring customers to opt-in for foodware accessories when ordering takeout are some of the best options to avoid unnecessary trash. If you're concerned about reusables during a pandemic, you can rest assured that **reusables are still a safe**, preferred, and sustainable option when proper precautions are taken.



How To Use This Toolkit

As part of the Surfrider Foundation's Plastic Pollution Initiative, this Bioplastics Toolkit is a resource for those looking for information and guidance on bioplastics.

This toolkit uses the term 'bioplastics' broadly to include bio-based plastics derived from renewable materials, such as plants and bacteria, as well as fossil fuel-based plastic products marketed as biodegradable or compostable.

The intended audience for this toolkit includes Surfrider Foundation chapters, Ocean Friendly Restaurants (OFR) members and those interested in this program, retail brands scoping sustainable alternatives, local community leaders, organizations and even legislators. We anticipate that most people using this toolkit already have some background on the single-use plastic issue and are ready to take the next steps to advocate for state and local single-use plastic product laws in their communities.

Greenwashing has become prevalent over the years, in part because consumers are demanding more sustainable alternatives to single-use plastic products. As companies attempt to persuade consumers to purchase their products, there is an increasing number making claims about their products being biodegradable, oxo-degradable, or compostable. However, not all of these claims are meaningful or authentic. There are also legal complexities with some of these terms. For instance, the term compostable has a certification process governed by various state laws in the U.S. and marketing a plastic product using the term biodegradable (and other terms involving degradable) is prohibited under some state laws.

The Surfrider Foundation's ultimate goals are source reduction and shifting away from single-use plastic items toward long-lasting reusable products. At this point, Surfrider does not endorse plastic marketed as biodegradable or compostable plastic.

However, as bioplastic is still an emerging material, Surfrider will continue to research the development and innovations of this type of material. It may have the potential to replace single-use plastics when reusables are not available, especially if proven to be benign to marine resources and compliant with current laws.

This toolkit includes clarification and additional information on policies and legislation regarding marketing plastic products as biodegradable or compostable. Our recommendations are based on the vetted review of our experts on this topic and definitions of terminology that can often be confusing and misleading.



As companies attempt to persuade consumers to purchase their products, there is an increasing number making claims about their products being biodegradable, oxo-degradable, or compostable. However, not all of these claims are meaningful or authentic.

Why Bioplastics Are Problematic

Before we dive in, here are the general definitions for bioplastic, bio-based, biodegradable and compostable:

- **Bioplastic*:** Can be made from non-fossil fuel / renewable sources and may or may not biodegrade or compost depending on how a product is made. Bioplastic is sometimes used as a broader term that also refers to a fossil fuel-based plastic that's been combined with additives to become biodegradable over various time frames.
- **Bio-based:** Bio-based plastics are manufactured from renewable material, mainly plants, instead of being made from oil or natural gas. These plastics can be designed to be structurally identical to petroleum-based plastics and if designed in this way, they are unlikely to be compostable. Instead, these plastics can cause similar harm to the environment and wildlife as they can last for the same period of time as petroleum-based plastic.⁵
- **Biodegradable:** A biodegradable plastic product can break down into its individual natural components over time but the exact conditions and time frame are not specified (meaning it could still take hundreds of years).
- **Compostable:** A compostable plastic product will measurably break down into its benign natural components within an established time frame but only in a specific controlled environment (while the whole process takes longer, most industrial composters typically complete their active composting process within 60 - 90 days⁶).

**This toolkit uses the term bioplastics broadly to include bio-based plastics derived from plant materials – which is the strict definition of bioplastics – as well as fossil fuel-based plastic products marketed as biodegradable or compostable.*

See [Appendix A](#) for more detailed definitions and terminology.

There are several reasons why products labeled as bio-based, biodegradable or compostable can be problematic:

1. They harm our coastal and marine environment:

Bio-based plastics can be loaded with toxic chemical additives that increase their durability.⁷ As a result, some of these products are not necessarily designed to be compostable and are piling up on our beaches, in waterways and in landfills, where they will continue to contribute to the plastic pollution problem. Similar to traditional plastics, bioplastic will degrade, contribute to greenhouse gas pollution and break up into smaller pieces – ultimately adding to microplastic pollution.

Microplastics can be mistaken for food and these chemicals harm wildlife that consume them. Many of the toxins are also known to bioaccumulate.⁸ This means that they work their way up the food chain, eventually reaching humans.

2. They create a false sense of being “environmentally-friendly:”

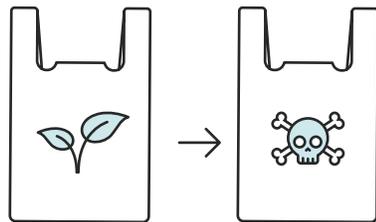
Bio-based plastics can be designed to be structurally identical to petroleum-based plastics and if designed in this way, can last in the environment for the **same period of time** as petroleum-based plastic.⁹ Certain bio-based plastics can be developed to be compostable but usually only under certain conditions in industrial composting facilities.

Improper disposal of these products can also cause more problems. For example, materials that are actually compostable and biodegradable, such as garden and kitchen waste, often end up at the landfill where they generate methane under anaerobic conditions, a greenhouse gas with **87-105 times greater** global warming potential than carbon dioxide.¹⁰ Also, the reality is that some bioplastics are just as toxic as traditional plastics.¹¹

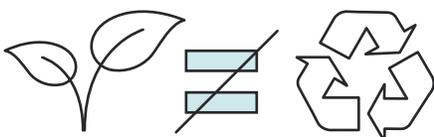
3. Identification and mislabeling: It is often difficult or impossible to tell the difference between compostable versus conventional plastic packaging, which makes it hard for consumers to know how to properly dispose of it (e.g. landfill vs. industrial composter). As a result, the **state of Washington**¹² and other jurisdictions (including the **city of Seattle**)¹³ have adopted policies banning look-alike non-compostable carryout or produce bags made from plastic film, or any other non-compostable foodware products that are tinted green or brown. The intent is to help customers and commercial composters to more easily identify which products are compostable. Foodware is a broader category and compostable containers are not readily identifiable by commercial composters.

4. Confusion: Consumers may be unclear as to what qualifies as biodegradable or compostable and how to properly dispose of the products. Due to 'greenwashing' claims, consumers may falsely assume that they are making a sustainable choice when purchasing products labeled as biodegradable or compostable, even when discarding that packaging or product in conventional waste streams.

Bioplastics are often marketed as the cleaner alternative to single-use plastics when in reality they are often just as toxic as traditional plastics.



Bioplastics are not recyclable and most communities lack the specialized facilities to properly break them down.



5. Increased use and disposal of single-use products: Rather than using reusable options, consumers may feel that biodegradable or compostable products are sustainable options when in reality, they can be harmful to the environment. Also, there may be an increase in littering because people assume that a product will biodegrade in the natural environment. This is often not the case, especially in marine waters.

6. Contamination of the recycling stream: Although some bioplastics made with bio-based PET and HDPE can be recycled, recycling bioplastics such as PLA requires a separate waste stream than conventional plastics which is not developed.¹⁴ These bioplastics can contaminate recycling infrastructure if disposed of in recycling bins, causing bales of recyclable materials to be rejected and sent to a landfill.

7. Lack of infrastructure to compost bioplastics: In many communities, there is not enough infrastructure in place to effectively compost bioplastics. According to a recent survey by BioCycle magazine, there are 185 full-scale food waste composting facilities confirmed in the U.S. Out of those facilities, **only 53** confirmed that they accept Biodegradable Products Institute (BPI) certified compostable foodware products which meet the ASTM D6400 standard.¹⁵

8. Contaminates commercial composting: Each industrial composting facility has its own specifications for how long it takes to compost and the quality of compost it produces. Generally, commercial processes that are hotter and run for longer time periods are better at handling compostable foodware products. The **ASTM D6400** standard for certifying that a plastic product is compostable is based on 90% disintegration within 84 days under active composting conditions, in addition to other criteria.¹⁶ However, most industrial composters complete their production process within 60 - 90 days.¹⁷ This means that incompletely degraded fragments remain as contaminants, which is costly if possible to screen out. Compostable plastic foodware products are increasingly seen as problematic at commercial composting facilities. In fact, a group of Oregon composters issued a statement stating that **they don't want compostable plastic foodware**.¹⁸

What's Allowed Under Federal Trade Commission Guidance

Federal and some state governments are working to address this complex topic of labeling products as compostable or biodegradable by developing a framework and passing legislation. The Federal Trade Commission's Green Guides provide a framework and guidelines for the use of environmental marketing but they do not include any enforcement provisions. Therefore, some states, such as California, have created laws that complement the Green Guides but allow for enforcement actions to be taken to minimize greenwashing and hold businesses more accountable for products marketed as compostable or biodegradable.

FEDERAL TRADE COMMISSION'S GREEN GUIDES

The **Federal Trade Commission's (FTC) Green Guides** were first written in 1992 and most recently revised in 2012. The guides provide recommendations on how companies can qualify their marketing claims in order to avoid environmental claims that mislead consumers.¹⁹ These apply to claims about environmental attributes and cover products, packages and services in connection with marketing and the sale of products. Marketing applies to the label, advertisement, promotional materials and other forms of mediums that are used directly or implied through words, symbols, logos, depictions, product brand names, etc.

The Green Guides do not supplant other federal laws, nor do they preempt state or local laws. Furthermore, compliance with those laws will not necessarily preclude Federal Trade Commission law enforcement.

See [Appendix B](#) to learn more about Federal Trade Commission's Degradable and Compostable Claims.



Federal and some state governments are working to address this complex topic of labeling products as compostable or biodegradable by developing a framework and passing legislation.

Product Certifications Allowed Under State Laws

There are independent organizations that provide certifications and are accepted by state law. These are the certifications that should be followed. Even if they are not required by law in your state, this is still a best practice. Below is a summary of the certifications.

ASTM International (ASTM) is an organization that develops industry-accepted standards which lead to certifications for materials, products, systems and services. Although the standards are voluntary and not mandated by ASTM, many governments around the world use these standards to enforce laws and regulations. ASTM does not conduct lab testing to certify products but it provides the evaluation criteria and testing methods.

Please note that only ‘specifications,’ such as those listed below, indicate that a product meets appropriate standards. A product that just showcases a testing method isn’t providing any meaningful information or assurance that it meets a standard. ASTM develops both specifications and testing methods so it’s important to note the difference.

- **ASTM D6400:**²⁰ This specification is issued for **commercial composting** and establishes the requirements for labeling of **plastics and products made from plastics** as “compostable in municipal and industrial composting facilities.” The standard determines if a given product will compost satisfactorily, including biodegrading at a rate comparable to known compostable materials.
- **ASTM D6868:**²¹ This specification covers labeling of **biodegradable plastics and products, including packaging, where a plastic film or sheet is attached** (either through lamination or extrusion directly onto the paper).

Third-party certification companies, such as the **Biodegradable Products Institute (BPI)**, provide services to go through the proper channels for testing to receive these ASTM certifications.²² If you decide to purchase a product labeled as compostable, it’s important to make sure that the certification is from a reputable source, has gone through rigorous testing and the certification presented is based on the ability of the tested product to meet those standards.



TÜV AUSTRIA Belgium (formerly known as Vincotte)

is another certification institute that is used to standardize home composting and biodegradability in soil definitions, among other bio-based products.

- **TÜV OK Compost HOME:**²³ This certification details specific technical requirements that a product must meet to be considered home compostable by TÜV. A home garden's compost heap involves a comparatively smaller volume of waste and a lower temperature, which is less constant than in an industrial composting environment. This makes home composting a more difficult and slower-paced process.
- **TÜV OK Biodegradable Soil:**²⁴ This label by TÜV certifies that a product will completely biodegrade in the soil without adversely affecting the environment. This certification is currently included in laws in two states, Washington and Maryland, for film plastic products used in agricultural mulch film during commercial farming operations.

Currently, there are no allowable certifications for marine biodegradable products in the U.S.

Currently, there are no allowable certifications for marine biodegradable products in the U.S. However, you may come across other marine degradable labels, such as:

- **ASTM D7081:**²⁵ This certification was withdrawn in April 2014 because the ASTM requires that standards are updated by the end of the eighth year since the last approval date, which was in 2005. A new specification has not been released.

This specification relates to products that are designed to be biodegradable under marine environmental conditions. It was initially allowed under California law but due to the ASTM standard being withdrawn, it is no longer a valid certification. In 2020, **AB 2287 was signed into law in California, which prohibits plastic products marketed as 'marine degradable' from being sold in the state.**²⁶

- **TÜV OK Biodegradable MARINE:**²⁷ This certification verifies the claim of the biodegradability of materials or products in the marine environment. The technical requirements are still condition-based, including temperature, aeration and humidity.



State Laws

Several states, including California, Maryland, Minnesota and Washington, have passed legislation addressing the labeling and marketing of degradable and compostable products. These laws tend to add additional details beyond the FTC guidelines and provide enforcement so companies making claims in violation of these laws can be sued. For example, marketing a plastic product as biodegradable is strictly prohibited under California and Washington state laws, with the exception of agricultural films used to cover crops.

The following table shows allowable certifications for labeling products under each state law:

	Products Covered	ASTM D6400	ASTM 6868	TÜV OK Compost Home	TÜV OK Biodegradable Soil*	Public Disclosure**
CA ²⁸ (2013)	Plastic Products	✓	✓	✓	✓	✓
WA ²⁹ (2020)	Plastic Products	✓	✓		✓	✓
MD ³⁰ (2018)	Plastic Products <i>Does not include personal care products</i>	✓	✓		✓	
MN ³¹ (2019)	Plastic Bags	✓				

✓ = included in state law

* Only for film plastic products used in agricultural mulch film for commercial farming operations.

** These states require public disclosure, meaning that the public may request additional information. The business has 90 days to provide information and documentation demonstrating compliance in a format that is easy to understand and scientifically accurate.

CASE STUDY

The state of California is aggressively dealing with misleading and incorrect labeling claims for products marketed as biodegradable or compostable. In 2018, the Monterey County District Attorney, in conjunction with 22 other District Attorney’s Offices throughout California, **settled** a consumer protection action against Amazon. Amazon agreed to pay \$1,512,400 in civil penalties and an additional payment of \$50,000 to CalRecycle to fund testing of plastic products marketed to consumers as biodegradable or

compostable. The settlement includes an injunction that prohibits Amazon from **unlawfully selling or offering plastic products labeled as biodegradable**, or selling or offering plastic products labeled as compostable, without appropriate certification.

In 2017, Alameda County District Attorney, in conjunction with 22 other District Attorneys throughout California, **settled** a similar consumer protection action against Walmart.

Ocean Friendly Restaurants

Surfrider’s Ocean Friendly Restaurants program is an excellent demonstration of how to reduce the use of single-use plastics. The [Ocean Friendly Foodware Guide](#) is an accompanying document, which is helpful to review when considering alternatives to single-use plastics.^{32, 33} One restaurant, one customer at a time – the Ocean Friendly Restaurants program is increasing awareness, driving behavioral change and ultimately creating scalable impacts to reduce our greater plastic footprint.

Ideally, using reusable items is the best choice, but there are various obstacles to full implementation and not all restaurants have the economic resources to afford reusables for every foodware and related accessory offered. It takes deliberate steps, starting with small changes, to achieve this goal broadly. **If you can’t use reusables, the next recommended products are single-use items made from minimally-processed, naturally-occurring materials**, such as recycled paper-based items, bamboo plates, wooden utensils and straws made completely from paper, hay, pasta, seaweed and bamboo.

However, be aware of plastic-lined paper items with words such as plant-based lining, poly-coated paper, and grease resistant. These terms do not mean that a product is recyclable or home compostable as they do not require certifications. Additionally, a number of paper and fiber-based products have been found to contain toxic **per- and polyfluoroalkyl substances** (PFAS). These ‘forever’ chemicals are added to make paper items more grease-resistant but they can leach into the food we eat, contaminate compost and ultimately end up in our bodies. For this reason, we recommend consulting the [Center for Environmental Health’s database](#) on PFAS levels in takeout foodware before purchasing paper and fiber-backed products. There is good news on this, however, as many new PFAS-free paper foodware products are available online, due to the public pressure on manufacturers.

If you own or manage a restaurant and are not yet a member of our Ocean Friendly Restaurants program, you can [sign up now](#) or reach out to your [local chapter](#) for more information.³⁴



Recommendations

The Surfrider Foundation firmly advocates for the reduction of the overall use of single-use plastics and encourages the use of reusable products as much as possible.

If reusable foodware products are not an option, in addition to using minimally-processed naturally occurring materials, here are additional recommendations to consider:

- Watch out for greenwashing and terms that do not require certifications. Words to look out for include biodegradable, degradable, eco-friendly, made from plants, bio-based, planet-friendly and green.
- Just because something says compostable doesn't mean it will necessarily be composted at industrial composting facilities or can be composted at home. There is a chance that it will be landfilled, incinerated or end up in our environment.
- Advocate for policy solutions that reduce single-use plastics and avoid bioplastic products like opting-in for foodware accessories and requiring reusables for dine-in meals. Learn more about foodware laws by reading Surfrider's [***Comprehensive Foodware Policy Toolkit***](#).³⁵
- Consider conducting an [***education campaign***](#) to help to empower consumers to make informed choices about the alternatives to conventional plastic products being offered.³⁶ This can also foster customer appreciation for the extra steps you are taking to implement more sustainable options.
- BYO reusables! Everyday actions can make a big difference. Get inspired to create change by going to Surfrider's [***Rise Above Plastics page***](#).³⁷

See [***Appendix C***](#) for additional resources.



The Surfrider Foundation firmly advocates for the reduction of the overall use of single-use plastics and encourages the use of reusable products as much as possible.

Key Takeaways

Bioplastics are often marketed as the cleaner alternative to traditional single-use plastics, leading consumers to believe that they are making a better purchasing decision. Despite the marketing hype claiming these products to be compostable or biodegradable, this type of single-use plastic is not the end-all solution they may seem like and they are distracting us from lasting solutions like reuse and refill.

At this time, **Surfrider does not endorse the use of bioplastics**, regardless of whether it's labeled biodegradable or compostable.

- The federal government and some state governments have created laws and guidance documents to minimize greenwashing and hold businesses more accountable for marketing their products as compostable or biodegradable.
- The term compostable has a certification process governed by various state laws in the U.S. and marketing a plastic product using the term biodegradable (and other terms involving degradable) is prohibited under some state laws.
- Generally speaking, plastic products and packaging cannot be marketed as biodegradable since companies/ suppliers have not been able to show with competent and reliable scientific evidence as of yet that the entire item will completely break down and return to nature.

Despite the marketing hype claiming these products to be compostable or biodegradable, this type of single-use plastic is not the end-all solution they may seem like and they are distracting us from lasting solutions like reuse and refill.



Appendix

A. Terminology

The terminology surrounding this topic can be confusing and terms are often used interchangeably, so we've defined key words here. There are more definitions in the [***Ocean Friendly Foodware Guide***](#) but this section focuses on terminology that incorporates policy implications and how these terms relate to certifications:³⁸

Biodegradable

The [**EPA**](#) defines this as “the ability of a substance to be broken down physically and/or chemically by microorganisms.”³⁹ For example, many chemicals, food scraps, cotton, wool, and paper are biodegradable; plastics and polyester generally are not.⁴⁰ While the term does mean that items can be broken down, the label typically hasn't taken into account the time frame for degradation to occur which could be weeks, months, years or longer. It also often doesn't consider if any chemicals would be left over in the environment or released during the breakdown processes. Additionally, it doesn't outline the specific conditions required for proper degradation, such as heat, moisture, or oxygen levels. These conditions do not exist in common disposal sites or out in the environment. More often than not, biodegradable items don't fully break down, resulting in more microplastic pollution. The term biodegradable is not well-regulated so be wary of companies that tout their products as biodegradable without any certifications or end-of-life instructions. **See [section 2](#) for details on available certifications and when plastic can be labeled biodegradable.**

Bio-Based Plastics

As stated by the [**EPA**](#), “bio-based plastics are manufactured from **plant materials instead of being made from oil or natural gas.**” Because they are plant-based, there is a tendency to assume that this type of plastic must be biodegradable. However, bio-based plastics can be designed to be structurally identical to petroleum-based plastics, and if designed in this way, they can last in the environment for the same period of time as petroleum-based plastic.⁴¹

Bio-based plastics are usually accompanied with a leaf symbol and may state that they are made from corn, sugar cane or other natural-sounding sources. These products may have a large environmental footprint because of the fertilizers, pesticides and land needed to grow the crops. There is also no indicator to state what percentage of the plastic is made from plants. Even the [**USDA**](#) sets their minimum bio-based requirement at just 25%, with the rest of the polymer usually made from or blended with conventional fossil fuel-based plastic.⁴²

Bioplastic is sometimes used as a broader term that also refers to a fossil fuel-based plastic that's been combined with additives to degrade over various time frames. **In short, bioplastics as they exist today should be avoided.**

Compostable

This means that an item is able to be **composted**, which is a **natural process that turns organic materials into a conditioner for soil.**⁴³ Similar to biodegradable products, most compostable products require highly specific environmental conditions, meaning that these items will not simply turn into compost when tossed in a landfill or in our waterways. They may need conditions that are available at commercial compost facilities (i.e., high temperature, moisture and aeration). If planning to use compostable products, make sure to check if your community offers commercial composting and has an organics collection system that accepts compostable foodware products. **An important distinction is whether an item is compostable in a home environment or only compostable in a specialized commercial composting facility.** Home composting will generally not break down compostable plastic products (discussed in the sections “Seven Problems with Labeling Products Bio-based, Biodegradable and Compostable”).

See [section 5](#) for details on when plastic can be labeled compostable.

Degradable

Degradable items don't use living organisms as a crucial part of the breakdown process. Instead, chemical additives used in the plastic allow a product to break down quicker than a standard plastic product usually would. However, these products can just break up into smaller and smaller pieces and end up as **microplastics**. The **Federal Trade Commission** states that if a company claims its product to be "degradable," and the product is typically thrown out in the trash, the company should have proof that the product will completely break down and return to nature in a landfill in the time or at the rate the advertisement states.⁴⁵



Oxo-degradable

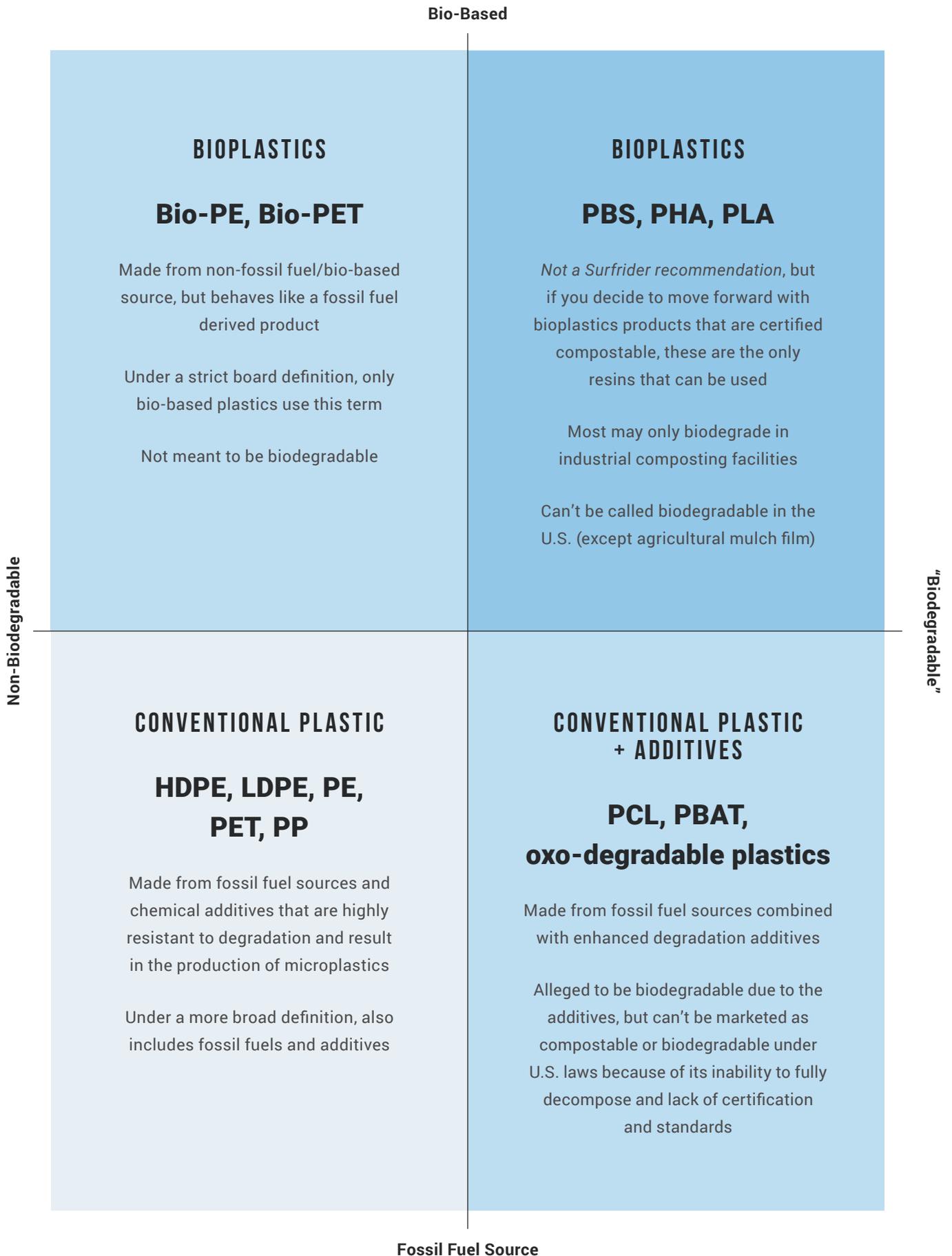
Oxo-degradable plastics are conventional plastics that include additives to accelerate fragmentation of the material often by UV radiation or heat exposure.⁴⁶ The main result of oxidation is fragmentation, not biodegradation, which means that particles break down into smaller and smaller particles but never fully degrade. Oxo-degradable plastics have become such a problem that in March 2019, the European Parliament approved measures to prohibit placing oxo-degradable plastic on the market starting July 2021.⁴⁷

PHA Polyhydroxyalkanoate (PHA)

PHA is an emerging bio-based plastic more commonly used in agricultural operations but is being made increasingly more available in foodware and medical devices. PHA products are produced through bacteria fermentation, which has less upstream impacts from other bio-based plastics like PLA (see below). PHA products also have a higher heat threshold, which reduces the need for chemical processing or additives.⁴⁸ Although it is still an emerging material and more testing needs to be done, PHA shows potential promise to degrade in the natural environment without the need of an industrial composting facility and some products have been TÜV OK Compost HOME certified. **Although they can be certified compostable, PHA products cannot be marketed as biodegradable in the U.S.**

PLA Polylactic Acid (PLA)

PLA is a bio-based plastic commonly used in foodware and takeout items and marketed as a sustainable alternative to conventional plastics. Despite claims of environmental friendliness, products made from **PLA will only reach complete degradation at industrial composting facilities and often contain high 'upstream impacts' from growing the plant-based material and processing it into a plastic product.** PLA is often made from corn and the raw materials must undergo an intense and highly polluting chemical process to transform that organic material into PLA.⁴⁹ PLA plastic will not break down into natural elements in your backyard composting pile, the landfill, or most importantly, the ocean.



ADDITIONAL DEFINITIONS⁵⁰

Bioplastics

Can be made from non-fossil fuel / renewable sources and may or may not biodegrade or compost depending on how a product is made. May include renewable sources, such as sugar cane, sugar beet, corn, hemp and wheat grain. Bioplastic is sometimes also used as a broader term that also refers to a fossil fuel-based plastic that's been combined with additives to become biodegradable over various time frames.

This toolkit uses the term bioplastics broadly to include bio-based plastics derived from plant materials – which is the strict definition of bioplastic – as well as fossil fuel-based plastic products marketed as biodegradable or compostable.

Bio-Based Plastics

Meant to degrade:

- **PBS (Polybutylene succinate):** Polymers with properties similar to polypropylene but are alleged to decompose naturally in water and CO₂.
- **PHA (Polyhydroxyalkanoate):** Polymers that are produced by microorganisms and have similar properties as polyethylene (PE) and polypropylene (PP). PHB (polyhydroxybutyrate) is a member of the PHA family and has similar properties to PHA.⁵¹
- **PLA (Polylactic acid):** Polymers made from renewable feedstock. Lactic acid is produced as the raw material, with similar properties to polyethylene and polypropylene.

Not meant to degrade:

- **Bio-PET (Bio-based polyethylene terephthalate):** Semi-rigid to rigid lightweight polymer often derived from sugarcane.
- **Bio-PE (Bio-based polyethylene):** Polymer able to be manufactured to varying densities, often derived from sugarcane.

Conventional Plastics + Additives

Typically derived from fossil fuels and include other enhanced degradation additives to make a product biodegradable.

- **PBAT (Polybutylene adipate terephthalate):** A copolymer marketed as a “biodegradable” alternative to low-density polyethylene (LDPE). PBAT is the additive to allegedly make a product degrade more quickly, even when derived from fossil fuels.
- **PCL (Polycaprolactone):** Mainly used as an additive for resins and can be mixed with starch to allegedly increase degradability.
- **Oxo-degradable plastics:** Include additives so that plastic breaks into smaller and smaller pieces but does not fully degrade.⁵²

Conventional Plastic:

Ethylene and propylene-based plastic, made from fossil fuels.

- **PE (Polyethylene):** Includes HDPE and LDPE and can be manufactured to varying densities.
- **PET (Polyethylene terephthalate):** Based on how it's processed, can be semi-rigid to rigid and it is very lightweight.
- **HDPE (High-density polyethylene):** A polymer with a large strength-to-density ratio and more durable than LDPE.
- **LDPE (Low-density polyethylene):** A clear or translucent plastic that exhibits flexibility, chemical resistance and waterproofing capabilities.
- **PP (Polypropylene):** Has similar properties to polyethylene but is slightly harder and more heat resistant.

B. Federal Trade Commission's Degradable and Compostable Claims

Here's what is included in the Federal Trade Commissions' Green Guides about degradable and compostable marketing claims.⁵³

For **degradable claims** (including biodegradable), the Green Guides provide the following guidance (see section 260.8):

- A producer / manufacturer should have competent and reliable scientific evidence that the entire item will completely break down and return to nature.
- If the degradable product enters the solid waste stream, it must completely decompose within one year after customary disposal.
- Degradable claims should be qualified clearly and prominently to avoid deception about 1) the ability of the product or package to degrade in the environment where it is customarily disposed; and 2) the rate and extent of degradation.

Example of a Deceptive "Degradable" Claim according to the FTC (*example 1 under section 260.8*):

A company / supplier advertises using an unqualified "degradable" claim for plastic trash bags. The company / supplier relies on soil burial tests to show that the product will decompose in the presence of water and oxygen. Consumers, however, place trash bags into the solid waste stream, which customarily terminates in incineration facilities or landfills where they will not degrade within one year.

The claim is deceptive because the company / supplier does not make qualifications and disclosures that are clear, prominent and understandable.

For **compostable claims**, the Green Guide provides the following guidance (see section 260.7):

- A company / supplier claiming that an item is compostable should have competent and reliable scientific evidence that all the materials in the item will break down into, or otherwise become part of, usable compost (e.g., soil-conditioning material, mulch) in a safe and timely manner (i.e., in approximately the same time as the materials with which it is composted) in an appropriate composting facility, or in a home compost pile or device.
- A company / supplier should clearly and prominently qualify the compostable claim if 1) the item cannot be composted safely or in a timely manner in a home compost or device; and 2) the claim misleads reasonable consumers about the environmental benefit provided when disposed of in a landfill.
- A company / supplier should clearly and prominently qualify compostable claims if such facilities are not available to a substantial majority of consumers or communities where the item is sold.



C. Additional Resources

- **Quick Reference Guide to California's Law** (2013)⁵⁴
- **Comprehensive Ocean Friendly Foodware Policy Toolkit** (2020)⁵⁵
- **Ocean Friendly Foodware Guide** (2020)⁵⁶
- **Ocean Friendly Restaurants** (2020)⁵⁷
- **Beachapedia's Bioplastic Glossary** (2020)⁵⁸
- **Better Alternatives Now (B.A.N.) List 2.0** (2017)⁵⁹

If you have any questions please contact your local Surfrider chapter or contact Surfrider's Plastic Pollution Initiative policy team at:

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Companies should follow the standards and specifications that are applicable in jurisdictions where their foodware is in use. Don't be afraid to ask a business about their products. A producer / manufacturer should (and some are required to) have information and documentation demonstrating compliance, in a format that is easy to understand and scientifically accurate.

If you live in one of the states below and think you have purchased or seen a product with false claims, it could violate a state law and you can report the potential violation. Take down the name of the product, the company, the specific claim (biodegradable, degradable, decomposable, etc.), any relevant ASTM or other certifications and a description of why you think a product may be in violation.

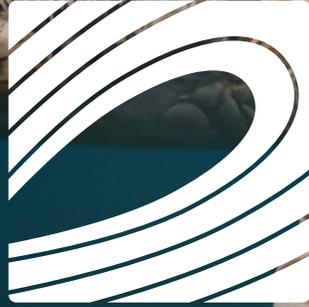
- **California:** A city, a county, or the state may impose civil liability. Call (916) 341-6300 or visit CalRecycle's **webpage** and email the contact for Degradable / Compostable Label or contact your local District Attorney or the State Attorney General's office.⁶⁰
- **Washington:** The state, acting through the attorney general, and cities and counties have concurrent authority to enforce this. Contact the **Attorney General's office** at 1-800-551-4636 (in-state only) or csu@atg.wa.gov, or the appropriate city or county's environmental department.⁶¹
- **Maryland:** The county, municipality, or other local government handles enforcement actions, so contact the appropriate jurisdiction's environmental department.
- **Minnesota:** The attorney general may bring an action in the name of the state in a court of competent jurisdiction for recovery of civil penalties or for injunctive relief. Contact the **Attorney General's office** at (651) 296-3353 (Twin Cities Calling Area) or (800) 657-3787 (Outside the Twin Cities).⁶²



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