

The starter's guide to **bioplastics in lawn and garden products**



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BIOPLASTICS



Those who get their hands dirty — gardeners, landscapers, growers — have a passion for natural spaces and leaving them better than they were found.

Given this mindset, bioplastics offer a material that's synergistic to the ideals of the end users of lawn and garden products. Because bioplastics use plant-based feedstocks to replace some or all of the petrochemicals found in traditional plastics, growers can reduce their carbon footprint and live by their commitment to sustainability.

Selecting a bioplastic to make your product will appeal to growers and will reflect well on your brand. These materials, however, can be confusing even though they are quite similar to traditional plastics.

To help you get started in designing a bioplastic product for lawn and garden, the following guide can help with the process. In these pages, you'll find:

- What's fueling a heightened interest in gardening and sustainability.
- Top benefits of using bioplastics.
- An introduction to the key distinctions between biocomposites and compostable plastics.
- Core factors when choosing a bioplastic material for a product.

Why bioplastics have a place in the garden

THE COVID GARDENING BOOM

Changes in life such as social distancing and stay-at-home orders implemented due to the COVID-19 pandemic have resulted in a renewed interest in gardening. The pandemic fueled a 23% increase in home improvement projects in 2020, according to [HomeAdvisor's State of Home Spending report](#). Nearly half of these improvements were focused on gardening and landscaping.

The [National Gardening Association](#) saw that interest in gardening nearly doubled in 2020, citing people's interest in growing their own fruits, vegetables and herbs to live a healthier lifestyle as driving the trend. Certainly, a portion of these COVID gardeners will "continue

gardening for years to come," says Dave Whiting, executive director of the National Gardening Association.

THE MILLENNIAL SURGE

In addition to the COVID-inspired garden plots, current home buying trends reveal that millennials are a key market segment for the lawn and garden industry. According to the Home Advisor report, millennials are the fastest-growing group of new homeowners. They're also shaping their living spaces to reflect their needs and lifestyles. That includes a heightened focus on their gardens and landscaping, and a desire to expand their outdoor living spaces.



MILLENNIALS VALUE SUSTAINABILITY

While millennials are leading the way in buying homes and making improvements on their outdoor spaces, it's been well documented in numerous surveys that they rank sustainability practices as a high priority. The vast majority, 85%, indicate that it's "extremely" or "very" important that companies implement programs to improve the environment, according to Nielsen's 2018 report, the [Evolution of the Sustainability Mindset](#). (It's worth mentioning that Gen Z and Gen X aren't far behind, at 80% and 79%, respectively.)

Offering sustainable products, including things made with bioplastics, is one effective way to capture their attention. 79% of customers, according to the same Nielsen survey, said they would change their consumption habits to reduce their impact on the environment, and 38% were willing to pay premium prices for environmentally friendly and sustainable materials.



HORTICULTURE AND SUSTAINABILITY

Today's focus on sustainability also presents opportunities for brands that make products and equipment for our food growers. The food and beverage companies that buy from these growers are looking beyond the product and packaging in attaining their sustainability goals. They want to work with like-minded growers.

As companies set new standards to reduce their carbon footprint, horticultural supplies made with bioplastics can be part of the solution for growers. By switching to bioplastic, whether it's compostable mulch sheeting and compostable plant ties, or investing in trellises made from biocomposites, bioplastic products can help growers as well as food and beverage companies achieve their sustainability goals and tout their progress to consumers.

Benefits of bioplastics

BIOPLASTICS ARE LABOR SAVING

In a commercial application, the higher upfront costs using plant ties and mulch film made of compostable materials can be offset by their advantages.

- Compostable materials are made with plant-based feedstocks, which break down and leave behind biomass, oxygen and water — not plastic residue. Once the material has served its purpose, the item can simply remain in place. Exposure to sun, moisture, oxygen and microbes in the soil contribute to the biodegradation process, returning the material to the earth.
- This remain-in-place system eliminates the need to send labor to the site to collect the materials.
- Compostable sheeting also zeros out the expense of hauling and disposing of used material.

BIOPLASTICS PROVIDE BRANDING BENEFITS

Environmentally friendly products cultivate a positive image for any brand. Consumers respond positively to brands and companies that prioritize sustainability.

SUSTAINABILITY IS A NATURAL FIT FOR HOME AND GARDEN

Bioplastics, especially compostable plastics, create the perfect material for cultivating the land, at home or in the field. Gardening and landscaping promotes the idea of preserving the beauty of natural spaces. Bioplastics provide another way to show a brand's commitment to this ideal.

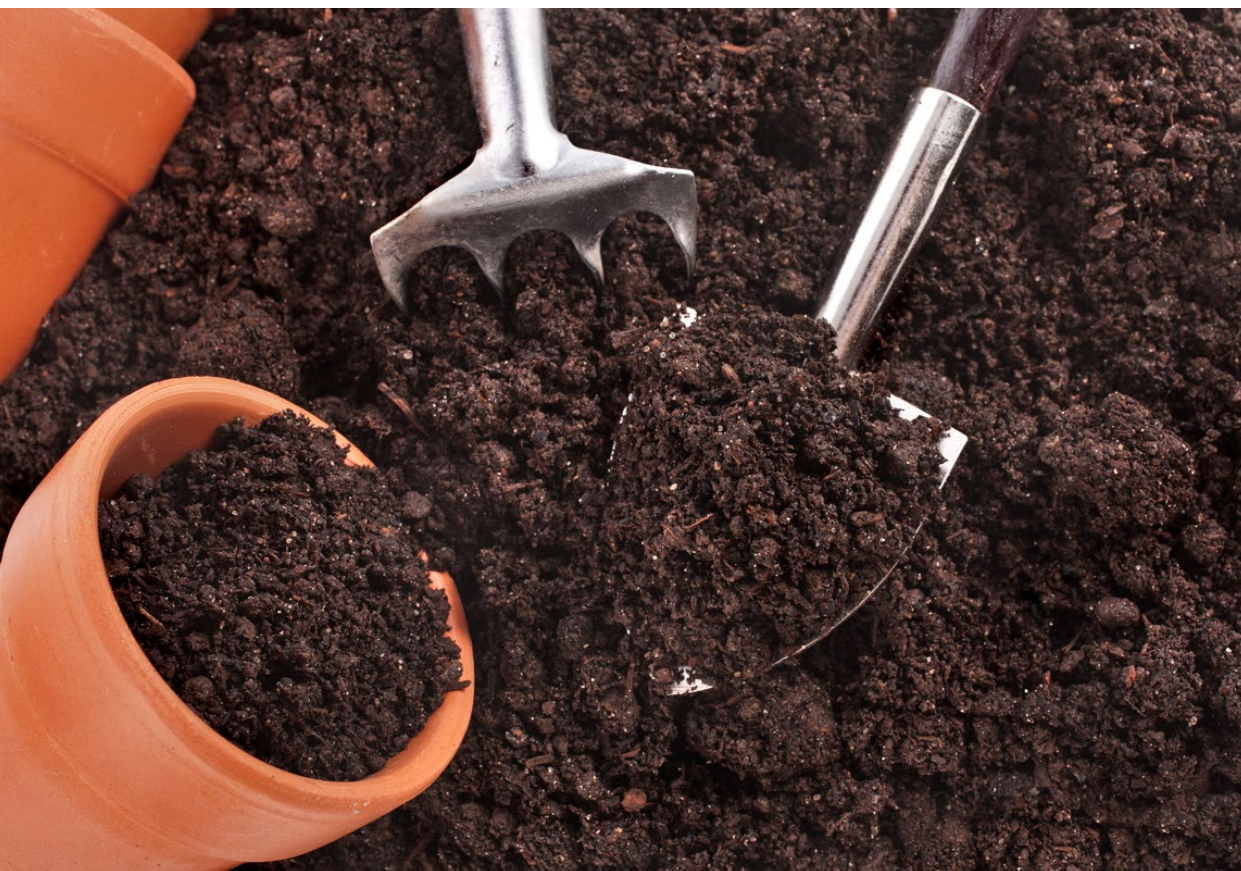
Gardeners, landscapers and horticulturists are well versed in the benefits of using organic matter, like grass clippings, leaves and other plant matter to enrich the soil. Compostable plastics introduce an advanced concept of this traditional life-cycle growing method.

Gardening products made with bioplastics can lower the brand's net use of fossil fuels. The renewable biomaterials take the place of some or all the petrochemicals in traditional plastic materials, lowering the carbon footprint.

BIOPLASTICS ARE COMPATIBLE WITH TODAY'S MANUFACTURING SYSTEMS

Bioplastics are available in injection molding, extrusion, and film grades. These materials can be made into products using the same equipment and processes as traditional plastics.





Getting the dirt on bioplastics

Though choosing a material comes later in the process — once a detailed design and prototype are completed — it's helpful to know early on whether a compostable material is practical or even possible for your product, or if a different bioplastic is better suited for your product.

It's not hard to see the attraction of creating biodegradable and compostable products for yards, gardens and horticulture. That excitement can sometimes be obscured when biodegradable materials are actually impractical and counterproductive in a garden environment. Use these considerations as a starting point in planning your product.

WHAT ARE BIOCOMPOSITES MADE OF?

Biocomposites are the result of combining thermoplastic resins with plant-based feedstocks. Some blends use resins from reclaimed plastic, further reducing the product's carbon footprint.

- Plant-based feedstocks can include reclaimed wood, giving the product the look, feel and lightness of traditional wood, while the plastic material provides strength and durability.
- Plant-based feedstocks can also be other renewable materials, including corn cobs, starches, jute, hemp and flax.

BIOCOMPOSITES CAN BE MADE WITH:

- Polypropylene
- Polyethylene
- Nylon
- Polystyrene
- ABS

BEST APPLICATIONS FOR BIOCOMPOSITES IN LAWN AND GARDEN

- Because the thermoplastic resins in the material bond to the natural materials, it protects the fibers and starches from weather, soil and other elements. Products made from biocomposites are strong, resilient, resist biodegradation and last for years.
- Biocomposites can be used for products that would traditionally be made of wood or plastic.

WHAT ARE COMPOSTABLE PLASTICS MADE OF?

- Compostable plastics can be made from plant material, starches, micro-organisms, petrochemicals or a combination of these materials.
 - o Some materials are petroleum-based
 - o Others are fully bio-based, like PLA and starch blends
- Plant-based feedstocks in compostable plastics include things like: Corn, potatoes, tapioca starches, cellulose and lactic acid.

BEST APPLICATIONS FOR COMPOSTABLE MATERIALS

- Compostable plastics offer a double benefit. They reduce our reliance on fossil fuels, but they're also designed to break down and be returned to nature. When the compostable item is exposed to the soil, heat, microbes, moisture and oxygen, the biodegradation process begins.

Compostable plastics present many possibilities for gardening and landscaping, such as seed starter pots, mulch, plant ties, weed barriers and plant stakes.

Core considerations when choosing a bioplastic

WOULD THE ITEM COME IN CONTACT WITH SOIL?

Products made of compostable material will start biodegrading after prolonged contact with the soil, moisture and heat. With the right product and right application, this is ideal.

A plastic sheeting or landscape fabric that breaks down over time would eliminate the need to collect and dispose of the material later. Simply till it into the ground and allow it to biodegrade naturally. Compostable pots that allow busy gardeners and landscapers to insert them directly into the ground can be a timesaver and reduce the stack of empty pots that have to go to the landfill.

WILL THE PRODUCT BE STORED INDOORS OR OUTDOORS?

In an indoor environment, compostable plastics can last for years. But in the great outdoors, prolonged exposure to sun, rain, dirt and other elements could kick off the biodegradation process. Because garden tools can be forgotten and left outside, compostable may not be the best solution.

Biocomposites, on the other hand, behave like traditional plastics, lasting for years.



WHAT ARE THE AESTHETICS?

Some garden items are functional, but can also make the backyard look more inviting. Natural fibers such as reclaimed wood and jute give biocomposites a unique and natural appearance. At the same time, the resin “seals in” and protects the feedstock, so organic fibers won’t decompose, even if the item lives outdoors. The result is an attractive and durable material that will last for years.

WHAT IS THE ITEM’S LIFESPAN?

Compostable materials are perfectly suited for single- or temporary-use garden items. Once they’re no longer needed, the end user may simply allow them to remain in the ground, put them in a compost pile or till in the material so it can start decomposing.

Biocomposites, on the other hand, have the strength, function and durability of traditional plastics. For items that demand weatherproof ruggedness, biocomposites are the way to go.



DOES THE PRODUCT NEED MULTIPLE COMPONENTS?

Would this product have multiple components requiring different types of materials? If your goal is to create a compostable product, that's an important consideration. When there's more than one component, unless all components are made from compostable materials, the product will have to be disassembled in order for the product to be properly disposed of.

Single-component products simplify the disposal process for compostable materials. When it comes to creating a compostable product, ideally, it's made of a single component, such as starter seed pot or mulch film.

Biodegradable vs. compostable: What's the difference?

Biodegradable and compostable are terms that are sometimes used interchangeably. To some extent, this is true.

If you were to make a pile of items in your yard — leaves, branches, cardboard, newspaper, food scraps — all would decompose at different rates. The same is true with compostable plastics. Some break down more quickly than others.

It's easy to imagine how taking in all compostable items would be a tremendous benefit to our current waste stream, reducing the amount of waste going to landfills. With that said, if products are not tested to ensure they do break down at a fast enough rate, they will cause problems for the compost facility. This is why in order to market a product as compostable, it has to be able to break down within a certain time frame and under certain conditions. In the United States, the composting standard is ASTM D6400 and Europe has a similar standard, EN13432. Under these standards:

- The item would break down in 90 days or less — a similar rate as other compostable materials like yard waste.
- At the end of the process, the item leaves behind only carbon dioxide, biomass, inorganic compounds and no toxic residues.

Right material for the right product

BIOCOMPOSITES WITH PLANT-BASED FILLER AND FIBERS

Ideal for products where durability, a natural aesthetic and weather resistance are desired.

- Decking material
- Trellis
- Arbor
- Bird feeder
- Flower bed edging
- Outdoor storage bins
- Buckets
- Hose attachments
- Planters
- Rain barrels
- Watering cans
- Gardening carts
- Garden bed extenders
- Grow tunnel
- Solar water panels

- Pond liners
- Frost protectors
- Bird and insect netting
- Garden tool handles
- Seed spreaders

COMPOSTABLE PLASTICS

Ideal for leave-in-place, single-use items.

- Seed starters
- Grow kits
- Plant ties
- Temporary supports
- Plastic sheeting
- Tomato helpers
- Netting
- Transplant pots
- Garden stakes
- Mulch sheet

Let bioplastics grow your next product launch

For more than one reason, bioplastics can provide the ideal material for the tools and products that end up in the hands of growers. Bioplastics are compatible with the gardening mindset of sustainability. When applied correctly, they offer almost endless possibilities for your next product launch.

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