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**Notice: The New Haven Transfer Station will be closed on Monday, December 25 and Monday January 1, 2024. The administrative offices of NSWRA at 14 Trumbull St. will also be closed on those days.**



Feature

## The Brave New World of Bioplastics



*Plastic is everywhere, and it's not going anywhere. How do we reduce the amount of plastic entering our waterways and the oceans? We certainly don't seem to be able to do it through recycling. The current effective rate of circularity of plastic is 5%, and there is no incentive to increase it without extensive end of life responsibility taken on by expensive EPR (extended producer responsibility) programs that take years of legislation. If only there were materials that would be more conducive to recycling that could serve as an alternative. Enter bioplastics...*

What are bioplastics? Basically, they are items with the qualities of oil-based plastics that are made from biological components. (Oil-based plastics are typically excluded here because they are considered conventional plastics, and are recycled in certain ways which are often very cost-prohibitive, but they too are technically bioplastics.) Interestingly, not all bioplastics are recyclable. For the purposes of this article, we will be focusing on those bioplastics that are also readily recyclable or biodegradable.

There are already a few categories of biodegradable bioplastics (I shall use the term BB's) that emulate the characteristics of legacy plastic (that made with petroleum-based products).

### Polyhydroxyalkanoates (PHAs)

Polyhydroxyalkanoates (voted the toughest spelling bee word of 2023!) are a class of biodegradable plastic naturally produced by various micro-organisms. The biosynthesis of PHA is usually driven by depriving organisms of certain nutrients such as phosphorus, nitrogen, or oxygen and supplying an excess of carbon sources.

### Polylactic acid (PLA)

Polylactic acid is synthesized from renewable biomass, typically from fermented plant starch such as from corn and sugar cane. In 2010, PLA had the second-highest consumption volume of any bioplastic in the world.

PLA is compostable, but non-biodegradable according to American and European standards because it does not biodegrade on its own in the atmosphere.

### Starch blends

Starch on its own is brittle, so these blends require plasticizers. All starch compounds are biodegradable, but are limited by the biodegradability factor in the plasticizers used to create these blends.

### Cellulose-based plastics

These plastics are less used because of the cost of production, which requires extensive modification of cellulose in order to become plyable (thermoplastic).

### Lignin-based polymer composites (we saved the best for last)

Lignin-based polymer composites are bio-renewable natural polymers with biodegradable properties. Lignin is found as a byproduct of the production of paper, ethanol, and more. It is high in abundance with reports showing that 50 million tons are being created by chemical pulp industries each year. Lignin is useful due to its low weight material and the fact that it is more environmentally friendly than other alternatives. Lignin is neutral to CO<sub>2</sub> release during the biodegradation process, unlike most other biodegradable plastic which has been found to release CO<sub>2</sub> and water as waste products produced by the degrading microorganisms.

Lignin contains comparable chemical properties in comparison to current plastic chemicals, the ability to form into films and high carbon percentage, and it shows versatility in relation to various chemical mixtures used with plastics. Lignin is both elastic and viscous yet flows smoothly when it is liquid. Most importantly lignin can actually improve on the current standards of plastics. It is being produced at such great quantities and is readily available for use as an emerging environmentally friendly alternative.

### **Upcoming:**

Of particular note is an exciting new process being developed actually using CO<sub>2</sub> (yes, CO<sub>2</sub>!) as the source of monomers (the basic building blocks) of plastic. These monomers are typically arranged in geodesic structures (as opposed to chains) so are more durable. At the same time, the CO<sub>2</sub> is fairly easy to break down.

The environmental benefits of this latest process are obvious: Putting waste CO<sub>2</sub> to use in building new materials addresses two issues at once: excess CO<sub>2</sub> in the atmosphere and a virtually limitless

supply of raw materials. On the other end, plastics made this way can be broken down completely into component elements or “reshaped” into new items fairly easily.

The main challenge with these plastics is the challenge with all biodegradable bioplastics: The public must be made aware that they have to be separated from 'legacy' plastics (oil-based ones). If this separation does not occur, both categories of plastic effectively get contaminated, so there is even more waste. MRF sorters have yet to develop ways to sort the two types, so the sorting has to take place at the source – you, the user.

### **This just in:**

A team led by researchers at the University of Washington has recently developed new bioplastics that degrade on the same timescale as a banana peel in a backyard compost bin. These bioplastics are made entirely from powdered blue-green cyanobacteria cells, otherwise known as **spirulina**. <https://www.washington.edu/news/2023/07/10/new-biodegradable-plastics-compostable-in-your-backyard/>

Natural biodegrading (composting) is not the preferred process for recycling these materials, but considering that most plastics are not sent for recycling, it's a nice to know that this particular category will not be contaminating our waterways and land in any case.

These plastics are rigid and strong. One thing researchers are still working on: making them less vulnerable to water – in their current state of development, don't leave them out in the rain!

**Feature**

## **The Four R's of Christmas**

*Between Thanksgiving and New Year's Day there is a 25 percent increase in volume of residential waste or about half a ton per household. This doesn't have to be. Here are some ways you can 'decrease the piece':*

### **Reducing:**

- >Try hiding presents rather than wrapping
- >When ordering online, always choose the option for “less packages,” and check the option for having all your items delivered on the same day (which saves on delivery vehicle fuel and carbon emissions as well)
- >Don't wait until the last minute to shop, and you won't end up with “filler” gifts that are likely to be discarded or left unused.
- >Less is more – a lot of thought put into one gift is better than quantity, and may result in less returns



- >Gift activities, online subscriptions, etc., as an alternative to gifting objects.
- >Conserve wrapping paper! Place your present diagonally on a piece of wrapping paper large enough to have the corners covered <https://www.youtube.com/watch?v=qAQnxcIIDEE>

### Re-using:

- >Just about any container can come in a reusable form.  
examples:
  - o water bottle
  - o shopping bags
  - o refrigerator/freezer storage bins
  - o trash receptacles that don't use plastic bags as liners
- >Wrapping paper – fold it away for another day
- >Consider saving some of the shirt boxes and more durable cardboard boxes left over from your gift exchange for use in wrapping next-year's presents.
- >Re-gift that item that wasn't right for you – to someone who could really use it. No judgment here!
- >Try shopping for gifts in used furniture stores, and vintage clothing or even thrift stores. You will find one-of-a-kind treasures and it can be a fun experience.

### Re-purposing:

Anybody can DIY, especially when it comes to re-purposing.... make an art-object from curios that have been hanging around and are about to get thrown out. Remember: Someone's (your) junk is someone else's treasure - sometimes simply because you put some thought into it.

- >Teacup candles (see pic). When they're spent, clean thoroughly and go back to drinking tea!
- >Glue some memorabilia (even scraps of signature wrapping paper from last year or this year) to a translucent lamp shade
- >Make a decorative multiple gift “stack” out of the boxes in which the items were delivered
- >Old desk drawers make interesting displays when spruced up. Also good for holding coffee-table books, albums, counter clutter, etc. Place them on a low table. They even work as picture frames or light-boxes.
- >Don't throw your artificial Christmas tree out – break it down into wreaths or use as part of floral arrangements.
- >Pay a visit to **EcoWorks** on State Street in North Haven – There you will find unique gifts that are made from mostly re-purposed materials/items, by local makers and crafters!



## Recycling:

Note that “recycle” is the last heading on this list because the other options should be considered first. Although recycling certainly cuts down on emissions and saves resources, collection and processing do have costs. That being said, you can recycle:

- >Real Christmas trees (bring to the New Haven Transfer Station)
- >Basic wrapping paper (no extra finishes) – Hint: put someone in charge of collecting and separating these items during your unwrapping ceremonies – you will find it less overwhelming later!
- >Tree light strings - **DO NOT PLACE IN YOUR RECYCLING BIN!** Your local Home Depot, Lowe's or hardware store might accept your faulty Christmas lights if you're searching for a responsible way to recycle them. Call ahead.
- >Single-use plastic cups (not styrofoam cups)
- >Hot liquid plastic tops (not the cups)

As always, it's important to know what is *not* recyclable, as putting such items in your bin can render whole truckloads of supposed recyclables “contaminated” and subsequently rejected at the materials recovery facility.

### *Not* recyclable:

- >Tinsel
- >Ornaments
- >Embossed or embellished wrapping paper
- >Artificial trees

## City of New Haven meeting schedule:

<https://newhaven-ct.legistar.com/Calendar.aspx>

## New Haven Parks and Public Works info:

### A Message from Parks and Public Works Resident Services:

The Parks & Public Works office located at 34 Middletown Ave will be closed, on Monday, December 25, 2023 and January 1, 2024. Please note that all trash and recycling pick-up will be delayed one day. DECEMBER 15TH will be the final day to place yard waste outside on your normal trash & recycling day as we will suspend yard waste pick-up during the winter. After this date, please bring your yard waste to the transfer station using your vouchers. Yard waste **MUST** be in brown bags

and cannot weigh more than 50 lbs. GRASS CLIPPINGS, ROCKS, AND DIRT should not be placed in yard waste bags. Branches cannot be longer than 4 ft long and MUST be bound. AS A REMINDER, IT IS A VIOLATION OF THE ORDINANCE TO RAKE OR BLOW LEAVES INTO THE STREET. EXTRA LEAVES WILL SLOW CREWS DOWN AND LARGE PILES CAN DAMAGE OUR EQUIPMENT. CREWS WILL AVOID THESE PILES AND REPORT THEM TO THE PUBLIC SPACE ENFORCEMENT DIVISION.

Bulk Trash pickup will continue through the winter months. Please call our office at 203-946-7700 for availability. Please remember this is first come first serve – we are not able to hold spots. During winter months spots are limited. If your bulk date is canceled due to weather, our office will contact you with a rescheduled date. IF YOU DO NOT HEAR FROM PUBLIC WORKS YOUR APPOINTMENT IS STILL ON!

New Haven residents with a valid CT state driver's license, or ID can stop by our office at 34 Middletown Ave Monday-Friday 7 am - 4 pm to pick up free vouchers to be used at the Transfer Station. The Transfer Station is open for residents Monday – Saturday from 9 am – 12 pm. Vouchers cover yard waste (such as branches, brush, and leaves) and residential waste such as electronics, bulky waste, and furniture - (think: garage, attic, storage room) that are not otherwise recyclable at the transfer station.

VOUCHERS DO NOT COVER DEMOLITION AND/OR CONSTRUCTION, STUMPS, OR BRANCHES LARGER THAN 6 INCHES AROUND AND WILL RESULT IN A FEE FOR THE RESIDENT. AS NOTED PREVIOUSLY GRASS CLIPPINGS, MULCH, AND DIRT ARE NOT ACCEPTED AT THE TRANSFER STATION!

Did you know that See Click Fix also sends alerts? If you haven't reported a concern via the app, you can still sign up to receive alerts. You can create multiple points of interest and register to receive notifications for that area so you can get street sweeping notices where you live and where you work. We also send out notices to remind you that trash will be delayed for the holiday. Please visit <https://seeclickfix.com/new-haven> to sign up!

**Links:**

New Haven Public Works-

<https://www.newhavenct.gov/depts/pw/>

Public Works paving schedule-

<https://www.newhavenct.gov/home/showpublisheddocument/15028/637903861608081376>

See Click Fix-

<https://seeclickfix.com/new-haven>

## NHSWRA contact info and link:



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