



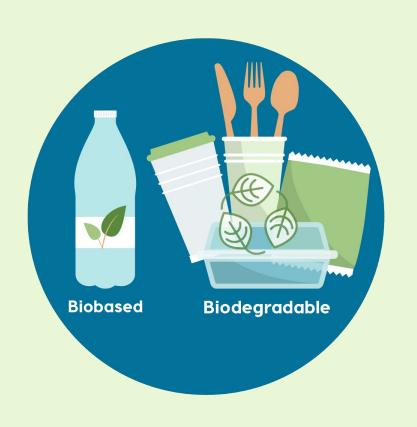
Bioplastic

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History

- During the 1920s, Maurice Lemoigne, a French researcher, discovered the first biodegradable plastic (<u>Polyhydroxybutyrate</u>) from his work with the bacterium
- In the 1990s, the research again became popular, this time in the biomedical industry. Between medical applications and fluctuating oil prices, research in biodegradable plastics has become steady and profitable. So far, researchers have invented several different types of plastics and a variety of manufacturing methods.



In 1855, the first-ever man-made plastic was made from cellulose, so it actually was a bioplastic. The discovery was made by Alexander Parkes In 1926, French scientist Maurice Lemoigne discovered what is now considered the first known bioplastic made from bacteria called polyhydroxybutyrate (PHB). In the decade of 1970s, there was a petroleum crisis that sparked interest in looking for solutions that didn't require oil as the raw material, as the oil was scarce and expensive.

In 2010 first bioplastics made from seaweed were invented. This is a big step, as the plantation of seaweed does not require chemical pesticides, fertilizers, and land.

In 1907 Bakelite was invented. This was the first fully synthetic plastic. It was discovered by Belgian-American chemist Leo Baekeland.

In 1930 Henry Ford started to use some bioplastics made from soy oil in order to manufacture some car parts. In 1975, Japanese scientists discovered a bacteria (Flavobacterium) that was able to break down nylon, this is how the principle of biodegradable plastics was conceived.

Nowadays, companies and laboratories of all sizes keep researching the field. Many of them are already producing biodegradable and compostable alternatives to petroleum-based plastics.



Purpose

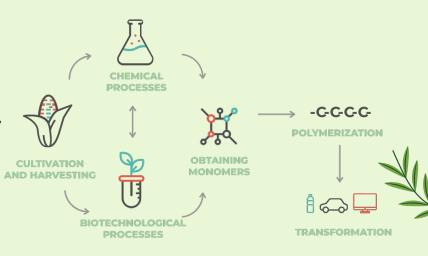
Broadly speaking, so-called "environmentally friendly" plastics fall into three types:

- Bioplastics
- Biodegradable plastics
- Eco/recycled plastics,
- The purpose of bioplastic is to make plastics from kinder chemicals to start with,
- Find a material that will break down more quickly and easily when we got rid of them.
- Reduce the problem of plastic waste that is polluting the environment
- As well as reduce dependence on fossil resources whilst improving a products carbon footprint





- Most Bioplastics are made from renewable biomass energy sources, such as corn and sugarcane.
- Production involves processing, fermenting, and synthesizing natural biopolymers from starch and cellulose.
- Then the materials go through a forming process
- Bioplastics can also be biodegradable
- In recent years Bioplastics have exploded in popularity





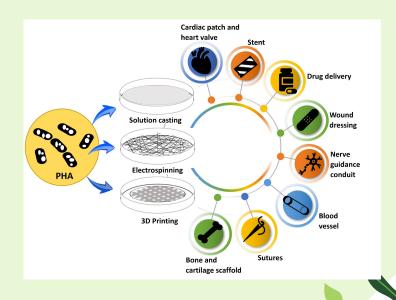
Polylactic acid (PLA)

- PLA bioplastics are made from the sugar in cornstarch and sugar cane.



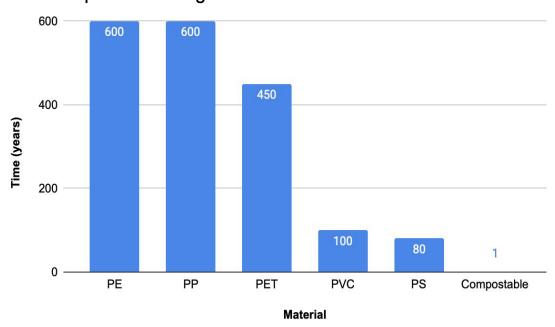
Polyhydroxyalkanoate (PHA)

- PHA bioplastics are made from bio-feedstock and microorganisms.

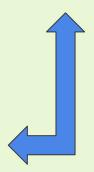


Compared to Normal Plastic





 Bioplastics degrade much faster than conventional plastics making them much better for the environment.









Compared to Normal Plastic

CONVENTIONAL PLASTIC

Materials: Finite resource. Linear. Extraction is causing severe health and environmental damages

Manufacturing: Plastic manufacturing facilities and plastic additive processing facilities, which can produce some significantly

harmful chemicals including phthalates and brominated flame retardants.

End of life: If contaminated with food: landfill or incineration. If not, at this stage, only a tiny portion of plastic packaging is actually recycled, especially after China's National sword policy

Circularity: Depends on the plastic-type, but some plastics lose their functionality after a few cycles. It is also hard to guarantee food contact safety of recycled content.

BIOPLASTICS

Materials: Renewable, circular, carbon sequestration while the plants are growing.

Manufacturing: Natureworks claims that manufacturing Ingeo produces approximately 80% fewer greenhouse gases and uses approximately 52% less non-renewable energy (NREU) than traditional polymers like polystyrene

End of life: Composting by industrial compost facilities.

Circularity: Organic recycling: the loop is closed by producing a new resource (compost) that can be used to grow more plants.



Pros:

- 1. Fewer Carbon Emissions
- 2. Enhanced biodegradability
- 3. Less plastic pollution
- Make better use of natural resources
- 5. Improved food safety
- 6. They can be recycled



Cons:

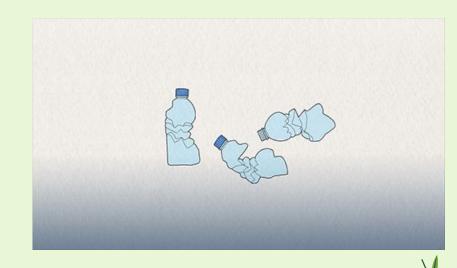
- Won't biodegrade in landfills
- 2. Encourages littering
- 3. Contaminate plastic recycling systems
- 4. Bioplastics remain less than one percent of all plastics manufactured worldwide.
- Most bioplastics do not yet save more carbon emissions than are required to manufacture them

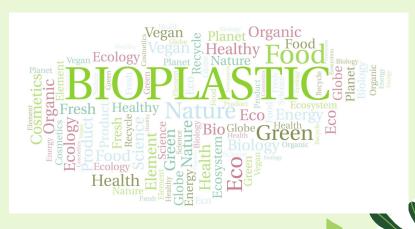


Summary

In conclusion:

- Bioplastics are beneficial for the environment
- Even though the are only a small percentage of the plastics being used and produced today, the more people that begin to use Bioplastic the more it will help our planet.
- We are <u>for</u> this emerging technology because we believe that in the long run, it will help solve the immense problem of plastic contaminating our planet and oceans.
- If we all make an effort to start using less conventional plastic and more bioplastic, then together we can help protect our environment







<u>Bioplastics purpose</u> - sciencedirect

Short History of Bioplastics - biopolylab

7 Advantages of Bioplastic Packaging for the Food and Drinks Industry- takeawaypackaging

The Pros and Cons of Bioplastics- greenhome

Making better plastic- explainthatstuff.com

<u>Plastic v Bioplastic</u>.- biopak

<u>Picture</u> - bioplasticsnews

<u>Picture</u>.- biopak.

<u>Picture</u>- carbiolice

The Truth About Bioplastics - news.climate.columbia.edu

GIF

<u>Picture</u>







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