

Bioplastics – A ecofriendly packaging technology

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Bioplastics (also called organic plastics) are a form of plastics derived from renewable biomass sources, such as vegetable oil, corn starch, pea starch or microbiota, rather than fossil fuel plastics which are derived from petroleum.

Bioplastics: PLA derived from corn-starch :

Bioplastics are a new generation of biodegradable and compostable plastics. They are derived from renewable raw materials like starch (e.g. corn, potato, tapioca etc.), cellulose, soy protein, lactic acid etc., not

hazardous in production and decompose back into carbon dioxide, water, biomass etc. when discarded. Corn starch is currently the main raw material being used in the manufacture of



bioplastic resins. Mater-Bi (main component corn-starch), and PolyActide (PLA) (made from corn-starch as well) are currently the 2 main resins (raw materials), being used today in the production of compostable and biodegradable plastics and are certified for compostability under standards set by international organizations. However, other resins are coming into the market made from potato starch, soybean protein, cellulose etc. Most of these are currently not certified for compostability, though some are for biodegradability. The field of bioplastics is constantly evolving with new materials and technologies being worked on and being brought to market.

Heat resistance :

– Corn-starch based products (bags, cutlery, cold cups, drinking straws): 120 degrees F

– Corn Starch Biodegradable Cutlery: 220 degrees F

Biodegradability and Compostability Bioplastics can take different length of times to totally compost, based on the material and are meant to be composted in a commercial composting facility, where higher composting temperatures can be reached and is between 90-180 days.

Most existing international standards require biodegradation of 60% within 180 days along with certain other criteria for the resin or product to be called compostable.

The rate of biodegradation for different biocompostables is dependent upon the composition and thickness of the material as well as composting conditions. Commercial composting facilities grind the materials, turn over the piles and reach high temperatures, thus reducing the amount of time it takes to compost and, is thus, the recommended method for composting these products. Home composting rates are slower and can vary, depending on how frequently the pile is turned over, the moisture and material content and the temperature.

Applications :

Because of their biological biodegradability, the use of bioplastics is especially popular for disposable items, such as packaging and catering items (crocery, cutlery, pots, bowls and straws). The use of bioplastics for shopping bags is already very common. After their initial use they can be reused as bags for organic waste and then be composted. Trays and containers for fruit, vegetables, eggs and meat, bottles for soft drinks and dairy products and blister foils for fruit and vegetables are also already widely manufactured from bioplastics.

Non-disposable applications include mobile phone casings, carpet fibers, and car interiors, fuel line and plastic pipe applications, and new electro-active bioplastics are being developed that can be used to carry electrical current. In these areas, the goal is not biodegradability, but to create items from sustainable resources.

Performance and usage :

Many bioplastics lack the performance and ease of processing of traditional materials. Polylactic acid plastic is being used by a handful of small companies for water bottles. But shelf life is limited because the plastic is permeable to water - the bottles lose their contents and slowly deform. However, bioplastics are seeing some use in Europe, where they account for 60% of the biodegradable materials market. The most common end use market is for packaging materials. Japan has also been