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Industry Produced Compostable Plastic and its Environmental Damage

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Introduction

Oil and natural gas are the major raw materials used to manufacture most plastics. Replacing petroleum-based plastics with plastics made from renewable raw materials, such as plants, reduces our dependence on fossil fuels. Replacing petroleum-based plastics with plastics designed to degrade, biodegrade, or compost can provide even more environmental benefits. Bio based and compostable plastics, also known as bio plastics, hold the potential to reduce dependence on fossil fuels, foster the development of more sustainable products, and increase the diversion of food waste from landfills. However, bio plastics also present challenges and create uncertainty for a wide array of stakeholders. Inconsistencies in product labeling and a lack of accepted definitions for industry terms cause confusion for consumers upon purchasing and when discarding the products. Improperly sorted bio plastics can contaminate recycling streams, contaminate feedstock for composting operations, or end up buried in a landfill. Inconsistent rates of decomposition from product to product can impede commercial composting operations.

One of the promises that companies often make is that they will switch from plastic to products that are 100% compostable. What could be better than packaging products in materials that decompose naturally in the environment, like paper? In the battle against the plastic soup, it's especially important that packaging decomposes quickly in the sea. In other words: in water with a low temperature, little oxygen, and little sunlight. That, however, is not what companies mean when they talk about '100% compostable', or biodegradable plastic. Here, they are referring to plastic that is made from natural raw materials like maize, cane sugar, or potatoes rather than oil. Nonetheless, these types of biodegradable plastics still have similar characteristics to conventional plastic, especially once they reach the marine environment.

Identification

In order to biodegrade, biodegradable plastics need to be placed into the end-of-life environment for which they were designed. If placed in the wrong environment, not only is a biodegradable plastic prevented from delivering many of its potential environmental benefits, but it can hinder the efforts of composters or recyclers. Composters and materials processing facilities need easily recognizable labels for appropriate sorting, and consumers need easily recognizable labels for appropriate source separation. Easily identifiable, clearly labeled products can facilitate proper end-of-life management of bio plastics. Consumers are currently overwhelmed with seemingly interchangeable terms and may not manage the product properly at the end of its lifecycle. The ASTM D6400 standard specification sets a compost ability standard for labeling plastics as compostable, with the BPI label providing 3rd party independent certification that products meet this standard. However identification challenges remain. Although ASTM D6400 provides a link between end-of-life processors, such as commercial composters, and the bio plastics brand owners who dictate how products are labeled, more formal communication between these two stakeholders is needed to resolve the product identification and labeling issue. Groups such as the Biodegradable Products Institute, SPI Bio plastics Council, Sustainable Packaging Coalition, and Sustainable Plastics Initiative can help facilitate communications.

Biodegradable plastics made of natural materials such as maize or cane sugar, are used for food packaging, disposable cups, bags, and other similar products. A move to compostable bio-based plastics is attractive to businesses for reasons beyond the reduction of plastic pollution: by using biodegradable plastics, companies are less dependent on oil and the accompanying fluctuations in the prices of oil around the world. Compostable plastics also have a lower CO-2 emission rate. In the Netherlands, there are lower packaging taxes for companies that choose biodegradable plastics, but they also have disadvantages. To obtain the biomass needed for the production of compostable plastic, valuable agricultural land is needed.

Industries Education

Consumers without a basic knowledge of composting and the difference between bio based and biodegradable are unlikely to properly manage bio plastic products. A consumer may send a bottle labeled as "bio based" to a compost facility, place the bottle in a regular recycling bin, send it to a landfill, or even toss it on the ground believing it will decompose like the corn or potato from which it was made. Consumer education on bio plastics should start with explaining the basics, such as the difference between bio based and biodegradable. Most consumers are not familiar with composting so consumer education should start with composting basics, and be aligned with well-respected non-governmental organizations such as USCC, National Research Council, and Sustainable Packaging Coalition to support packaging details. Then collaborative efforts should tackle education from a broader standpoint and plan the best method to educate the general public.