Using the Chemistry of Plastics to Make Biodegradable Lunchboxes

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It is a new school year and millions of new plastic lunch boxes are purchased once again. The lunch box market is majorly growing due to the demand from school and college-going students. Some students use plastic bags or brown paper bags for lunch which is not a good alternative because they do not last for long and you have to replace them constantly. Most plastic lunch boxes are made from polypropylene plastic. While polypropylene is recyclable, when it is heated it creates chemicals with unknown toxicity. The plastics are made from an energy-intensive process using petrochemicals that are harmful to the planet and, also produce a toxic discharge which is incredibly harmful to the environment. This is a big problem when you consider that China produces over 15 billion plastic lunch boxes each year. Also, the amount of chemicals presents in plastic seep their way into your food and are responsible for maximum damage to your health, while also bearing the tendency to become carcinogenic.

Bioplastic is a plastic that is biodegradable, meaning it will dissolve over time. Bioplastic is also plastic made with renewable resources such as vegetable oils, starches, and other biology-based ingredients. Some plastics made of renewable resources are also biodegradable. Most large biological molecules are polymer**s,** long chains made up of repeating molecular subunits, or building blocks, called monomers**.** If you think of a monomer as being like a bead, then you can think of a polymer as being like a necklace, a series of beads strung together. Polymers are broken down into monomers via hydrolysis reactions, in which a bond is broken, or lysed, by the addition of a water molecule. This is the reverse of a dehydration synthesis reaction, and it releases a monomer that can be used in building a new polymer.
Biobased is those “derived from plants and other renewable agricultural, marine, and forestry materials, as opposed to non-renewable materials, such as petroleum. So, when we say our products are plant-based, it means simply that plants are the primary biobased resource we used to make them.

Insulated lunch boxes usually contain an outer layer made of a tough plastic fabric like vinyl, nylon, or polyester that can be hard to stain or tear. The bag’s inner layer is usually made from a water-resistant material – plastic, aluminum, vinyl, and foil liners are common and help keep food fresh and dry. An inside middle layer of insulating foam is typically made from materials like durable polyurethane, polyethylene plastic, or thermal batting made out of polyester fibers.

Biodegradable lunch boxes are made from 100% organic sugarcane**,** with natural adhesives made from plants. It is formed at very high temperatures to form a durable surface that looks and feels like plastic. Keep in mind that these lunch boxes may look like plastic, but they are not. They are 100% biodegradable and natural. They will last for many years then eventually dissolve in landfills or composts, they will be completely biodegraded within 180 days. Silicone seals are BPA-free and recyclable.

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Although compostable and biodegradable materials are usually interchangeable, they do not mean the same. Biodegradable means that products can be decomposed without oxygen and converted into carbon dioxide, water and biomass in a reasonable time. The difference between main compost and biodegradable compost is that the compostable products need to be decomposed in specific settings, while the biodegradable products decompose naturally. Generally, composting is a faster process, but only under suitable conditions.

Biodegradable lunch boxes will produce significantly fewer greenhouse gas emissions than traditional plastics over their lifetime. There is no net increase in carbon dioxide when they break down because the plants that bioplastics are made from absorbed that same amount of carbon dioxide as they grew. Those using them will benefit tremendously by not having their lunch boxes spread chemicals to their food.

References

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