

Plastic Waste at the SBRC in Barbados

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Sara with SBRC team categorizing plastic waste

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I am a third year student of Bioresource engineering at McGill University.

I love travelling and being able to apply the knowledge I learn in the classroom to real life situations. In the future, I will continue to work on global environmental concerns.

Introduction:

Plastic is one of the most commonly used man-made materials in the world today due to its many desirable characteristics. Plastic is cheap, convenient, and versatile. However, what happens to plastic when we discard it? Is it recyclable? Is it reusable?

In 2014, it was approximated that 46,000 pieces of plastic cover every square mile of ocean floor! In addition to this, at least two thirds of the world's fish are suffering from plastic ingestion (D'Allesandro, 2014). Plastic waste has a domino effect on human health. If plastic is in our oceans, it is in the fish we eat and in the water we drink. Hence, plastic waste has become a global concern. If plastic waste is left untreated it will end up completely destroying our environment. If it isn't sorted from human garbage, it ends up in landfill.

Background information:

Sustainable Barbados Recycling Center (SBRC) is one of the largest companies on the island of Barbados. It is in charge of safely handling the island's public waste. SBRC receives waste in four main categories:

A) municipal solid waste B) construction and demolition waste, C) rocks and soil, and D) green waste.

Project Activities:

1) Coordinate and participate in plastic waste sorting.

Rational: It is important to categorize plastic waste at SBRC because:

a. If economical to do so, sorting would reduce the amount of plastic waste entering the landfill,

- b. Knowing how much of each plastic is recoverable could help to determine potential markets.
- 2) Examine degradability of Vegware® and related food trays used in the hospitality industry and for home use.

Rationale: It is important to identify a food tray that can be recommended for Barbados.

- a. If Vegware, which is supposed to be compostable, can be quickly degraded, this product could be recommended for use on the island. However, previous experimentation with Vegware at SBRC was not promising. Vegware plastic containers did not degrade (at all) over 6 months of composting.
- b. It could be that other food trays could be recycled or composted too so all of them were collected and tested for degradation under various conditions. Vegware plastic containers and the four other products (crude oil-based plastic containers, Vegware paper containers, competitors paper containers and Styrofoam plastic containers).

Hypotheses about plastic waste in Barbados were considered:

- a. Vegware® plastic containers made from PLA, crude oil-based plastic containers, Vegware® paper containers made from bagasse, competitors paper containers, and Styrofoam plastic containers will not

degrade under various conditions (boiling in water, exposure to caustic (high pH) and acidic (low pH) conditions, or exposure to UV, due to their chemical properties.

When investigating the degradability of food trays, the following tests were performed: 1) Boiling in water for 45 min 2) windrow composting bin for 6 weeks 3) Submerging in vinegar, Draino or water for 1 week 4) Submerging in ¼ cup of Bleach or Purple power degreaser for 1 week 5) Submerging in 1 M HCL or NaOH for several days, 6) Exposure to UV irradiation (sunlight) for 1 week.



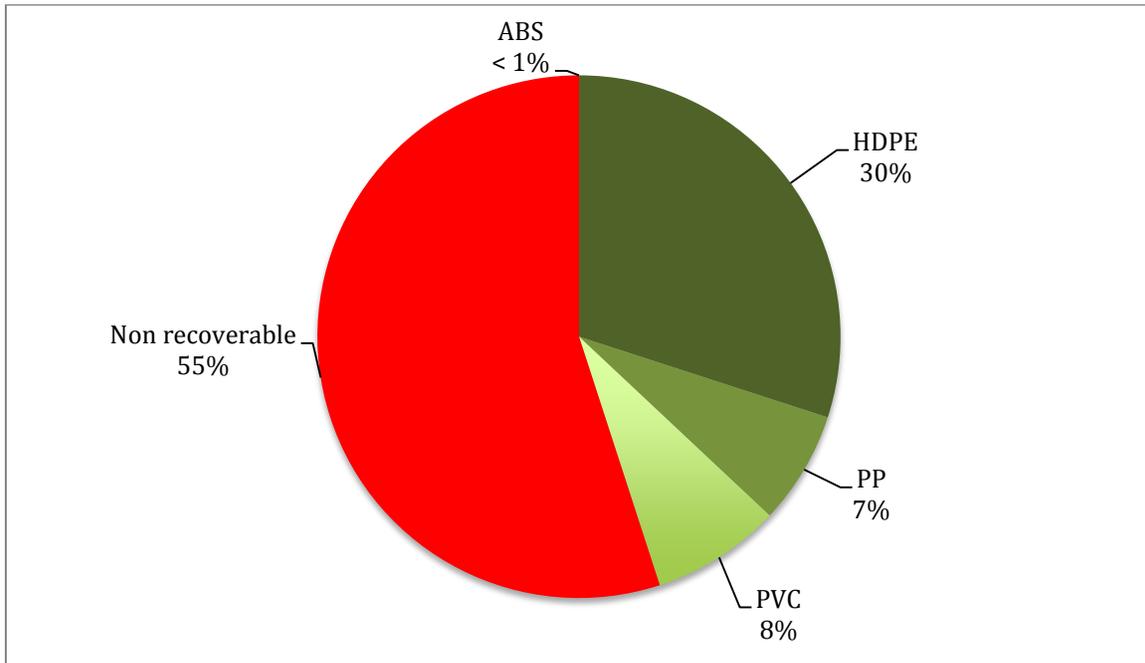
Pile of PVC separated from the pile of plastic



Piece of Vegware plastic after being in vinegar for 1 week

No drastic changes in the food tray products occurred from any of the treatments. From these results it is evident that further investigation needs to be done to recommend a compostable or degradable food tray for the island.

Results Of the Plastic Separation Activity



After 6 weeks of sorting plastic, the team determined that 55% of the plastic entering SBRC is unrecoverable; too dirty or too small for effective recycling or separation. The good news was that the plastic that could be recycled has potential markets and is valuable to the economy. The recoverable plastic can be separated into four main categories: 1) HDPE (30%), 2) PVC (8%), 3) PP (7%), and ABS (<1%).

From the above pie chart a few remarks can be made: HDPE is both recyclable and reusable and amounts to 30% of the total plastic weight. It is made up of car bumpers (11%), gasoline tanks, and other items. PP is recyclable and reusable and amounts to 7% of the total plastic weight. It is made up of polypropylene plastic and is often used for disposable plastic containers. PVC (8% by weight) is collectable but is difficult to recycle as it has limited market resale. It can't be reused safely in food or children's toy products.

However, it is mostly made up of piping which could potentially be repurposed.

Recommendations:

1. Train staff at SBRC to identify and separate out the three main categories of useful plastic waste (HDPE, PP, and PVC) as it enters the facility.
2. Hire a professional, trained in plastic and/or compost, to recommend a greener food tray for use in Barbados.



Conclusion:

Educating the public about the detrimental effects of plastic waste on the environment and reducing its sale and use is critically important. In a world reliant on nature, we must seriously address an issue as big as plastic waste management as soon as possible.

References:

D'Allesandro, N. (April 4th, 2014). 22 Facts About Plastic Pollution (And 10 Thing We Can Do About It). *EcoWatch*. Retrieved online from:
<https://www.ecowatch.com/22-facts-about-plastic-pollution-and-10-things-we-can-do-about-it-1881885971.html>

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