

Report on Compostable and Biodegradable Plastics (DRAFT)

Created by Noah Snell in November 2018 for Surfrider Vancouver Island’s “Straws Suck” campaign

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**Problem**

- **Plastics cause many problems in the marine environment**
  - “Plastic by-products do not degrade naturally, but break up into infinitely smaller pieces, which get ingested by sea life” (1)
  - “Plastic contains toxins which travel up the food chain and end up on our plates” (1)(6)
  - “Plastics...fill ocean gyres” (1)
  - “Plastics...kill marine life and other organisms” (1)

**Adopted Solution**

- **Many businesses have turned to compostable and biodegradable plastics as a means to reduce their environmental footprint**
  - **The only way to verify what these terms really mean is if they are certified**
    - ASTM (American Society for Testing and Materials) provides guidelines for certification, but different countries have different methods
    - General assumptions about each: see below

Bio-based	Biodegradable
<ul style="list-style-type: none"><li>● “Plastics derived from sources such as microbes and plants rather than fossil fuels” (6)</li><li>● PLA - Polylactic Acid - most commonly used (7)<ul style="list-style-type: none"><li>○ Natureworks Ingeo - largest manufacturer of PLA (8)</li></ul></li><li>● Is not necessarily biodegradable or compostable (6) (7) - for example PET is partially bio-based but not biodegradable (6)</li><li>● May still have BPA or toxins added (12)</li></ul>	<ul style="list-style-type: none"><li>● Is not necessarily bio-based.</li><li>● Can leave toxic residue</li><li>● “An item can be broken down by the action of living organisms, typically microbes” (6) “into simple chemical elements” (6) such as “carbon dioxide, methane and water” (6)<ul style="list-style-type: none"><li>○ Microbes - too small to be seen by naked eye. Eg. bacteria</li></ul></li><li>● Time varies greatly depending on factors such as environment (6)</li><li>● Sometimes have additives mixed in - these “may be released when plastics degrade” (6)</li><li>● See (6) for types of biodegradable plastics</li></ul>

Compostable	Degradable
<ul style="list-style-type: none"> <li>● Is not necessarily bio-based.</li> <li>● Cannot leave toxic residue</li> <li>● Break down into organic matter, which would facilitate plant growth</li> <li>● Commonly associated with ASTM D6400 certification</li> </ul>	<ul style="list-style-type: none"> <li>● Most plastics are degradable (6)</li> <li>● Ability to break down into fragments through weathering effects (sunlight, heat, friction etc.) (6)</li> </ul>
Oxo-degradable	
<ul style="list-style-type: none"> <li>● Typical plastics “that contain additives known as pro-oxidants”, typically metal salts that “are intended to speed up degradation” .. “into smaller fragments without any help from microbes” (6)</li> <li>● Lots of micro-fragments created (6)</li> <li>● “The evidence suggests that oxo-degradable plastic is not suitable for any form of composting or anaerobic digestion and will not meet the current standards for packaging recoverable through composting in the EU.” (6)</li> </ul>	

**Why Don't They Work?**

- 1. While their use is often well-intentioned, there is no way to guarantee that compostable/biodegradable plastics end up in the right facilities in order to be processed. Therefore, their key goal is not achieved.**
  - a. Biodegradable and compostable plastics are only certified to degrade properly in industrial facilities at high temperatures with high moisture levels and the right microorganisms (16)
    - i. Such facilities are not available in the Victoria area
      1. Only one location in Chemainus (9)
    - ii. They will not break down in home compost bins
    - iii. They will not break down in landfills (6) (15) (16)
    - iv. They will not degrade in marine environments (17) (18)
      1. Therefore pose the same challenges as conventional plastics
- 2. Money being spent by businesses on biodegradable/compostable plastics is wasted**
- 3. Even if compostable, there is energy used, emissions created, and environmental impacts to every product created. Therefore, we need to focus on reducing consumption overall.**

4. Potential for further research here - I believe that we do not need further research to identify *key* reasons why compostable/biodegradable plastic should not be used - we already have enough points to build an argument. However, for further argument against biodegradable/compostable plastics, the following issues are among those that can be raised:
  - a. Ethical issues such as sourcing of crops and use of GMOs (6)
    - i. Land use for these crops
  - b. Energy use to create biodegradable/compostable plastics
  - c. Impact on recycling facilities
  - d. Bioplastics create emissions such as methane when they biodegrade in landfills (6)(9)

### **Suggested Solutions**

(with focus on compostable/biodegradable straws - however, can be applied to many different compostable/biodegradable plastic products)

#### **1. Promote Surfrider Certification among businesses**

- a. If beverage is being enjoyed in-house, use a reusable metal straw, or none at all.
- b. Do not provide any form of single-use straw unless requested by a customer.
- c. If beverage must be taken to-go, use paper straws.
- d. Ensure paper straws do not have a plastic coating.

#### **2. Spread the word to increase awareness among consumers**

- a. Stop using straws or use reusable metal, bamboo straws etc.
- b. Choose local businesses with Surfrider certification
- c. Encourage businesses to obtain Surfrider certification
- d. Only use single-use products if absolutely necessary

#### **3. Ban single-use plastic products**

- a. Already proven - municipalities and countries worldwide have introduced bans on plastic products. However, these bans vary in what plastic products they cover.
  - i. Examples of plastic bans that have included plastic straws:
    1. Vancouver (2)
    2. Seattle (3)
    3. The Royal Estate in the UK (4)
    4. Taiwan (4)
    5. Malibu, California (4)
    6. Scotland (5)

#### **b. A next step here is to include compostable/biodegradable plastics in such bans**

4. Possibility for further research - alternative types of compostable plastics?
  - a. Marine biodegradable plastics? -ASTM D6691 (11)
  - b. Biodegradable in a home compost bin? (10)
  - c. Edible straws? One company has created edible bioplastic from seaweed (14)

## **References**

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