OCEANSAFE

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Goal

To bring awareness to the impact that toxoplasma gondii has on sea otters, and to design a product that will reduce the amount of cat feces going into the ocean while causing the least damage to the environment.

Initial Idea

- Local biodegradable bag with logo and slogan
  - Sammy the sea otter says “Bag it up!”
  - Hydro Degradable
    - 60% starch
      - sugar / potato
    - 40% biomass
      - renewable carbon based fuel
  - Landfill
    - does not leach toxic chemicals

http://atlanticpoly.com/biodegradable-plastics

Our Plan

Design

- Anaerobic Digester:
  - Sterilize feces
  - Kills toxoplasma gondii oocysts
  - Soil conditioning byproduct
  - Affordable

What is Anaerobic Digestion?

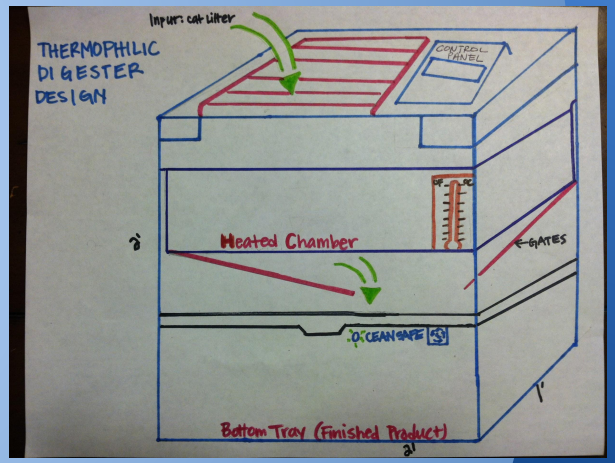
- Biochemical reaction carried out by several types of microorganisms which require no oxygen to live.
- Thermophilic anaerobic digester (122° F or higher)
  - byproducts
    - digestate (for soil)
    - biogas (methane and co2)
- Sodium Bicarbonate
  - helps maintain consistent PH balance
  - natural odor absorber

What goes in determines what comes out

- Most common type of litter
  - “clumping” clay litter
    - non biodegradable
    - produced by strip mining
- Ideal Feedstock for biodigester
  - non fibrous biodegradable plant or animal matter
    - pine / recycled paper litter too pulpy
- Biodegradable / compostable litter alternatives
  - cassava, barley, okara, dried orange peel

Current Design

- Material: Steel because it retains heat well (to keep the temperature from fluxuating)
- Air tight
- Control Panel: Auto temperature detector
- Two chamber design
  - Add cat litter to upper chamber
  - Once finished, product automatically drops into removable tray



Heating the Thermophilic Digester

- Plug in
- Composting process alone produces heat of 120ºF or more
- Internal thermometer to measure temperature
  - Provide additional heat if needed

How Much Power?

- Need approx. 12btus/hr or 3W from baseline to ideal of 140ºF
- One day digestion period: 245 btus or 72W
  - 72W = 0.072kW/h per day
    - small fraction of average household usage
    - average per year is 11,280kW/h
      - (or approximately 31 kW/h per day)

According to US Energy Information Administration:
http://www.eia.gov/tools/faqs/faq.cfm?id=97&t=3

Future Plans

- Continue research
  - Completely self sustaining by recapturing the methane produced
  - Current research on methane
    - Used to power fuel cells and store electrical energy chemically until needed

Goal, Pricing, & Backers

- Goal: $25,000
- If you pledge:
  - $2,500: Digester and year supply of biodegradable litter
  - $1,000: Digester
  - $100: T-shirt, coffee mug & sticker
  - $50: Coffee mug & sticker
  - $10: Sticker

Thank You!