

# Encouraging a Future of Renewable Plastics Through Composting Innovation

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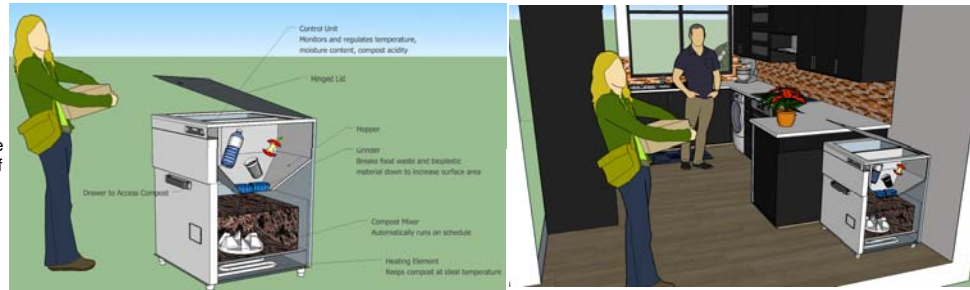
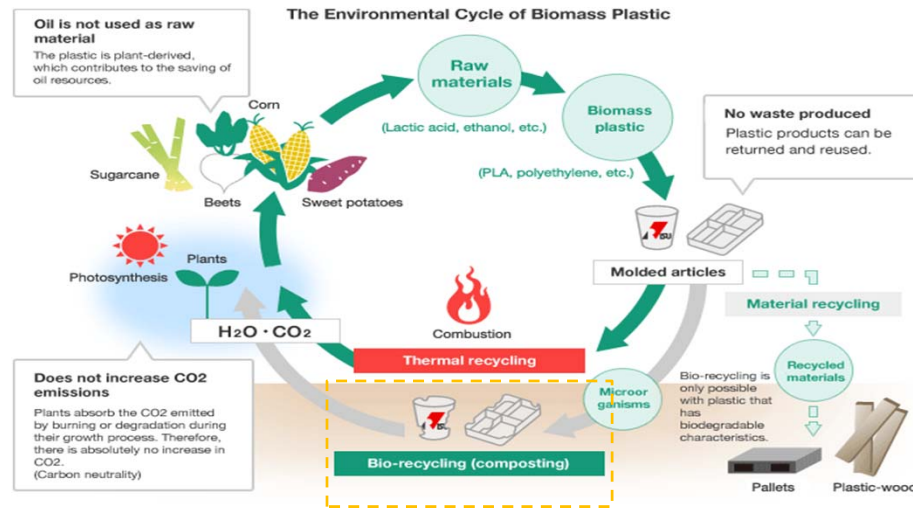
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## The Problem

Plastic has become a master symbol of a modern society. Considered a successful multi-faceted, transformative, and malleable material that has been used in consumer and industrial grade products - features on vehicles, food and drink storage and preservation, medical items for patients (fluid bags, tubing for fluids, syringe cartridges, implants and prosthetics). It has become nearly impossible to separate user from product in the current social environment. My discipline of studies within cultural and biological anthropology has presented a humanistic dilemma to initiating a transition of human-interaction and responsibility in the usage of petrochemical plastics to more sustainable and renewable biodegradable plant-based plastics. The intersection of creating a product that influences a dynamic change with how we see a process, and the ease of use and understanding directly influences the success of human interaction within that system. Currently, successful disposal of biodegradable plastics involves a heavy lift on the consumer side, and includes identifying a municipal recycling or composting facility capable of properly handling the substances. If the responsibility of disposing PLA and other biodegradable plastics becomes simplified, and becomes productized in a way that consumers can connect and identify with, then the efforts to participate within that system will greatly increase in its effectiveness. By developing an in-home unit for composting of organic material similar to the accessibility of a fridge or an oven, which includes the features necessary for the successful composting of biodegradables, one might see an increase in that participation. Consumer adoption and demand may then influence investor and manufacture interests in making the transition from petroleum based plastics, derived from fossil fuels, to plant based plastics that are less invasive in production within the environment. The dilemma of successfully composting PLA plastics have led to increasingly negative assumptions to the effective development of this type of plastic for commercial use. If not composted, PLA plastics may end up in landfills or recycling plants - increasing amounts of greenhouse gases and methane through decomposition released into the atmosphere, or 'contaminate' other eligible recyclable plastics within facilities, which in turn, those recyclables are rejected and dumped into landfills. It's time to take another approach to the issue of the effectiveness of PLA plastic composting as an adaptable part of plastic consumption.

## The Project

The development of a temperature moderated compostable unit for personal use has several beneficial factors to the successful outcome of biodegradable plastic use. I have used information drawn from scientific articles and journals, personal experiences in attempts in hot-composting, and interests in alternative uses to petroleum plastics to high-level design a personal-use composting unit that can serve as the link between PLA plastic use and the responsible disposal of the material - by eliminating the confusion on how to dispose properly of PLA plastics; which has appeared to be the argument against the transition from petroleum based plastics. Factors to include in development of the unit include cost, composting space, temperature moderation, layering and mixing of organic material, energy-efficiency powering of the unit, shredding or grinding of plastics and biomass to increase surface area for quick decomposition, and a successful way to manage input and output management vectors on the unit increase usability rates.



## The Outcome

By creating a composting unit that is accessible at the commercial market level, major industry can drive an increase in demand for more sustainable plastics development. Major retailers such as Walmart have already displayed an interest in moving to PLA and biodegradable plastics for goods and food packaging but have met criticism for not enabling easy responsible disposal of the material. A next-generation home appliance which resolves this issue is a gateway disruptive breakthrough to further encourage this transition and has the ability to change markets much like the creation of the microwave oven. The market for bioplastics and biodegradable plastics have already seen an increase in innovation and production by investors that have already committed to finding sustainable practices for their businesses; like NatureWorks Ingeo Innovations development of a large scale composting facility that is for PLA disposal. The next step is a micro-scale operation which is compatible with the average consumer's lifestyle.

## Sustainability

**Built system** - Incorporating a household appliance, like the temperature moderated composting unit I've proposed, into the living spaces as a general household appliance will ensure a successful transition from demands on petroplastic manufacturing to one that successfully uses bioplastics for their intended use. Investing in the human experience of controlling how effective human impact in the reduction in the carbon footprint will not only be an act of necessity, but a motivation that significantly attracts users who are in tune to having a more impactful involvement with their environment.

**Managed system** - The investment of business and manufacturers meeting requests from companies, like Walmart, to develop ethically driven sustainable business practices makes it apparent that innovation and approaching a different approach to how plastic production is handled has become a driving force to predicting a company's success. At consumer level, the transition towards focusing responsibility to stakeholders within companies to be held accountable for investing in ways to develop their products to be more sustainable has become a key market pressure. Though sometimes slightly misinformed, "Green" as a marketing tool has become a powerful force in the consumer economy.

**Social system** - Adopting a new strategy of interaction within the human environment, and influencing how we consume plastics will create a demand of user applicable products aimed at reducing the human carbon footprint. The development of a household unit for eliminating consumer good waste which would otherwise most likely end up in a landfill, increases the power a consumer has to decide what plastic they choose to use, and the selection will become more of a priority. Demands for stakeholders and investors to evolve towards alternatives to compete against forms of standard petroplastic product packaging and will ignite the startup of innovative formats to transition to bioplastics. Empowering the consumer will drive innovation.

**Natural** - Developing a composting plant for bioplastics, the sequestering of carbon dioxide and water successfully into soil integration, the ability to produce more nutrient rich soil for agricultural use, and developing a cradle-to-cradle system that benefits the environment. The possibility of limiting the need for extensive fertilizer usage in agriculture can be reconsidered in agri management. Supporting the efforts of companies like NatureWorks Ingeo initiative towards a more sustainable closed-system of bioplastic production increases public knowledge, and highlights the benefits of an alternative thinking towards the methods that will significantly decrease carbon emissions and greenhouse gases.

## Personal Reflection

The opportunity to participate in the Sustainability minor program at the University of Arkansas has given me the crucial critical thinking skills that complement my studies in cultural and biological anthropology. A sustainable perspective will assist me in my transition into the job market as an invaluable resource for development of successful systems thinking with the concentration of progressively sustainable initiatives into a business company culture. I've learned that having a sustainable outlook to the way system thinking is comprised has influenced my ability to develop a sustainable mindset for the future.