

## Drink and Wear Kombucha? A Sustainable Approach to Fashion

Makenzie Sayers, Indiana University of Pennsylvania  
Mercan Derafshi Ph.D., University of Tennessee Martin  
Pao Ying Hsiao Ph.D., Indiana University of Pennsylvania

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### Design Mentor Statement

The mentorship process started with my student taking the textile class and learning about nonwoven textiles which included topics of Bio Couture and sustainability. The student watched a video about Suzanne Lee's innovative approach to growing textiles and making apparel. My mentee wanted to create a product and learn about the research process. Thus, the creative scholarship process began. I collaborated with a faculty member from The Food and Nutrition department for the process of growing and drying the bacterial cellulose. This research process followed the steps of exploring background information, identifying a gap in literature, purpose statement, objectives, methods and materials, design inspiration, and development of the bag. I met with the student on a weekly basis and provided feedback. The bacterial cellulose growth process was presented as an e-poster at the undergraduate scholar forum. Furthermore, the research proposal was recognized and awarded by the college research incentive grant to be completed and presented at an international conference. I chose to sponsor this work due to the mentee's execution of problem-solving skills, use of Cricut dye-cutting machine, use of biomimicry as a design inspiration, and overall high aesthetic and craftsmanship qualities of the handbag.

### Statement of Purpose

Historically, the fashion industry is the world's second major polluting industry (Friedman, 2018). The production and processing of crops, textiles, and apparel, are all detrimental to the environment. The degradation includes large amounts of textile waste filling landfills, the use of chemicals, and excessive amounts of water and energy usage. Due to the plethora of environmental issues, designers strive to seek ways to become more sustainable by reducing waste and eliminating chemicals from the design processes (Camere & Karana, 2018). Sustainable designers use natural and biodegradable ingredients to bring their ideas to life (Samanta & Agarwal, 2009). Therefore, the purpose of this research was to design and construct a handbag made from biodegradable bacterial cellulose. With this product, the designer aimed to spread awareness about the negative impact of the fashion industry on the environment and to promote sustainable textile materials. Inspired by nature and its complexity, the designer

experimented with geometrical shapes. The hexagon shapes were observed in beehives. The intricate configuration of hexagon patches were complemented with bees to mimic a honeycomb. The sketchbook included a triangulation of pre-grown bacterial cellulose, dye swatches from natural ingredients, and images of geometrical structures found in nature. This handbag was developed through the exploration and manipulation of a biodegradable bacterial cellulose. Furthermore, this product development process bridges techniques of couture, sustainable textiles, and biomimicry into a fashion accessory that could be used daily.

### **Aesthetic Properties and Visual Impact**

Design elements such as color and shape were incorporated in the creation of the handbag while prioritizing the sustainability and its everyday functionality. The leather-like and naturally unique imperfections of the bacterial cellulose, made it appropriate for a saddle bag. The body and straps of the bag were made from the original dark brown color obtained from black tea used in the growing process. Primary colors of red, blue, and yellow were selected to dye the patches to separate a complex form into easily readable parts. The hexagons patches were dyed with natural dyes: red beets, blueberries, and turmeric. Gold hardware was used on the shoulder strap for attaching it to the bag. Gold paint was applied on the bee patterns to complement the gold hardware.

### **Process, Technique, and Execution**

Bacterial cellulose was grown in three rectangular plastic containers (36"x17"x6"), using black tea bags, granulated sugar, water, starter kombucha, small pieces of bacterial cellulose, and muslin fabric. As the bacterial cellulose fermented, more tea and sugar was added for the duration of 14 weeks in a temperature controlled room (72°F). As a result, a ¼" thick cellulose that resembled a mat was grown. One week of drying the mats under fans lead to a naturally dark brown mat with a pliable leather-like appearance. The hexagon patches shown on the front flap, extending to the back piece, were cut using a Cricut dye-cutting machine. The Cricut software was used to size and position the hexagons, the ¼" mat was laid onto a cohesive Cricut mat and cut (see figure 1). For each natural dye, blueberries, turmeric, and red beets were separately boiled in water and simmered approximately for 2 hours. Solid particles were strained from the pot, leaving a

**Figure 1**

*Cricut dye-cutting machine used to cut hexagon patches*



saturated dye bath. Hexagons were submerged in the dye bath for 1 hour. Flat pattern techniques were utilized to draft the handbag and a prototype was made with crafting felt. Applique techniques were used for assembling the hexagons. Major bag pieces were cut with ½” seam allowance using an exacto knife and ruler. Sequence of operations were; hexagon patches sewn to the back and to the flap pieces, front flap to the back piece, side piece to back, and the front to the side piece. Finally, seam allowances were trimmed and the strap piece was attached. The entire bag was assembled with a brown cotton thread and a home sewing machine.

### **Cohesion**

This handbag was designed and created by bringing elements of design and mixing it with couture, natural dyeing, technology, and biomimicry. The symmetrical honeycombs were cut with perfection and golden bees were a symbol of spring drawing the eye to nature’s creation. Growing cellulosic bacteria from black tea mimicked hides thus making it suitable for this handbag. The subtle veins on the surface were accented by introducing shades of blue, red, and yellow thus bringing a unique texture that is not found in hides.

### **Originality and Innovation**

One of the aims of this research was to showcase a sustainable textile materials that is biodegradable, biocompatible, naturally dyed, pliable, and that can be used in every-day items. Constructing a handbag supports that cellulosic bacteria can be used in other items such as interior and apparel design. This pliable material has the potential to be substituted with hides as it yields a leather-like appearance without the damaging effects of processing and curing hides. This handbag was constructed to be unique and distinctive as it depicts elements of biomimicry, couture techniques, and sustainable textile dyeing. Future research can include a full ensemble and accessories made with home-grown bacterial cellulose.

### **References:**

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