

Biosynthetics: Post Carbon Lab vs Duedilatte

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## **Introduction**

The fashion industry is one of the worst polluters in the world and according to the United Nations, the fashion industry is responsible for producing twenty percent of global wastewater and ten percent of global carbon emissions (Monteiro, 2019). However, many companies in the fashion industry are shifting towards sustainability practices. Companies are using various methods to produce garments more sustainably. Using biosynthetics are one of the ways companies are reducing the carbon footprint emission. A biosynthetic is a polymer created from either partial or 100% natural renewable resources for the manufacture into synthetic fibers. There are three key stages in the biosynthetics production method: Stage 1 is the choice of biobased feedstock used, Stage 2 is the processing method, and Stage 3 is the end-of-life method. The feedstocks are the raw materials that will be used to produce the chemicals required in the polymer production, they are categorized into three different generations and only the first generation is commercially available. First generation feedstocks are crops such as corn and sugar cane, the second generation is agricultural and forestry waste, and third generation are non-food resources such as algae, fungi and bacteria (AboutBiosynthetics.org, n.d.). Two companies that use two different types of biosynthetic production methods are Post Carbon Lab and Duedilatte. Post Carbon Lab uses algae as feedstock to produce a photosynthesis coating that can be applied to garments, and Duedilatte uses spoiled milk as feedstock to produce silky smooth garments.

## **Post Carbon Lab**

Post Carbon Lab is a start-up company in London founded by Dian-Jen Lin and Hannes Hulstaert. Their mission is to take a different approach towards sustainability compared to every other fashion company in the world. Their approach is coined as “Regenerative Sustainability

Activism”, which is designing garments that have photosynthetic/pollution-filtering properties (Post Carbon Lab, 2020).

### **Figure 1**

*Co-founder Dian-Jen Lin in biosynthetic Euglena Print Jacket*



The company has successfully created a photosynthesis coating that absorbs carbon dioxide and emits oxygen from algae, the feedstock would be categorized as third generation. The jacket that Lin is wearing (see Figure 1) is coated with layers of photosynthetic organisms that intake carbon dioxide and emits oxygen and turning that carbon into sugar. The process of how they made this coating is not revealed, but Lin said after numerous testing, she claims the coating can be applied to almost any garment. The care instructions for garments that are coated will be different from regular clothing---hand-wash only. Instead of typically putting the coated garments into a dark closet, they would need to be placed somewhere bright and lively, filled with carbon dioxide. Also, undergarments are not recommended to be coated, it would be best for windbreakers or jackets. The coating also changes color, if not cared for properly. Shades of green means the organisms are in a healthy state, any other color means it is unhappy. Numerous

designers and industries have been working with the company and they are slowly trying to make the photosynthesis coating into a marketable product (Tapper, 2020).

### Duedilatte

Duedilatte is an Italian-based company founded by Antonella Bellina. Bellina founded this company because she was making her morning coffee one day and realized her milk was expired. Instead of throwing the milk out, she was inspired to use it towards something---apparel (Monteiro, 2019). The mission of the company is unknown, but based on research, I believe their mission is to inspire others to adopt a more sustainable approach in fashion by respecting the environment, the fashion industry, and themselves.

**Figure 2**

*Duedilatte T-shirt made from milk protein*



**Figure 3**

*Duidilatte baby outfit made from milk protein*



According to the Italian Agricultural Association Coldiretti, thirty million tons of dairy is wasted each year (Monteiro, 2019). In Italy, Bellina was able to collect spoiled/sour milk from a lot of places for free, so she only had to pay for the transportation to retrieve her feedstock, spoiled/sour milk is categorized as second generation. The first three years in the company were dedicated to the research and development of the fabric. Her background in working as a researcher in the textile industry for over ten years gave her an advantage in the process and by the fourth year, she had developed the secret method and was able to understand the fabrics advantages (Elven, 2019). According to Morice (2018), the process of production starts with heating the milk to fifty degrees, then citric acid is added to separate the whey from the casein protein. The step after that is a secret that turns the casein into powder. The powder is then put into a machine known as a cotton candy spinner to turn the powder into fibers. The fibers are then turned into garments (see Figure 2 and Figure 3).

### **Biosynthetics Comparison**

Post Carbon Lab's approach towards sustainability is designing something that not only limits the amount of carbon dioxide emitted during production but eliminating the carbon emission while also giving back to mother earth. Hence, the biosynthetic they created is a photosynthesis coating that can be applied to almost any garment. Duedilatte's approach towards sustainability is creating clothing in a more sustainable way to inspire others to adopt sustainable practices. Thus, the biosynthetic they created is milk fabric.

In terms of which biosynthetic being more sustainable, I would say Post Carbon Lab's photosynthesis coating. The reason why I determined that Post Carbon Lab's is more sustainable is because the coating is created through the use of algae, and algae can be found almost everywhere and it can even be grown. Milk, however, needs to be produced from farmers and it

can run out one day if the animals that humans obtain milk from go extinct. Duedilatte's production is 100 percent natural, they do not use chemicals, they use natural dyes, and their factories run on solar energy (Morice, 2018). Despite Duedilatte's biosynthetic being super environmentally sustainable, the thing that sets Post Carbon Lab's biosynthetic apart is the ability of the coating to intake carbon dioxide and emit oxygen. According to Lin, "One large T-shirt – nearly a square metre of material – generates about as much oxygen as a six-year-old oak tree" (Tapper, 2018). Designing sustainable garments with low carbon emission is already amazing, but being able to coat garments with a photosynthesis coating to cover convert carbon dioxide to oxygen is taking it to another level.

### **Conclusion**

Post Carbon Lab and Duedilatte are two companies that exist because of sustainability despite their different approaches. Dian-Jen Lin and Hannes Hulstaert found Post Carbon Lab and their approach was coined "Regenerative Sustainability Activism", they created a photosynthesis coating that can be applied to almost any garment. Antonella Bellina's found Duedilatte and her approach was creating clothing in a more sustainable way to inspire others toward sustainable practices, she created a fabric that is made from spoiled milk. Although both companies had different approaches in their biosynthetic production, they both achieved their companies' mission. Even though I believe Post Carbon Lab's photosynthesis coating is more sustainable, Duedilatte is not far behind. If Post Carbon Lab were to use their photosynthesis coating on Duedilatte's milk fabric garments, they would create the ultimate sustainability garments.

## References

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*Figure 1.* Co-founder Dian-Jen Lin in biosynthetic Euglena Print Jacket. Reprinted from ‘The Guardian’. By J. Tapper, 2020, Retrieved from <https://www.theguardian.com/environment/2020/feb/08/fashion-living-garments-suck-carbon-from-air>.

*Figure 2.* Duedilatte T-shirt made from milk protein. Reprinted from NBC News. By C. Monteiro, 2019, Retrieved from <https://www.nbcnews.com/news/world/spinning-spoiled-milk-environmental-revolution-n969296>

*Figure 3.* Duedilatte baby outfit made from milk protein. Reprinted from Made in Tuscany. n.d., Retrieved from [https://www.madeintuscany.it/site/dt\\_portfolio/duedilatte-fashion-collection/?lang=en](https://www.madeintuscany.it/site/dt_portfolio/duedilatte-fashion-collection/?lang=en)

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