



# SUSTAINABLE FASHION AND BIODEGRADABLE PLASTICS

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## Concept

The Fashion industry is one of the most polluting activities [1], mostly during raw material production and processing [2], with a particular concern on the management of plastics and their impact on the environment. One of the factors having a significant footprint impact is the high demand for clothing, which increases energy consumption and generates waste. Even though there is a tendency in the industry to uphold the use of recycled materials, there will be a need for renewable

feedstock (raw material) innovation for synthetic fibres, and this is because of recyclability (at least nowadays) has a limit. Therefore, it is necessary to improve resource management along with the production cycle system, implementing a more circular process throughout all phases. Generating less waste and reducing the amount of water among others along with innovation and investigation to make possible a change. A possible greener material alternative for creating clothing is biodegradable biomaterials. These biomaterials are made

from natural biopolymers and are biodegradable by themselves (under specific conditions). There are eight types. The most common are carbohydrates and proteins. It can help reduce the waste problem due to the ability to biodegradation in specific atmospheric conditions in a relatively short period, reducing the environmental footprint. In addition, we can use food waste as a feedstock, which could help reduce food waste, water, and energy use, among others. These biodegradable biomaterials are having a considerable impact on the markets, and their use has increased exponentially, especially in the packaging industry, such as Xampla Ltd.

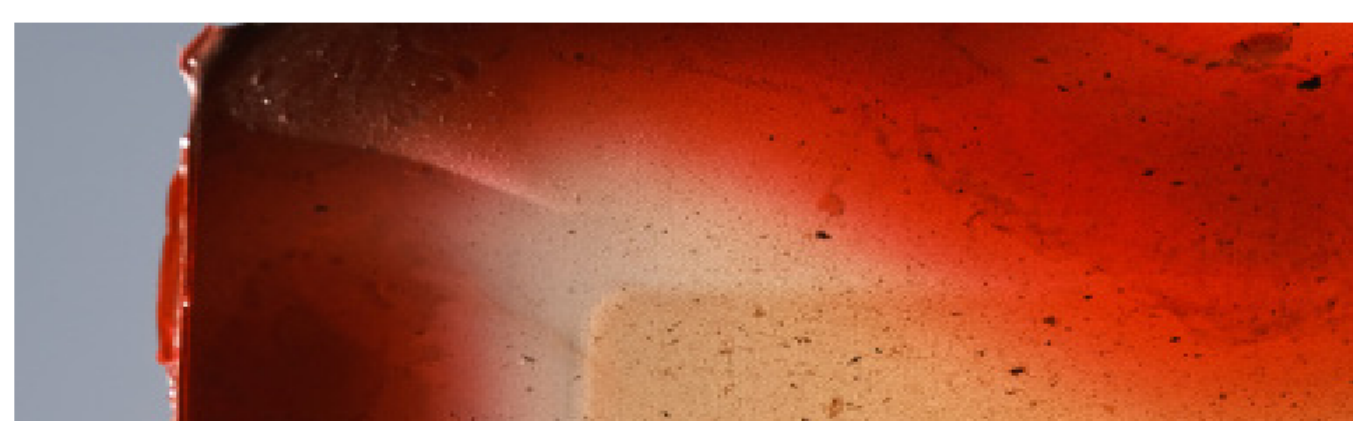


## Research

The first inspiration for this research are recipes used in experimental cooking, such as transparent edible film plastics. The concept of creating a product within a limited period of time led to researching some biochemistry fundamentals so that I could start producing some bioplastics samplings.

Finally, the aim was to make a material simple enough that could be made by anyone in any kitchen with the minimum amount of tools and ingredients possible, including waste food. Exploring the possibilities of using alternative materials for plastics in a fashion textile context. Some of the companies and de-

signers that I have been inspired by are: Jasmine Linington, who works on experimenting with the properties of seaweed and creating yarns from kelp. Again, this is an example of combined integration, manipulation, and science. Studio Nienke Hoogvliet is another example that works with algae applied to textile materials as an alternative to the fabrics currently in use. These examples show that there is a particular interest in using new alternative materials, especially algae and fungus.



## Process

Only three materials were used for the initial sampling: glycerine (acting as a plasticiser), water, and gelatine (polymer). Other ingredients were added subsequently such as agar agar, carrageenan and corn starch, as an experimental part of the sampling research. The aim was to evaluate how different components work together and behave

in the environment. In the elaboration of bioplastics, ingredients are first inserted into a pot, and constantly mixed and simmered for approximately 20 minutes. Then, after getting a semi-viscous substance, we turn off the heat and leave it to cool down for a few minutes before pouring it into the container and leaving it until dry. For this research, the materials used for the container were plastics and metal.

The drying period depends on the samples' temperature, humidity, and size. In optimal temperature room conditions (dry and sunny) it takes around 24h to a week. An oven or dehydrator can accelerate this process. The result can vary depending on the ingredients used and the quantities. However, all these samples present a problem; it has a low resistance to humidity.



## Conclusion

This project's objective was to experiment with the boundaries of biodegradable plastics and create samples resistant enough that could be manipulated and implemented in a garment. Depending on the mix, it is possible to get either softer or firm results, also giving the possibility to create different effects on the surface just by using different materials or textured containers. In addition, they can be dyed and assem-

bled by stitching or glue. The intention is to show that there are potential greener alternative solutions that require less energy, water, and toxic elements and can also help reduce waste. Furthermore, the process does not need sophisticated machinery to create them on a small scale. Therefore, these potential materials can lead to further developed alternatives, making it more feasible to produce more sustainable garments.

## Reference

IMG 1 Own picture

[1] A New Textiles Economy - Full Report | Shared by Fashion (thirdlight.com)

[2] A New Textiles Economy - Full Report | Shared by Fashion (thirdlight.com)

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