

Bioplastics

DEFINING “BIO”

BIOMATERIAL

‘Biomaterial’ is a term used to indicate materials that have non-specific biological association.

Examples of biomaterials could be any of the materials listed in this table.

BIOBASED

Biobased materials are ‘wholly or partly derived from biomass, such as plants, trees or animals (the biomass can have undergone physical, chemical or biological treatment)*’. (excluding those derived from fossil sources)

Examples of biobased materials would include, but are not limited to: natural fibers (e.g. cotton, wool and silk), manmade cellulose (e.g. viscose), natural polymers (e.g. chitin, keratin and casein), animal leathers and their alternatives, through to polycotton blends (where the biocontent meets the minimum stipulated requirement).

BIOFABRICATED MATERIALS

Biofabricated materials are produced by living cells (e.g. mammalian) and microorganisms such as bacteria, yeast and mycelium.

Examples of biofabricated materials would include fermented biosynthetic & biofabricated ingredients and bioassembled materials as below.

BIOSYNTHETIC

Biosynthetics are synthetic polymer materials comprised, in whole or in part, of bio-derived compounds. These compounds can either be made with an *input* of biological origin (biomass), and/or where the *process* is performed by a living microorganism.

Examples of biosynthetics would include the fermentation (of sugars, GHGs etc.) or the catalytic conversion of biomass to create precursor chemicals for synthetic polymers such as nylons, polyesters and polyurethanes.

BIOFABRICATED INGREDIENTS

Biofabricated ingredients are building blocks produced by living cells and microorganisms e.g. complex proteins like silk or collagen. They need further mechanical or chemical processing in order to make a macroscale material structure.

Examples would include fermented recombinant silk which then has to be spun into a fiber, or processed to form a sheet material.

BIOASSEMBLED

A bioassembled material is a macroscale structure that has been grown directly by living microorganisms such as mycelium or bacteria.

Examples would include mycelium or microbial cellulose leather alternatives.

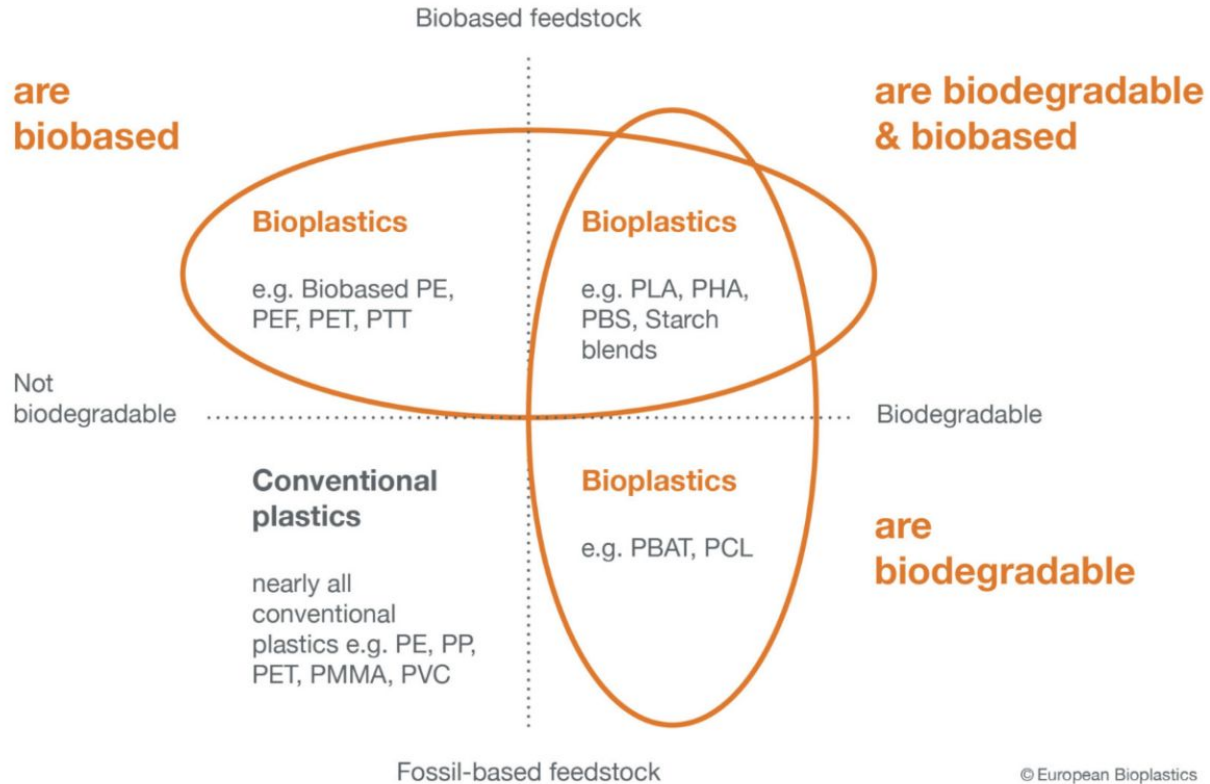
What is plastic?

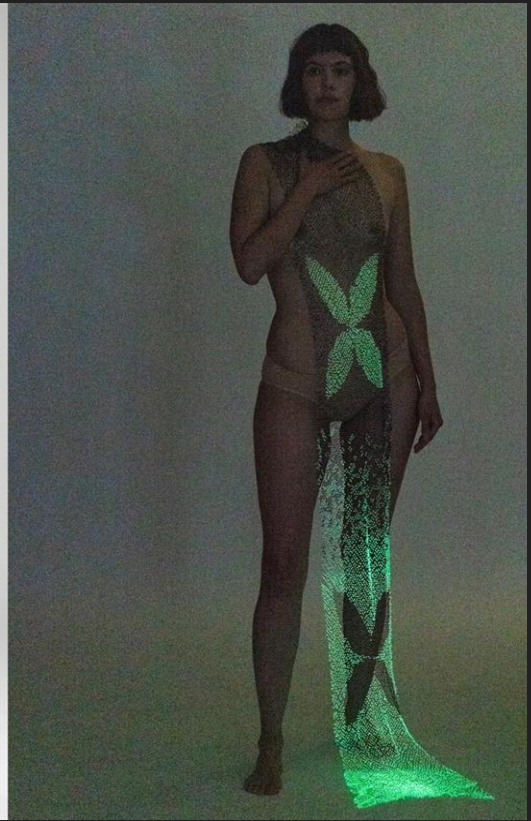
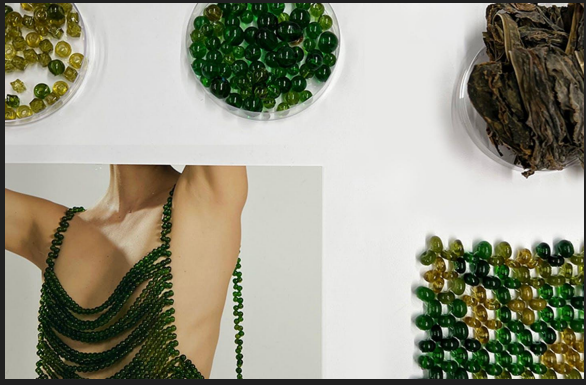
Plastic - a polymeric material that has the capability of being molded or shaped

Polymeric - made of Polymers - large molecules made of a chain of monomers, which have different properties

What's wrong with synthetic plastic?

- Plastic is **non-biodegradable**, meaning it virtually never breaks down, it just gets smaller and smaller - leading to plastic accumulation in landfills and waterways, which can harm wildlife and cause pollution
- Plastics shed **microplastics**, which have many health risks including cancer and infertility
- The production of plastic requires significant energy consumption, because of the amount of processing needed, contributing significantly to **greenhouse gas emissions**
- 99% of plastic are made of fossil fuels, also contributing significantly to greenhouse gas emissions





Aradhita Parasrampur / Cellsense, 2022

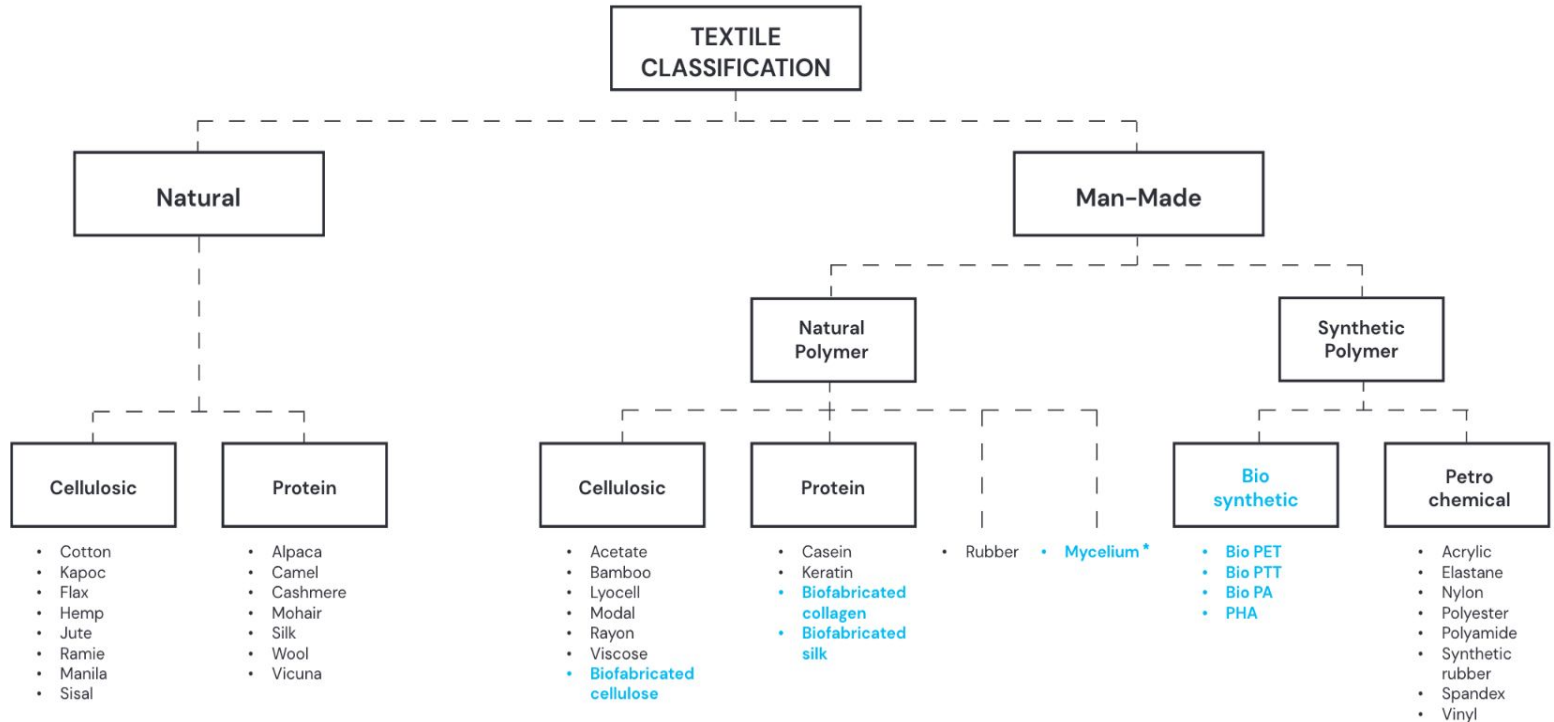


TomTex x Collina Strada, 2024

100% biodegradable “leather” made from shrimp and mushroom food waste



TomTex x Peter Do, 2024



*[Mycelium is one of nature's composites comprising mainly of protein, cellulose and chitin.](#)

Figure 4:
Textile Classification Chart