

From food waste to fashion: fabrics made from discarded food are the next ready to wear



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Each year, globally, 17% of all food produced is wasted. 11% of food waste comes from households around the world. According to the [UN](#), food waste accounts for a whopping 38% of total energy usage in the global food system.

Wasted food dumped in landfills creates greenhouse gas emissions, a significant contributor to climate change.

Food is thrown away every day, either because it's not consumed or stored appropriately, isn't attractive enough to be sold in shops, such as wonky fruit and vegetables, is spoilt by weather conditions or insects, or simply because some parts of it aren't eaten or used or simply aren't edible, like the skin of some varieties of grape, the peel and seeds of some fruit and vegetables and the leaves of pineapples.

92 million tons of fashion waste is thrown away every year, with most of it ending up in landfills. If that wasn't sobering enough, some types of dyes and fabrics are toxic and several textiles contain micro plastic. Even the oh so natural cotton is not environmentally friendly. It not only requires large amounts of water to grow (10,000 for 1kg of cotton), but the cotton industry is a large user of fertilisers and pesticides.

Leather, often excused because it's a by-product of the meat and dairy industry, has a large impact on the environment. For instance, agriculture and forestry are responsible for at least **24%** of all greenhouse gas emissions, and with no livestock, there's no animal leather. Leather tanning and dying require a variety of chemicals, some of them toxic, and if that wasn't enough, animal-derived fabrics are certainly not cruelty-free. If an animal hasn't brutally died so that humans can wear its skin or fur, you can rest assured they weren't having any fun when they were sheared so that we could wear a warm woolly jumper.

However, among this environmental bleakness, a ray of sunshine shines through: food waste innovation.

Now more than ever, experts are looking at a solution to use natural by-products that otherwise would be thrown away to fix the food and fashion waste problem and the following fabrics and fibres are, little by little, making an appearance and changing the fashion world.

Piñatex – pineapple leaf fibre

Piñatex has been used for quite some time now to replace leather, making clothing, shoes and accessories not only more environmentally friendly, but also cruelty-free.

Award winning eco-centric children footwear brand **Pip and Henry** uses piñatex in its designs. Its CEO and Founder, Jeroo Doodhmal, is enthusiastic about this vegetable leather:

"We spent many, many months researching materials to use in our shoes, experimenting with and testing different materials in our factory. We knew we wanted to find something that was truly eco-friendly, that looked good, was durable enough to last through tumbles on the playground yet was soft and comfortable enough for children's feet!", she says. "We also needed to find a material that was commercially easy to access, had a range of colours we could use and had a reliable supply chain. piñatex fit the bill across all of these criteria for us."

What are the stand-out pros of using pineapple leaf fibre and can it be used to create different styles or shoes?

"The biggest pro of course are the sustainability credentials of piñatex – it's a strong and breathable textile made from the waste leaves of pineapple plants which are a by-product of existing pineapple harvest.", says Doodhmal "As a raw material pineapple leaf fibre requires no additional environmental resources to produce and the sale supports the farmers who produce it. It is coloured using GOTS (Global Organic Textile Standard) certified pigments and a resin top coating gives it strength, durability and water resistance.

Being similar in strength and appearance to leather, piñatex affords us a lot of flexibility in terms of use across designs, and we plan on using it in our shoe uppers across a variety of

From a look and feel, comfort and durability stand-point – definitely yes! , says the CEO. “However, its biggest drawback is cost. It is a very expensive material, even in comparison to some of the superior leathers in the market, and from a supply chain perspective you are reliant on the one manufacturer and their supply chain (for example they faced many issues last year with COVID which meant delays with order fulfilment). So that would be the biggest challenge to fully replacing animal leather in footwear, especially for bigger footwear brands.

“There are smaller disadvantages like the fact that they only have 8-10 colour variations, you cannot print on piñatex to create designs/patterns on it like leather – but those are more design limitations rather than concerns about the material itself.”

WineLeather – grapes

Being the largest producer and exporter of wine and the country that makes the finest leather, Italy has married the two things and created WineLeather, a leather-like material made from marc, the otherwise wasted skin, seeds and stalks of grapes. The ingenious idea came to Italian architect Gianpiero Tessitore, who founded the **VEGEA** in 2016 in Milan. The company was launched with the aim to ‘promote the integration between chemistry and agriculture through the development of new eco-sustainable products.’

The company develops plant-based substitutes to leather and 100% synthetic oil-derived materials to be used in the fashion, furniture, packaging, automotive and transportation industries.

Backed by the H&M foundation, VEGEA collaborated with Italian eco-fashion designer Tiziano Guardini to create a prototype clothing capsule. **A stunning dress by Guardini** using VEGEA materials was exhibited at the V&A's Fashioned from Nature exhibition in 2018.

Orange Fiber – oranges

Made from the by-product of citrus juice, Orange Fiber is a cellulose, silk-like fibre that can be used as a vegetable silk or weaved in with other fabrics, such as cotton and insect silk.

The Italian company **Orange Fiber** was founded in Catania, Sicily, in 2014 and in 2015 it won the Global Change Award, the annual award initiated by **H&M Foundation**. In 2019 Orange Fiber was included in H&M Conscious Exclusive fashion collection.

PelleMela – apples

I don't know what it is with Italians at the moment. They've won Eurovision, they've won Euro 2020, they've won the **EarthShot Prize**, they've even won The Great British Bake Off, and now it seems they are winning at creating eco-friendly, cruelty-free fabrics too!

PelleMela (literally apple leather) was created by an apple grower from Bolzano using discarded apple peels and cores. The apple leather has proved durable, flexible and overall a

Mycelium leather – mushrooms

Made from mushroom root, mycelium is a fibrous material that can be weaved to create mushroom leather.

Soft like high quality animal leather, durable, hard-wearing, flexible, and compostable, mycelium can be grown in a lab using fungi.

Californian company **MycoWorks** recently collaborated with luxury brand Hermés to create a handbag using mushroom leather.

Talking to **The Guardian**, MycoWorks CEO Dr Matt Scullin said: *“We are working with luxury fashion first because they are ahead of the curve when it comes to sustainability. These are brands which are in a position to think big and to think long term.”*

Cocona – coconut shells

Made from coconut shells, cocona is a semi-synthetic fabric that’s mainly used in activewear thanks to its durability, quick-drying and wrinkle-free properties. Its production utilises minimal land, energy and water use, however the fabric is not biodegradable and is blended with synthetic polymer fibres.

All these fabrics made from food waste are not just eco-friendly, cruelty-free, clever, beautiful and durable, they also clearly point out a need and urgency to use our sustainable natural resources and materials that would otherwise be wasted, adding to the pollution and environmental issue. More and more textiles from food waste are making an appearance, including corn, ground coffee waste and cactus, and with investment and innovation, more are yet to come.

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