



Creating sustainable fabric from food waste

Problem

In the United States, 30 to 40 percent of food supply is wasted with 80 billion tons of food waste in 2020 alone. When this food is decaying in landfills it emits methane, a potent greenhouse gas. If we were to reduce our food waste by just 20%, we could avoid 18 million tons of greenhouse gas emissions.

Our Solution

We are breaking down food waste into cellulose using acidic hydrolysis. We'll proceed with using the Viscose Rayon method to turn our purified cellulose into rayon fibres. With the additional substance like wood pulp, our fabric will not only be cheaper, but also sustainable and organic.

Viscose Rayon Method

Step 1

Production begins with processed cellulose, as it's dissolved in caustic soda. The solution is then pressed between rollers to remove excess liquid. The pressed sheets are crumbled or shredded to produce what is known as "white crumb." The "white crumb" is aged through exposure to oxygen.

Step 2

Aged "white crumb" is mixed with carbon disulfide in a process known as Xanthation. Xanthation changes the chemical makeup of the cellulose mixture and the resulting product is now called "yellow crumb." The "yellow crumb" is dissolved in a caustic solution to form viscose and set to stand for a period of time, allowing it to ripen.

Step 3

After ripening, the viscose is filtered to remove any undissolved particles and any bubbles of air are pressed from the viscose in a degassing process. The viscose solution is extruded through a spinneret, which resembles a shower head with many small holes.

Step 4

As the viscose exits the spinneret, it lands in a bath of sulfuric acid, resulting in the formation of rayon filaments, which are then stretched, known as drawing, to straighten out the fibres. The fibres are then washed to remove any residual chemicals. The filament fibres are cut down to produce staple fibres.



"This is a fascinating topic! I'm excited to see where this goes and based on the research we currently have it's a feasible solution with real potential."
-Véronic Bézaire, UCarleton Biochemistry Professor

Status Quo

The current approach to reducing food waste is not to create it in the first place. However, wasting less food in a bad food system won't make that system any better. The nutrient cycle doesn't care if you clean your plate. All environmental impacts that brought that meal into being are done deals. By focusing so much on waste, we miss the way things are further upstream.