

Greybox Paper: A better way to recycle waste

Forming paper from food and paper waste

Margo Senchenko

WHY WAS IT MADE?

Greybox paper is paper made entirely out of waste and its purpose is to reduce the amount of food, and paper waste in the world, and decrease wood extraction used to create paper. A statistic made in 2022 stated that approximately 14% of deforestation is caused due to the increasing demand for paper products. Therefore over 2 billion trees are cut down for paper every year. Furthermore, approximately 40% of food is wasted every year and paper makes up 35% of landfills in Canada alone. The goal of this project is to create a paper product made entirely out of food and paper waste sourced from school compost bins and households and, furthermore reduce the amount of paper produced from trees.

HOW WAS IT MADE?

Both the paper and food waste are broken down to create a pulp, which is then run through a mold and deckle to form sheets of paper. Both the food and paper waste are broken down differently, the food waste is broken down using an alkali treatment which uses sodium hydroxide (**NaOH**) and sodium sulfide (**Na₂S**) to break down the lignin in the food waste and extract the cellulose to form a pulp. The paper waste however is broken down only using water (**H₂O**) as it already contains cellulose fibers. The paper is then formed by combining the two pulps and running it through a mold and deckle to form sheets of paper.

RESULTS

With 1 pound of waste (1.12lbs) (0.56 lbs each) Greybox paper can be formed into 10 sheets of (16.5 x 11.5 cm) paper. It can withstand pencil, pen, marker, sharpie markings, and acrylic paint. With each prototype, however, the majority of the food waste that was used was plant-based, meaning any dairy or meat-based waste was rotten. From this, we can see that GreyBox Paper can be used for purposes in the arts, however, there's still a long way ahead where the product can be used for other purposes. However, If the production of this product continues and expands its range of uses then it will hopefully slow down the production of wood-made paper and decrease the amount of waste in the world.

FUTURE STEPS

With the judge's feedback in mind, Greybox Paper will continue to develop into expanding the product range, creating cardboard, milk cartons, printer paper, etc. To also create bigger sheets and sketchbooks as more of a cosmetic display. With the process itself, a large amount of water was used to form the sheets of pulp, so the process will need to be adjusted. Greybox Paper will also develop into a food-waste-only product as food waste is expanding in landfills and there is no common alternative to prevent it. However the same cannot be said for paper waste, as there are already paper waste other options to reduce it. So, it is safe to say the development for Greybox Paper is not ending very soon, but it will surely improve the product.