

# Investigation Into the Creation of a Biodegradable Croc

by

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## Abstract of Biomaterials

The popular footwear known as Crocs produces significant waste each year because they are incapable of being recycled or easily destroyed. As a result, tons of waste build up annually across the globe polluting water and land. A potential solution is for Crocs to be created from a biodegradable material, able to break down naturally. In order to test this, we used a biodegradable material called YOGA Flex and 3D printers. The research began by acquiring an STL file from Thingiverse ([www.thingiverse.com](http://www.thingiverse.com)) for a croc meeting the desired traits. From this, many miniature crocs were printed for later material testing, along with one adult-sized for walking tests. Aside from the crocs, small tensile testing samples were designed and printed to acquire the mechanical properties of YOGA flex. This allows for the full-size pair of crocs to be printed as strongly as possible. The miniature crocs printed as desired, with the only visible issue being their stiffness, but as observed from the large model, this is likely due to the size. The large croc was evaluated via a brief walking test, however, it quickly sustained severe cracking damages on both the interior and exterior. From the tensile testing, it was observed that YOGA Flex with vertical layering had a yield stress of 0.962 (MPa) and an ultimate stress of 6.253 (MPa), while the horizontal layering was only 3.316 (MPa). The data acquired from tensile testing clearly displays greater strength when vertical layering is used, therefore being a good option for the final print. ASTM degradation standards will be investigated to determine if microbial degradation testing could yield the desired results. In order to sustain a healthy world capable of housing our civilization, it is important for society to make the necessary changes to green materials.