Responsible (at Home) Recycling of Disposable Diapers

Alvarado-Olivo, Salvador

Disposable diapers are one of the top contributors to waste in landfills. In the US alone, nearly 25 billion diapers are deposited into landfills each year. This project aims to reduce the total amount of disposable diapers going into landfills by utilizing existing washing machines in typical households to enable the separation and recycling of their main components. A diaper is mostly comprised of plastic films, fibers, fluff pulp, and SAP (Super Absorbent Polymer) which is responsible for the high absorbency rates. The core of the idea is the development of a device that when placed inside the reservoir of a washing machine and coupled with the motor, will cut and separate the main diaper components using a double filtration system. Using the dimensions of a commercial washing machine and a CAD software, a model was designed and later taken to a machine shop for construction. Using a variable speed power drill and a plastic container to simulate the reservoir and the motor of a washing machine, a series of experiments were conducted to determine the most efficient cycle (time & speed) to obtain the maximum recovery of SAP and the other materials. Different amounts of diapers were placed inside of the device at different speeds and time intervals. It was concluded that placing 4 diapers inside the machine for 2 minutes at speeds of 350RPM and 1400 RPM was the most efficient cycle due to the high recovery of SAP (99%) and relatively low energy consumption.

Awards Won:

Third Award of $1,000