CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36177

Project Title

Are Green Detergents Biodegradable and Less Toxic?

Abstract

Objectives/Goals

In this project, four detergents, Honest Laundry, Green Works, Dreft and Tide were tested and compared for biodegradability and toxicity. Super Worms were used as testing organism. For biodegradability testing, one set of four detergents were exposed to sun for 36 hours, another set of detergents were kept regular without sun exposure. Two sets of four detergents were mixed with garden soil. Worms were then put in to see which detergent killed more worms during 9-day period. For toxicity testing, worms were tested with the set of regular detergents. Honest Laundry outperformed all three other detergents, proving its ingredients are biodegradable and less toxic. However, Green Works, marketed as a green detergent, turned out as toxic as Tide; its ingredients are not biodegradable as its company claims.

Methods/Materials

Four detergents: Green Works, Honest Laundry, Dreft and Tide; one set of four detergents with 36-hour sun exposure, another set was kept regular without sun exposure; 500 Super worms used as testing organism. Put worms in garden soil saturated with different concentrations of two sets of four detergents. Observe and log in numbers of dead worms every day for 9 days. The experiment was repeated three times. The final data used in data analysis are average data of three rounds of experiments.

Results

Honest Landry did not kill worms throughout three rounds of experiments, indicating its ingredients are environment friendly. Green Works killed just as many worms as the conventional detergents, showing Green Works is not as environmentally friendly as the company claims.

Conclusions/Discussion

Honest Landry's performance supports our hypothesis that the ingredients in green detergents are biodegradable, thus cause no harm or less harm to the environment compared with conventional detergents. However, Green Works, as another green detergents that I tested, turns out just as toxic as Tide, which means ingredients in Green Works are not biodegradable and environmentally friendly as the company claims. Meanwhile, 100% concentration Dreft does kill 80% worms, but 50% and 25% concentrated Dreft turns out much less toxic which probably can be used to support their company's claim that diluted Dreft are mild and soft for baby skin. Also, performance of four detergents support our hypothesis that the more concentrated detergent, the more toxic it is.

Summary Statement

Four detergents, Green Works, Honest Laundry, Dreft and Tide were tested and compared for biodegradability and toxicity.

Help Received

Preliminary