



The Summons lab greens its science



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OUR SCIENCE

We study organic matter from microbes, environmental samples and rocks. Ancient rocks and oils contain a rich abundance of hidden information within, including molecular (lipid) and isotopic signatures of the organisms that existed at the time the organic matter was formed. The goal of our research is to extract and interpret these signals, in order to reconstruct ancient environments and understand how life evolved within them. To do this we use physical and chemical (solvent) extraction methods and analyze our organic extractions on various chromatographs and mass spectrometers.

BEFORE

At the start of the Green Labs challenge we identified our 3 major waste streams. They were:

1. Liquid solvents (DCM, methanol, hexane, chloroform)
2. Gloves! Lots of gloves were going into our trash bins.
3. Excess electricity powering lights, freezers and instruments



Fig. 1. Example instrument in our lab: Pyroprobe autosampler, GC-MS in Summons Geobiology Laboratory, Massachusetts Institute of Technology.



Fig. 2. Most of our trash bins were full of gloves, as our lab produces very little other solid waste.



Fig. 3. Multiple freezers in our lab were iced over. Carolyn defrosted them, reducing the amount of electricity they were drawing.

PRELIMINARY ACTIONS

1. Liquid solvent waste reduction and separation:
 - a. we started separating halogenated from non halogenated solvents; the non halogenated solvents are then sent to a fuel facility for recycling.
 - b. during washing and rinsing of glassware we now use the third solvent rinse as the first rinse for the next batch of glassware.
2. We now separate used, clean, nitrile gloves into a separate waste stream that can be picked up for plastics recycling. We also now have more comprehensive recycling of plastics such as film plastics, plastic bags and packing materials.
3. To reduce electricity and power usage:
 - a. all of our freezers were defrosted.
 - b. we installed motion sensing lights in multiple areas of our lab.



AFTER

Here are photos to demonstrate how our lab has implemented greener practices in our daily science:



A. Comprehensive sorted recycling

B. Instruments OFF when not in use

C. Glove recycling



D. After initial review we were Green certified. At the end of the Challenge we achieved GOLD certification!



C. Separation of halogenated vs. non halogenated solvents



F. Our comprehensive plastics recycling practices have caught on in other labs in our department!

PRELIMINARY RESULTS

1. Since the start of the challenge we have recycled ~25 lbs of nitrile gloves, with about 10 lbs more ready and waiting to be picked up.
2. Multiple liters per week of non halogenated wastes are saved for recycling into fuel and we have an overall reduction in tens of liters per week in total solvent wastes due to our new cleaning/rinsing practices. We no longer use chloroform (relatively higher toxicity).
3. Our nitrile glove and film plastic recycling practices have spread to other labs on our floor, further reducing waste in our building!

Acknowledgements

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