

Gold certified - 4,468 lbs GHG emissions saved annually



Prather Lab

- Sustainable Chemicals Produced with Sustainable Lab Practices

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Our Research

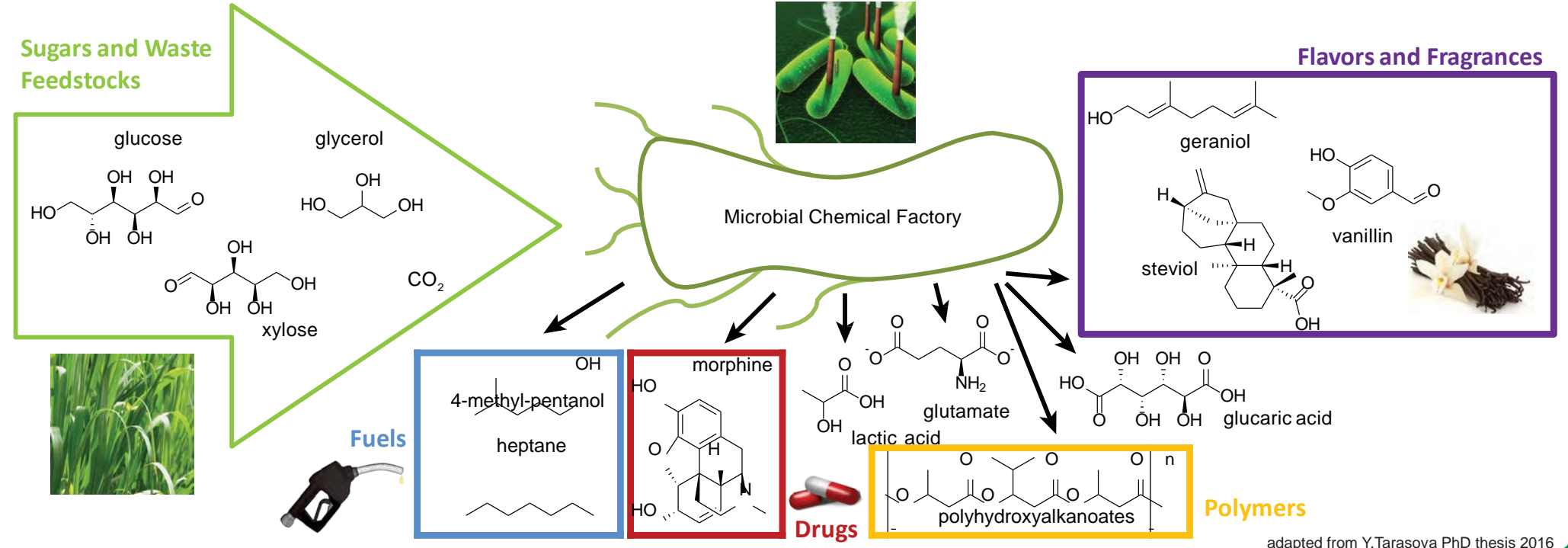
Green Chemical Production

The Prather Lab constructs microbial chemical factories for the production of a variety of chemicals from renewable resources.

Target compounds have applications in the pharmaceutical, polymer, flavor and fragrance industries.

Key activities are:

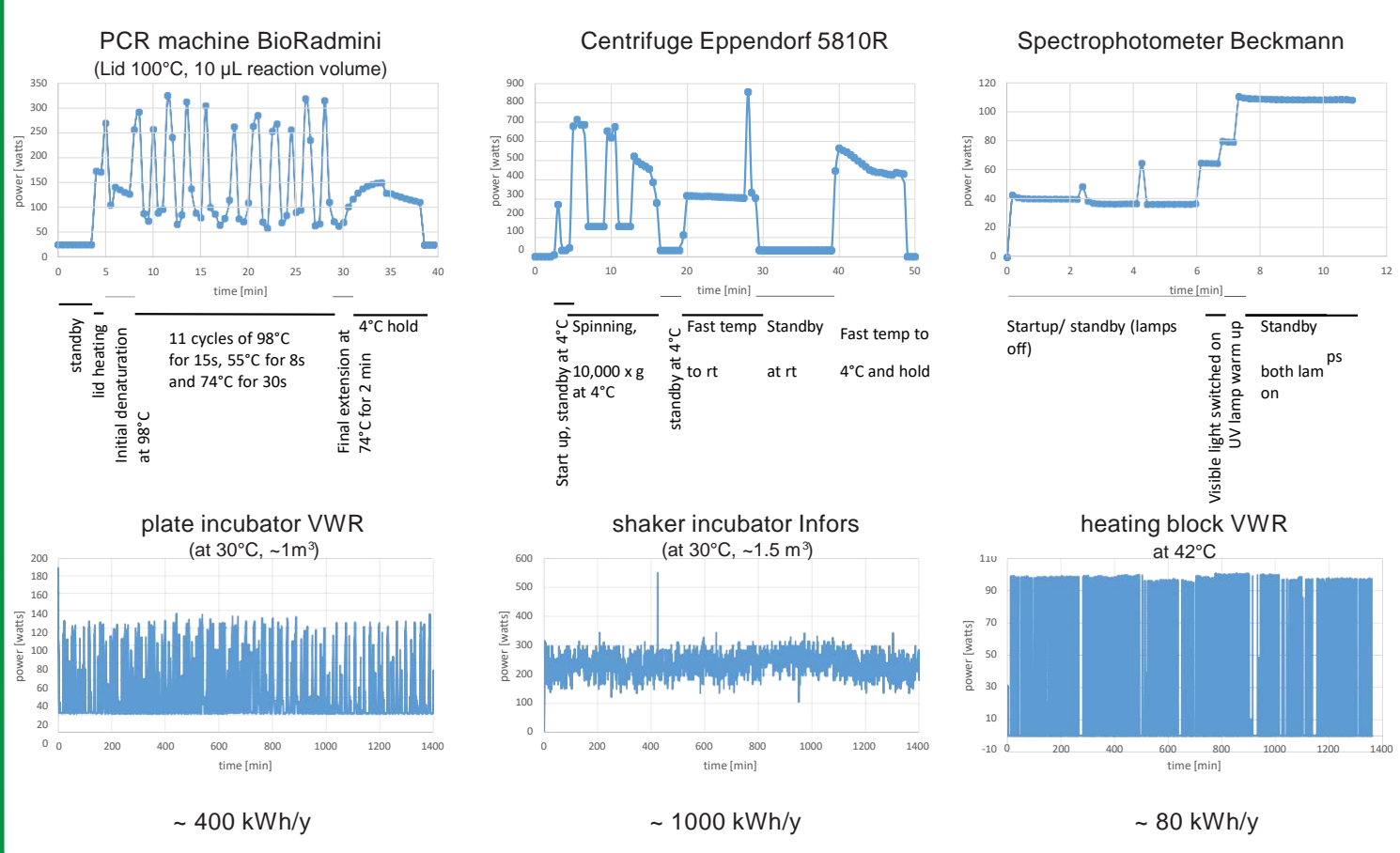
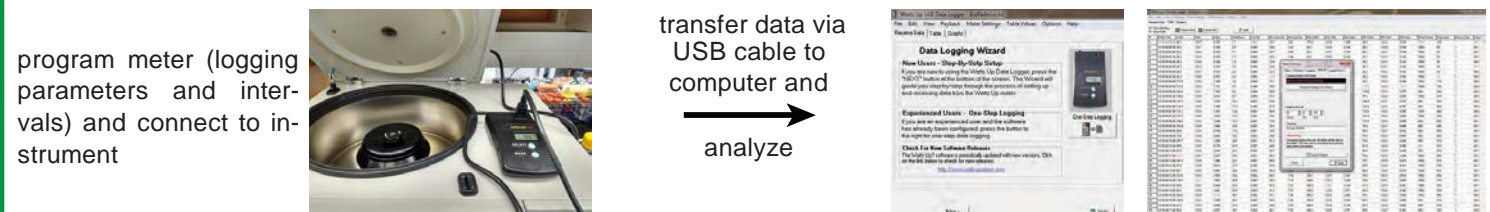
- pathway design
- enzyme bioprospecting
- enzyme engineering
- dynamic pathway regulation (sensor modules)
- host discovery and engineering
- fermentation process engineering



adapted from Y.Tarasova PhD thesis 2016

Our Green Labs Efforts

Power Metering with the Watts up? PRO meter



Waste Reduction

1. purchase products with reduced packaging
2. use vendors' return options for packaging
3. establish efficient recycling streams

Expected annual results:

- recycling of 10 kg plastic film
- recycling of 4 kg uncontaminated nitrile gloves
- recycling of 5 kg styrofoam
- reuse/ return ~ 40 ice boxes
- collect ~ 40 ice packs

Energy Conservation Measures

- A, electricity
1. join freezer challenge and chill up ultra low temperature freezers to -70°C
 2. behavioral change
 - switch off unused equipment (PCR machines, PowerPacks, shaker incubators)
 - post "flip the switch" signs
 3. facilitate accessibility of power switches (enabled by Green Labs seed fund)
 4. set work station computers to automatic shut down and start-up routines and turn off associated equipment through smart powerstrips (seed fund)
- B, fume hoods
- behavioral change: post "close the sash signs" at fumehoods

Expected annual results:

- 6,120 kWh/y electricity saved
- 850 USD/y if fume hoods are closed when not in use

Water Conservation Measures

1. use low flow aerators and foot pedal operated faucets
2. adjust the autoclave water-mizer to 140°C

Expected annual results:

- 51,480 Gal/y fresh water and sewer

Innovative Idea

Direct Feedback Device to Improve the Closing of Fume Hood Sashes

A previous study performed at MIT showed that direct feedback is a great tool to improve the behavior of fume hood users and save energy associated with room and fume hood ventilation (Chemistry Department saved \$41,500 in 2009) (Wesolowski D. et al. 2010).

Devices currently on the market, e.g. "zone" and "sash open" detectors by Phoenix Controls, only give immediate feedback for extreme cases of environmentally irresponsible behavior in form of an alarm when the sash is wide open and no researcher is detected in the work zone.

Our idea was inspired by a spin-off from ETH Zurich that produces devices that monitor people's shower behavior (temperature and amount of water used), log the information for long term analysis and at the same time give direct feedback to the user in form of an animation (melting iceberg).

We believe that a similar device would be very useful for fume hoods as it combines immediate user feedback with long term observations. The additional emotional component of the animation might also further motivate users to improve their behavior.

The logging and feedback device could either be added to an existing commercial monitoring system or incorporated into a custom built design that could be developed in laboratories at MIT.



Wesolowski D. et al., *IJSHE*, 2010, 11(3): 217-235, doi: 10.1108/14676371011058523
Tiefenbeck V. et al., *IEEE*, 2013, doi: 10.1109/IECON.2013.6699906

Future Plans

1. collect and recycle clean, small plastic items
2. collect and recycle Tyvec envelopes (~ 350 per year)
3. stop using single-use plastic items for food at group meeting (seed fund)
4. establish the permanent lab job "sustainability manager" (responsible for reinforcing the green lab practices and continue greening the lab)

