How to Become More Sustainable in Your Lab

Reduce waste, reuse materials, and recycle whenever possible – these are the tips you need

1. Reduce

- Minimize your experimental design
  - It is possible to perform your assay in a miniaturized design like a microplate?
  - Store your sample in the appropriately sized tube and storage boxes. Switching to smaller tubes and boxes will save storage space in your freezer.
  - Example: You can start by reducing your sample preparation and using Liquid phase Microextraction (LPME) or Solid Phase Microextraction (SPME). These techniques can be applied to obtain analytes out of very different matrices, ranging from water samples to blood samples to the detection of metabolites in cell culture supernatants.

- Plan your experiments mindfully
  - Of your experimental design helps you to avoid unnecessary repetition of experiments. Invest your time in good planning and save resources.

2. Reuse

- Plastic isn’t always single-use
  - Consider reusing plastic items, e.g. tubes, for non-sterile or non-critical applications. Some items can even be autoclaved and reused for sterile applications: take a look in the product specifications.

- Packaging
  - Reuse packaging material, like cardboard boxes or Styrofoam® boxes to send your items or use bags again as waste bags etc.
  - Take care and be aware that your packaging material isn’t contaminated.

- Choose alternatives
  - Consider reusable alternatives for single-use items.

3. Rethink

- Communication
  - Exchange best practices in your lab community or with other research groups.

- Communication
  - Start by asking yourself: Where can I change something? And be aware that even little changes are worth the effort!

- Minimize your experimental design
  - It is possible to perform your assay in a miniaturized design like a microplate?
  - Reduce waste, reuse materials, and recycle whenever possible – these are the tips you need.

Did You Know?

About 322 Million tons of plastic waste have been generated in 2015 (1). The proportion of plastic waste from laboratories corresponds to approximately 1.8% of the plastic waste generated worldwide (based on the year 2015) (2). This is equivalent to 67 cruise liners or about 550-times the weight of the Eiffel-tower. We’re avoiding plastics in our private life, but what about plastic waste reduction in our daily work in the lab?

A decision guide: glassware vs plastic ware

<table>
<thead>
<tr>
<th>DURABILITY</th>
<th>GLASS WARE</th>
<th>PLASTIC WARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass breakage is problematic from the point of view of health &amp; safety at work due to the risk of injury.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Glassware is porous, but the risk of glass breakage. Always handle with care!</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SINGLE-USE</td>
<td>THE PRODUCTION OF LABORATORY GLASSWARE IS ENERGY INTENSIVE.</td>
<td>THE PRODUCTION OF PLASTIC ITEMS IS LESS ENERGY INTENSIVE.</td>
</tr>
<tr>
<td>MULTI-USE</td>
<td>DEPENDING ON THE APPLICATION.</td>
<td>✓</td>
</tr>
<tr>
<td>RECYCLABILITY</td>
<td>LABORATORY GLASSWARE IS MADE OF RECYCLED MATERIAL, WHICH IS A HIGH-MAKING SPECIAL GLASS. IT CANNOT BE RECYCLED (REMAIN IN GLASS) AND HAS TO BE DISPOSED OF SEPARATELY.</td>
<td>PLASTIC PRODUCTS CAN BE RECYCLED IN PRINCIPLE, BUT THERE IS THE RISK OF CONTAMINATION. THEREFORE, IT IS Suggested TO DISPOSE OF IT SEPARATELY.</td>
</tr>
<tr>
<td>SPECIAL REQUIREMENTS</td>
<td>QUESTIONS TO ASK TO DECIDE WHICH ITEM FITS BEST YOUR NEEDS: WHAT DO YOU WANT THIS ITEM FOR? DOES IT COME IN FALL SPECIAL REQUIREMENTS RACK AS BEING STERILEABLE?</td>
<td>✓</td>
</tr>
</tbody>
</table>

4. Recycle

- Know your waste management
  - Get to know the waste management and recycling streams in your institution.

- How to separate the different waste streams like paper, cardboard, plastic, … and where to dispose of it.

Only use pipette tips in pre-sterilized disposable racks when you need certified sterility and freedom of endotoxin. Switch to autoclavable boxes and tips, when possible.

- Packaging
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- Communication
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- Communication
  - Start by asking yourself: Where can I change something? And be aware that even little changes are worth the effort!