Beyond Silos

The next generation of interdisciplinary scientists

Berkeley Center for Green Chemistry
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<table>
<thead>
<tr>
<th>Year</th>
<th>Solvent/Chemical</th>
<th>Hazard</th>
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<tbody>
<tr>
<td>1970</td>
<td>Stoddard solvent</td>
<td>Fire hazard</td>
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<tr>
<td>1978</td>
<td>CFCs</td>
<td>Ozone depletion</td>
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<tr>
<td>1980</td>
<td>Methylene chloride</td>
<td>Carcinogen</td>
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<tr>
<td>1985</td>
<td>1,1,1-Trichloroethane</td>
<td>Ozone depletion</td>
</tr>
<tr>
<td>1990</td>
<td>Perchloroethylene</td>
<td>Dioxin emissions</td>
</tr>
<tr>
<td>2002</td>
<td>Hexane/acetone blends</td>
<td>Neurotoxicant</td>
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<tr>
<td>Next</td>
<td>1-Bromopropane</td>
<td>Reproductive toxicant</td>
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</tbody>
</table>
Eliminating or substituting hazardous chemicals protects workers, general public, environment.

Safety as design parameter

- Safety
- Price
- Function
- Performance
# Risk vs. Alternatives Assessment

## Risk Assessment
- ✓ What is an acceptable level of harm? (e.g., # of cancers/1000 people)
- ✓ Does this activity or product fall within that acceptable level?
- ✓ Activities considered in isolation

## Alternatives Assessment
- ✓ Is this potentially hazardous activity/product necessary?
- ✓ How little damage is possible?
- ✓ What other options are available?
- ✓ Multiple activities compared
The Greener Solutions Process

Partner’s challenge

Chemical Function

Understand design constraints

Evaluate alternatives
- Function
- Hazard

Identify alternatives

OPPORTUNITY MAP
<table>
<thead>
<tr>
<th></th>
<th>Hazard</th>
<th>Antimicrobial Efficacy</th>
<th>Level of Uncertainty</th>
<th>Biodegradability</th>
<th>Origin of Raw Materials</th>
<th>Product Compatibility</th>
<th>Regulatory Concerns</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Terpenes</td>
<td>1</td>
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<td>Peptides</td>
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<td>Lipids</td>
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<td>Methylisothiazolinone</td>
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</tr>
</tbody>
</table>

(1 = good; 3 = bad)
DANGER
DEEP BRAIN SILO
AUTHORIZED PERSONNEL ONLY
150 Extra Engineers

An IBM Electronic Calculator speeds through thousands of intricate computations so quickly that on many complex problems it's like having 150 EXTRA Engineers.

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Simona Bălan and Ana Mascareñas have received national recognition for their work in environmental health. Learn more about DTSC's dynamic duo: dtsc.ca.gov/upload/Success...
Product – Chemical Profile for Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) in Carpets and Rugs

February 2018 • DISCUSSION DRAFT
Conceptual exposure model