Consumer Habits and Practices for Formulated Cleaning Products and Personal Care Products

Symposium on:

Exploring Global Data Resources for Consumer Exposure Assessment

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21st Annual Meeting of the International Society of Exposure Science
Baltimore, Maryland
October 25, 2011
About ACI

- ACI is a 117-member trade association representing the $30 billion US cleaning products industry
- ACI has studied product ingredient safety for 50 years
- ACI sponsored nearly 300 of 2,700 HPV chemicals in the EPA and OECD programs over the last decade
- ACI provided data beyond-SIDS including exposure and screening-level risk assessments of its ingredients
Information Needs for Exposure Assessment of Formulated Consumer Products

• What ingredients are in products?
• What are the exposure models for products?
• What are the exposure factors for products?
• What is the ingredient concentration?
• Is there one place where I can find all of this information?
What ingredients are in products?

• Mandatory ingredient reporting
  – Cosmetic labeling (except fragrances, dyes, preservatives)
    • Fragrance Industry published a list of fragrance ingredients used in consumer goods by their customers worldwide in 2010
  – Cleaning product labeling in Europe

• Voluntary ingredient reporting for cleaning products
  – Australia “What’s In It?” campaign (ACCORD)
What are the exposure models for products?

Product exposure scenarios broken down by:

• Route of exposure (dermal, oral, respiratory)
• Direct/Indirect exposure
• Activity/Use
• Regional approaches (North America, Europe, Other)
## Sample Exposure Models

<table>
<thead>
<tr>
<th>Exposure Route</th>
<th>PE Scenario</th>
<th>PE Model</th>
<th>Parameters</th>
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</table>
| **Dermal: Indirect** | Exposure after activity/use: Laundry detergents: wearing clothing Fabric conditioners: wearing clothing | **North American (NA) approach:**  
\[ A \times PR \times PT \times CF \times DA \]  
\[ \frac{BW}{BW} \]  
where,  
\[ PR = 1\% \text{ based on SDA data} \]  
**European Union (EU) approach:**  
\[ A \times PR \times PT \times CF \times DA \]  
\[ \frac{BW}{BW} \]  
where  
\[ PR = \frac{(PD \times FD)}{W} \times CA \]  
and  
\[ PD = Sw / Tw \] | A: amount used (g/day)  
PR: percent retained on clothing (%)  
PT: % transferred from clothing to skin  
CF: conversion factor (1,000 mg/g)  
DA: dermal absorption (100%)  
BW: female body weight (60 kg)  
PD: percent deposition (%)  
FD: fabric density (mg/cm²)  
W: total wash weight (mg)  
CA: body surface contact area (cm²)  
Sw: Mass of water after spin cycle (kg)  
Tw: Mass of water per spin cycle (kg) |
| **Dermal: Direct** | Exposure during activity/use of: Laundry detergent: hand-washing clothes Laundry detergent: laundry pretreatment Dish detergent: hand-washing dishes Dish detergent: washing hands Dilutable hard surface cleaners Nondilutable hard surface cleaners Dilutable all-purpose cleaners Nondilutable all-purpose cleaners | **NA and EU approach:**  
\[ FQ \times CA \times PC \times FT \times CF \times TF \times DA \]  
\[ \frac{BW}{BW} \] | FQ: frequency of use (use/day)  
CA: body surface contact area (cm²)  
PC: product concentration (g/cm³)  
FT: film thickness on skin (cm)  
CF: conversion factor (1,000 mg/g)  
TF: time scaling factor (unitless)  
DA: dermal absorption (100%)  
BW: female body weight (60 kg) |
What are the exposure factors for products?

Exposure factors (habits and practices) for formulated consumer products:

• Frequency of product use
• Amount of product per use (dosing)
• Duration of use (time to rinse-off)
Data Sources

- Regulatory authorities (e.g., EPA Exposure Factors Handbook, EU Technical Guidance Document)
- Submissions to regulatory authorities (e.g., AISE-CEFIC HERA, AIHC exposure initiative assessments)
- Published literature
- Survey data collected by industry associations (i.e., CTFA/PCPC, COLIPA, AISE, SDA/ACI)
- Member company data
Exposure Factor Data Sources

• Cleaning product habits and practices
  – For laundry, dishwashing & hard surface cleaners
    • North America: SDA/ACI (Sanderson et al., 2006)

• Personal care product habits and practices
  – For 12 product types covering 95% of exposure
    • U.S.: CTFA/PCPC (Loretz et al., 2005, 2006, 2008)
    • Europe (Hall et al., 2007, 2011)
What is the ingredient concentration?

SDA 2001 Member Survey

• Chemical production/importation volume
• Chemical use by product category (e.g., liquid laundry detergent)
• Chemical releases to the environment
• Conditions under which potential worker exposures are mitigated
• Concentration in formulated products
SDA Member Survey Results

• Minimum/maximum ingredient concentrations
• Major chemical categories: Aliphatic acids, Aliphatic alcohols, Alkyl sulfates, Amine oxides, Hydrotropes, LAS

• Five product categories
  – Laundry: 9 product types
  – Dishwashing: 3 product types
  – General Cleaning: 7 product types
  – Personal Care: 15 product types
  – Cosmetics: 4 product types

• North America, Europe and Japan
One-stop Shopping

- Exposure data for formulated consumer products
- Risk screening methodology
- Case studies: peer-reviewed journal articles
- Ingredient concentration data
- Available on ACI Science website (aciscience.org)
Summary

• Data are readily available for what ingredients are in cleaning product from manufacturers (http://www.cleaninginstitute.org/ingredientcentral/)

• Info on exposure models, exposure factors and (some) ingredient concentrations for formulated consumer products are available via ACIScience.org

• Ingredient concentration data are often proprietary so some educated estimation may be necessary
References


Thank You

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