How Green is your Clean?

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New York State Pollution Prevention Institute
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Disclaimer

Any opinions, findings, and conclusions or recommendations expressed in this presentation and/or discussion do not necessarily reflect the views of the New York State Pollution Prevention Institute (NYSP2I), the New York State Department of Environmental Conservation (NYSDEC), or the US Environmental Protection Agency (EPA).
Agenda

- Reading Product Labels
- Common Chemicals of Concern
- Eco-labels & purchasing tips
- Alternatives
Areas of Concern

- There are 30 areas of concern in the US Great Lakes
- These are places where chemical contamination of sediments from the lakes has seriously endangered the quality of life for people and wildlife
- There are 6 AOCs in NYS
  - Buffalo River
  - EighteenMile Creek
  - Niagara River
  - Oswego River/Harbor
  - Rochester Embayment
  - St. Lawrence River at Massena

## Beneficial Use Impairments

<table>
<thead>
<tr>
<th>Buffalo Area</th>
<th>Syracuse Area</th>
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<th>Massena Area</th>
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<tr>
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<td>3. Restrictions on drinking water consumption, or taste and odor</td>
<td>3. Bird or animal deformities or reproduction problems</td>
</tr>
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<td>4. Degradation of benthos</td>
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**EighteenMile Creek**

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**Niagara River**

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Why is it important to **Green Your Clean?**

**Health**

Many ingredients in cleaning products can be hazardous to your health

- Skin, nose, throat, and eye irritation
- May interfere with, mimic or block hormones
- Contribute to or cause asthma

**Environment**

Products are released to the environment during normal use through evaporation of volatile components and rinsing down the drain of residual product from cleaned surfaces, sponges, etc.

- A May 2002 nationwide study by the U.S. Geological Survey (USGS) showed that nearly 70% of the streams tested contained breakdown products of detergents, while 66% contained disinfectants³

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Funding provided by the US Environmental Protection Agency Great Lakes Restoration Initiative in the amount of $104,192 and by the NYS Pollution Prevention Institute through a grant from the NYS Department of Environmental Conservation.
Cleaning Product Regulations

• Cautionary labeling on immediate container and outer containers of hazardous household substances to:
  – help consumers handle and use the products safely
  – give consumers information about immediate first aid steps to take if an accident occurs

• The EPA regulates antimicrobial cleaners, disinfectants, and other products that kill organisms as pesticides

US EPA, Pesticides, www.epa.gov/pesticides/about/types.htm
Label Requirements

• Name and place of business of the manufacturer, packer, distributor or seller
• Common or usual name or chemical name
• Signal words
• Precautionary measures to follow
• Instructions for first aid treatment when appropriate
• Instructions for handling and storage
• Keep out of the reach of children or its practical equivalent
• Certain substances declared to be caustic poisons

16CFR1500.129 Substances named in the Federal Caustic Poison Act, Federal Hazardous Substances Control Act, 15USC1261
Product Labels: Signal Words

- **Toxic**: poisonous or lethal when ingested, touched and/or inhaled
- **Danger**: extremely flammable, corrosive or highly toxic
  - One taste to one teaspoon is fatal to a 180-pound male
- **Warning** or **Caution**: all other hazardous products
  - Caution: One ounce to one pint may be harmful or fatal to a 180-pound male
  - Warning: One teaspoon to one ounce may be harmful or fatal to a 180-pound male

Federal Hazardous Substances Act, 15USC1251
Cleaners Used Around the House

- Glass & Surface Cleaners
  - Toilet Bowl Cleaners, Mildew Removers, Air Fresheners, Drain Openers
  - Oven Cleaners, Dishwashing Soap
  - Floor & Carpet Cleaners
  - Stain Removers

- Disinfectants

- Furniture Polish, Laundry Detergents


Funding provided by the US Environmental Protection Agency Great Lakes Restoration Initiative in the amount of $104,912 and by the NYS Pollution Prevention Institute through a grant from the NYS Department of Environmental Conservation.
Volatile Organic Compounds (VOCs)

Chemicals that are emitted from solids or liquids at room temperature & contaminate air

- Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors
- Emitted by a wide array of products including: paints, paint strippers, and other solvents; wood preservatives; aerosol sprays; cleansers and disinfectants; moth repellents and air fresheners; stored fuels and automotive products; hobby supplies; dry-cleaned clothing

Health effects

- Vary greatly from highly toxic to no known health effects & vary between chemicals
- Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment are among the immediate symptoms that some people have experienced soon after exposure to some organics
- Effects may include: eye, nose, and throat irritation; nosebleed; headache, loss of coordination, nausea; allergic skin reaction; damage to liver, kidney, and central nervous system
- Some organics can cause cancer in animals; some are suspected or known to cause cancer in humans
- Long term exposure can cause sick building syndrome

Actions you can take

- Use products according to manufacturer's directions and meet or exceed any label precautions
- Make sure you provide plenty of fresh air when using these products.
- Throw away unused or little-used containers safely; buy in quantities that you will use soon.
- Keep out of reach of children and pets.
- Never mix household care products unless directed on the label.

Aerosol Products

- Propellants propel the pressurized contents out of a container
  - n-butane: VOC, flammable
  - Isobutane: VOC, flammable
  - Dimethyl ether: flammable
- Mists – small particles can easily enter your lungs
- Aerosol cans cannot be recycled
  - Empty cans of non-hazardous products can typically be throw in the trash
  - Cans with remaining product typically disposed of as household hazardous waste
- **Safer alternative:** pump sprays
Air Fresheners

• Aerosol air fresheners typically contain
  – Formaldehyde: respiratory irritant and suspected carcinogen
  – aerosol propellant: flammable, VOCs
  – petroleum distillates: irritate skin, eyes, throat
  – p-dichlorobenzene: disinfectant, may be a carcinogen
  – Fragrance

• Usually highly flammable and strong irritant to eyes, skin, and throat

• **Safer alternative:** baking soda

Fragment

What is the concern?

- We are exposed to a lot of scented products – personal care, cleaners, air fresheners, laundry soap, etc.
- Usually made up of a blend of chemicals
- May be from natural or synthetic sources
- **Breathe it in** – perfume, cleaners, air freshener, scented candles, other airborne products
- It is **absorbed through the skin** – shampoo, soap, lotion, other personal care products, laundry soap on clothes & bed sheets

Fragrance

Chemicals typically found in fragrance

Phthalates
- Act as solvents and carriers for those chemicals that create the scent in a fragrance
- Shown to cause reproductive and developmental harm in laboratory animals, and are linked to similar impacts in humans
- Linked to diabetes and asthma, potential risks to reproductive system & thyroid
- *EPA is concerned about phthalates because of their toxicity and the evidence of pervasive human and environmental exposure to these chemicals*

Synthetic Musks
- Man-made chemicals produced to replicate musk scents originally obtained from musk deer & musk ox
- Don’t break down in the environment and can accumulate in our bodies
- Potential hormone disruptors and may break down the body’s defenses against other toxic chemical exposure

Fragrance

What you can do

✗ Avoid products with “-phthalate”, “musk”, “parfum”, or “fragrance” as an ingredient
✗ Avoid air fresheners and scented candles
✓ Choose fragrance free products labeled “free of perfumes and dyes,” “fragrance free”, or “unscented”
✓ Use homemade unscented cleaners
✓ Choose naturally scented products
✓ Use baking soda to naturally absorb odors
Sodium hypochlorite

Bleach is a pesticide

- Disinfectant to kill germs
- Fungicide to kill fungi and molds
- Antimicrobial pesticide to kill disease causing microorganisms
- Liquid bleach in the bottle is a 5.25% sodium hypochlorite solution, other products may have lower/higher concentrations
Sodium hypochlorite

Health effects

- Can cause severe skin, nose, throat, and eye irritation & chemical burns to broken skin
- Contributes to reactive airways dysfunction syndrome (RADS), a type of asthma caused by irritating or corrosive substances

Actions you can take

- NEVER mix ammonia containing products with those that contain chlorine bleach!
- Avoid cleaning with chlorine-based products, especially if you or your children have asthma or chronic lung or heart problems.
- If you do use cleaning products that contain chlorine, wear gloves to avoid direct contact with skin, and provide plenty of ventilation by opening windows.

Quaternary Ammonium Compounds

Disinfectants

Concerns

• Asthmagens – can aggravate existing asthma & attacks or cause asthma in those that don’t have it

• Causes skin burns and eye damage

• Release formaldehyde
  – Carcinogen
  – Can cause skin & eye burns

• Very toxic to aquatic life

Environmental Working Group, Guide to Healthy Cleaning, [http://www.ewg.org/guides/cleaners](http://www.ewg.org/guides/cleaners)

May be found in

• Spray cleaners
• Disinfectant/antibacterial cleaners
• Disinfecting air fresheners

products that contain quats
**Triclosan**

**Antibacterial – kills or slows the growth of bacteria**

**Concerns**

- Linked to thyroid function and emergence of bacteria resistant to antibacterial products, studies show it’s interaction with hormone receptors
- Toxic to aquatic bacteria at levels found in the environment and inhibits photosynthesis in algae
- Chloroform is an impurity
  - Linked to cancer, birth defects, reproductive issues
  - May affect CNS, liver

**December 2013** - The US FDA issued a proposed rule to **require manufacturers of antibacterial hand soaps and body washes to demonstrate their products are safe for long-term daily use and more effective than plain soap and water in preventing illness and the spread of certain infections.** If companies do not demonstrate such safety and effectiveness, these products would need to be reformulated or relabeled to remain on the market.

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FDA News Release, FDA issues proposed rule to determine safety and effectiveness of antibacterial soaps, [http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm378542.htm](http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm378542.htm)

Environmental Working Group, Guide to Healthy Cleaning, [http://www.ewg.org/guides/cleaners](http://www.ewg.org/guides/cleaners)
Ammonia

Helps lift dirt and grime off surfaces so it can be wiped away

- Colorless gas with a very distinct odor – used in smelling salts
- Ammonia gas can be dissolved in water but once exposed to open air, liquid ammonia quickly turns into a gas
- Applied directly to soil on farm fields, and is used to make fertilizers for farm crops, lawns, and plants

May be found in
- Window cleaners
- Floor polishing waxes
- Drain cleaners
- Toilet cleaners
- Bathroom cleaners
- Multi-surface cleaners
- Glass cleaners
- Oven cleaners
- Stainless-steel cleaners

Ammonia

Concerns

Environmental Effects
- Does not last very long in the environment as it’s rapidly taken up by plants, bacteria, and animals
- Nutrient for plants and bacteria

Health Effects
- May irritate skin, eyes, throat, and lungs and cause coughing and burns
- People with asthma may be more sensitive to breathing ammonia than others
- Greater damage if mixed with chlorine bleach (or cleaners containing bleach) - forms highly poisonous chloramine gas that cause coughing, choking and lung damage
- Swallowing concentrated solutions can burn your mouth, throat, and stomach
- Splashing ammonia in your eyes can cause burns and even blindness

Actions you can take
- Ventilate rooms well when cleaning by opening windows and using fans.
- NEVER mix ammonia containing products with those that contain chlorine bleach!
- If symptoms develop from inhaling fumes, immediately discontinue use and get fresh air.


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Butyl Cellosolve

Used to remove grease & oils

AKA butyl glycol, 2-butoxy ethanol, & ethylene glycol monobutyl ether (EGBE)

Health Effects

• Animal studies indicate that it may cause reproductive damage
  – testicular damage, reduced fertility, death of embryos and birth defects
• Irritate eyes, nose, mouth, and throat & cause headache, dizziness, lightheadedness, confusion, and passing out
• May damage the liver & kidneys

May be found in
• Glass cleaners
• Oven cleaners
• General degreasers
• Spot removers
• Air fresheners
• Carpet cleaners

products that contain it


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Alkylphenol ethoxylates & Nonylphenol ethoxylates

Nonionic surfactants or surface active agents that help other components of the cleaner penetrate grime

<table>
<thead>
<tr>
<th>Alkylphenol ethoxylates</th>
<th>Nonylphenol ethoxylates</th>
</tr>
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<tbody>
<tr>
<td>AKA APEs, nonoxynol, octoxynol, nonylphenol, octylphenol, nonylphenol ethoxylate, octylphenol ethoxylate</td>
<td>NPE breaks down into nonylphenol (NP), which is more toxic/hazardous than NPE</td>
</tr>
</tbody>
</table>

Found in some laundry detergents, tile cleaners, de-greasing cleaning products

Found in detergents, cleaners, degreasers, indoor pesticides, prewash spotters, dust control agents

Concerns

• Environment: persistent in water, moderately bioaccumulative, and extremely toxic to aquatic organisms

• Health: Highly irritating and corrosive to the skin and eye, potential endocrine disruptors
Alkylphenol ethoxylates & Nonylphenol ethoxylates

Government Action

• 12/31/12: California banned APEs & NPEs from oven & grill cleaners, non aerosol general purpose cleaners & degreasers, and glass cleaners
  – Reasons for the ban:
    • APEs are toxic to aquatic species
    • APEs are hormone disruptors
    • Any potential additional use could adversely impact aquatic life
    • There are replacements available that are more effective and environmentally safe
• 9/11: USEPA alternatives assessment for NPE
  – Identified 8 alternative chemicals with less hazardous environmental & human health effects


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Alkylphenol ethoxylates & Nonylphenol ethoxylates

Example products that contain them

Actions you can take

Look for products containing safer surfactants, such as:
• soap
• vegetable-based detergents (Green Seal requirement: does not contain alkylphenol ethoxylate)
• alcohol ethoxylates

Many alternative, cost competitive products are available.

US EPA, Nonylphenol (NP) and Nonylphenol Ethoxylates (NPEs) Action Plan, August 2010,
WHO/UNEP/ILO International Programme on Chemical Safety, Integrated Risk Assessment: Nonylphenol Case Study
http://www.who.int/ipcs/methods/Nonylphenol.pdf

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Diethanolamine (DEA) & Monoethanolamine (MEA)

Surfactants that help other components of the cleaner penetrate grime also used to control pH

**DEA**
- White powder or colorless liquid
- Slight ammonia like odor

**MEA**
- Colorless, thick liquid or solid

May be found in
- Laundry detergent
- Floor strippers
- Oven cleaners
- Tub & tile
- Carpet cleaners

Products that contain them

Diethanolamine (DEA) & Monoethanolamine (MEA)

Potential health effects

**DEA**
- Can cause or worsen asthma
- Can irritate nose, throat, & skin
- Breathing can cause headache, nausea, and vomiting
- May cause skin allergy

**MEA**
- Can cause or worsen asthma
- Corrosive, contact can severely burn eyes & skin
- Breathing can irritate the nose, throat, & lungs causing coughing, wheezing, shortness of breath
- May cause skin allergy
- May damage liver and kidneys
- High exposure can affect the nervous system

**Actions you can take**
- Avoid products with DEA & MEA
- When using products that contain them,
  - Avoid skin contact
  - Use in well ventilated areas
  - Rinse areas of contact thoroughly after use


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Phosphates

*found in laundry and dish washer detergents*

Phosphorus from dishwasher detergents is carried to ponds, rivers, lakes and streams by wastewater discharges from septic systems and water treatment plants.

Phosphorus in water has been linked to reductions in oxygen necessary for fish to breathe, algae that turn waterbodies green and algae and algae by-products that degrade drinking water.

Over 70 NY waterbodies are impaired due to phosphorous.

Removing phosphorus at wastewater treatment plants can cost up to $20 per pound.

2010 NYS Dishwasher Detergent and Nutrient Runoff Law restricts phosphorus in dishwasher detergents and fertilizers.

Actions you can take:
- Buy no phosphate dishwasher soap
- Do not purchase dishwasher soap in other states for use in NY


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Greenwash

Misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service.

1. Sin of the Hidden Trade-Off
2. Sin of No Proof
3. Sin of Vagueness
4. Sin of Worshiping False Labels
5. Sin of Irrelevance
6. Sin of Lesser of Two Evils
7. Sin of Fibbing


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What does it REALLY mean??

In many cases, manufacturers make claims that are neither independently verified nor regulated

Non-toxic
✓ No standard definition
✓ No organization independently verifying this claim
✓ Implies the product will not harm the user or environment

Natural
✓ No standard definition
✓ Implies product is made from all natural – no synthetic – ingredients
✓ Just because the ingredients are “natural” doesn’t mean the product is less toxic or won’t cause health effects

Environmentally friendly
✓ No standard definition
✓ No organization independently verifying this claim
✓ Implies the product has an environmental benefit
✓ Can be misleading
✓ Implies a product will breakdown in a short period of time
✓ Has been loosely defined by the US government


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Third Party Certifications

- Identify products that **meets specified environmental performance criteria** or standards
- Awarded by a **third-party organization** to products or services that are determined to meet the criteria or standards
  - In contrast to “green” symbols or claim statements made by manufacturers and service providers
- **Voluntary** approach to environmental performance certification that is practiced around the world

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Certified Organic Products

- USDA regulates “organic” as it applies to agricultural products through the National Organic Program
- If a product contains agricultural ingredients, and meets the USDA organic production, handling, processing and labeling standards, it may be eligible to be certified

<table>
<thead>
<tr>
<th>Package says</th>
<th>Composition of the PCP</th>
<th>What must be on the product packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% Organic</td>
<td>Must contain 100% organic ingredients</td>
<td>USDA Organic Seal Certifying agent’s name &amp; address</td>
</tr>
<tr>
<td>Organic</td>
<td>Must contain at least 95% organic ingredients</td>
<td>USDA Organic Seal Certifying agent’s name &amp; address</td>
</tr>
<tr>
<td>Made with organic ingredients</td>
<td>Must contain at least 70% organic ingredients</td>
<td>Certifying agent’s name &amp; address Indicate which ingredients are certified organic</td>
</tr>
<tr>
<td>Cannot be labeled organic</td>
<td>Products with less than 70% organic ingredients</td>
<td>Indicate which ingredients are certified organic</td>
</tr>
</tbody>
</table>
Using Cleaning Products Safely

Use in well ventilated areas

Use in areas away from pregnant women, babies and young children, seniors, people with asthma, and others who may be sensitive

Store all cleaners and other chemicals away from children

Mixing ammonia & bleach creates chloramine gas
  - Toxic, causes coughing shortness of breath, chest pain, wheezing, nausea, watery eyes, irritates the throat, nose & eyes, pneumonia & fluid in the lungs

Mixing acids and bleach creates chlorine gas, & hydrochloric acid when mixed with water
  - Chlorine gas causes coughing and breathing problems, burning & watery eyes, and runny nose. Higher levels cause chest pain, more severe breathing difficulties, vomiting, pneumonia, and fluid in the lungs. Very high levels can cause death. It is absorbed through the skin & causes pain, inflammation, swelling, & blistering.
  - Hydrochloric acid causes burns to the skin, eyes, nose, throat, mouth & lungs.

Do not use two drain cleaners together, or one right after the other as they may contain bleach or acid

If you think or know you mixed these together –
  - Leave the room & get fresh air immediately. Don’t return until the room has been well ventilated.
  - Contact your local Poison Control (1-800-222-1222)
Proper Disposal of Household Cleaners

- Always **dispose of cleaners in accordance with the manufacturer’s instructions** on the product label.
- Most **water soluble cleaners** (those mixed with water during use), including liquids, gels, and powders can be disposed of down the drain with running water just like when you use them.
- Most **solid products** (soap scouring pads, sticks, towelettes, etc.) can be placed in the trash.
- For **other products** (such as oven cleaners, crystal drain openers and furniture polishes) contact the manufacturer for disposal recommendations, or check with your local trash hauler and the EcoPark.


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**Alternative Cleaning Ingredients**

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<th>USED TO ...</th>
<th>PRACTICAL EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baking soda</td>
<td>Clean, deodorize, water soften, scour</td>
<td>Clean toothbrush or hairbrush</td>
</tr>
<tr>
<td>Unscented, non-antibacterial soap</td>
<td>Clean a huge range of materials and surfaces</td>
<td>Washing dishes</td>
</tr>
<tr>
<td>Lemon</td>
<td>Fight household bacteria</td>
<td>Rub on smelly cutting board</td>
</tr>
<tr>
<td>Borax</td>
<td>Clean, deodorize, disinfect, water soften, clean floors, wallpaper, and printed walls</td>
<td>Alternative to bleach, boosts soaps, and removes stains</td>
</tr>
<tr>
<td>White vinegar</td>
<td>Cuts grease, removes mildew, odors, some stains, and wax build-up</td>
<td>Remove grease from clothes, towels, carpets, rugs</td>
</tr>
<tr>
<td>Cornstarch</td>
<td>Clean windows, polish furniture, shampoo carpets and rugs</td>
<td>Absorbs smell; sprinkle on carpet, let sit for 30 minutes, and vacuum up</td>
</tr>
<tr>
<td>Citrus solvent</td>
<td>Cleans paint brushes, oil and grease, some stains</td>
<td>Use instead of paint thinner, clean painting materials</td>
</tr>
</tbody>
</table>

Household Products Database

http://householdproducts.nlm.nih.gov/

Search for cleaning products by name

- Info available: Product info, manufacturer, health effects, handling/disposal, ingredients
Guide to Healthy Cleaning

http://www.ewg.org/guides/cleaners

Search for cleaning products by name
Search for cleaning product types
Search for companies
Search for ingredients
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<table>
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<tr>
<th>Risk Category</th>
<th>Concern Level</th>
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<tbody>
<tr>
<td>Asthma/Respiratory</td>
<td>Moderate Concern</td>
</tr>
<tr>
<td>Skin Allergies &amp; Irritation</td>
<td>Some Concern</td>
</tr>
<tr>
<td>Developmental &amp; Reproductive Toxity</td>
<td>Low Concern</td>
</tr>
<tr>
<td>Cancer</td>
<td>Low Concern</td>
</tr>
<tr>
<td>Environment</td>
<td>Moderate Concern</td>
</tr>
</tbody>
</table>

How does it rate: Scores for similar cleaners ranged from A to F. Search for a better General Purpose Cleaner.

Top Scoring Factors: May contain ingredients with potential for acute aquatic toxicity; respiratory effects; skin irritation/allergies/damage.

Ingredient Disclosure: poor
Green Certified: NO
Print
Share on: 

Product ingredients

<table>
<thead>
<tr>
<th>Known Ingredients</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMMONIUM HYDROXIDE</strong></td>
<td>F</td>
</tr>
<tr>
<td>Health, Environment, and Disclosure Concerns</td>
<td>High Concern: acute aquatic toxicity; Moderate Concern: respiratory effects; Some Concern: damage to vision, skin irritation/allergies/damage</td>
</tr>
<tr>
<td><strong>ETHANOL</strong></td>
<td>D</td>
</tr>
<tr>
<td>Health, Environment, and Disclosure Concerns</td>
<td>Low Concern: skin irritation/allergies/damage</td>
</tr>
</tbody>
</table>
Packaging

- Choose recyclable packaging
- Choose packaging with recycled content
- Consider packaging with biobased content, such as “compostable”
  - Few towns have industrial composters
- Choose concentrates instead of ready to use formulas
  - Reduced environmental footprint of transporting the cleaner and uses less packaging than ready to use formulas
- Choose refills when you can
  - Uses less packaging than ready to use formulas
  - Typically cheaper

L: 50oz, 4x laundry soap (66 loads); recyclable or compostable bottle made from 100% recycled fiber uses 66% less plastic than other bottle
R: 50 oz, 2x laundry soap (33 loads)

L: 18 ounce liquid dish soap
R: 36 ounce liquid dish soap refill
Upcoming Events

Webinar Series
1hr presentation followed by Q&A starting at 2:00 on the dates below

March 18 How Green is Your Clean?
March 26 Safer Household Products
April 2 Hazardous Waste at Home
April 9 Potential Hidden Dangers of Personal Care Products

Contact NYSP2I at greenhomes@rit.edu to register

March 26, 7-9pm
Breast Cancer Coalition of Rochester, University Ave

Clean, Green, & Healthy:
Choosing Safer Household and Personal Care Products
Learn how to identify and protect yourself and your family from potential health hazards found in products around your home.

Registration not required.
Questions & Discussion

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Phone: 585-475-5390

New York State Pollution Prevention Institute
http://www.nysp2i.rit.edu