

HANDBOOK ON REDUCING CHEMICAL FOOTPRINTS

Chapter 9. Reducing Our Chemical Footprints: Practical Steps

Everybody can take steps to reduce chemical footprints. This chapter starts with a list of ten easy steps that each of us can adopt to reduce our chemical footprints, protect our health, and prevent environmental harm. This is followed by more detailed tips for avoiding, decreasing or replacing chemicals in personal care, household, and gardening products with safer alternatives.

Ten Easy Ways to Reduce Your Chemical Footprint

Don't buy antibacterial soap! The American Medical Association recommends against the use of antibacterial soap in the home because it contains the chemical triclosan. Triclosan makes bacteria stronger, leading to antibiotic resistance, poisons fish and is linked to endocrine disorders. Soap is equally effective at cleaning skin and eliminating bacteria. Avoid soap that has triclosan.

Don't buy toothpaste that contains triclosan. Triclosan can enter your body through ingestion or absorption into your bloodstream through your gums and is not necessary to clean your teeth or gums.

Avoid fragrances. "Fragrance" on an ingredient label indicates artificial fragrance. Many artificial fragrances cause allergic reactions and do not readily biodegrade once in the environment where they are suspected of harming fish. Buy all personal care and household products that are unscented, or that are scented with essential oils instead of artificial fragrance.

Buy fresh food instead of packaged food. Many metal food cans have an inner lining that uses bisphenol A (BPA). The FDA recently expressed concern over "the potential effects of BPA on the brain, behavior, and prostate glands of fetuses, infants and children." Bring and reuse your own plastic or cloth bags to buy fresh food.

Avoid food that contains preservatives. Chemical food preservatives, such as butylated hydroxyanisole (BHA) and parabens, are listed on the ingredient label, so they are easy to avoid. These chemicals end up in the environment where they pose toxic risks.

Wash your laundry with half the detergent you use now. Laundry detergents often contain harmful chemicals such as artificial fragrance and synthetic surfactants. Your clothes will get just as clean with less detergent. Let your clothes soak before you turn on the washer and spot-clean stains to reduce the need for detergent.

Wear your clothes more between washing. This will increase the life of your clothes and protect the environment from the chemicals in your detergent. Hanging previously worn clothes in the bathroom while you shower can freshen the fabric and get out wrinkles.

Wash your hair less often. Many shampoos and conditioners contain chemicals that are toxic to the environment. By washing less often, you can reduce your exposure to chemicals, keep your hair healthier, and prevent more chemicals from getting into the environment. Try using less shampoo and conditioner with each washing.

Switch to non-toxic household cleaners. When you clean your home, use non-toxic cleaners such as vinegar and baking soda. If you use a housecleaning service, ask your housecleaner to use non-toxic cleaners, or switch to a non-toxic service.

Only run your dishwasher when it is full. You have heard this tip before for water and energy conservation, but it will also improve water quality by releasing fewer chemicals to the water stream.

More Tips to Reduce Your Personal Care Chemical Footprint

While many products on the market contain chemicals of concern, there are also many options for avoiding or reducing the use of these chemicals. Substitute the following chemicals of concern with non-toxic, less toxic or non-chemical alternatives.

1. Antibacterials in body care products: Preventing bacteria from growing and spreading disease is important for maintaining personal and public health. Triclosan has been widely adopted to address this goal, but there are many human health and environmental concerns connected to its use (including endocrine disruption, skin irritation, the rise of antibacterial resistant microbes, bioaccumulation and toxicity in other species). Alternatives to achieve the bacteria-fighting goal:

- Use ordinary soap and water. Look for bar and liquid soaps that do not list triclosan in the ingredients. The US Food and Drug Administration finds that there is “no evidence that over the counter (OTC) antibacterial soap products are any more effective at preventing illness than washing with plain soap and water.”¹ Hand washing also prevents the spread of many toxins from hands to mouth.
- Use alternative hand sanitizers when soap and water is not available. Safer alternatives include alcohol-based sanitizers, using isopropyl alcohol (also called rubbing alcohol) or ethyl alcohol (ethanol).
- Wash and disinfect objects that might carry and spread bacteria or toxins (see below under household cleaning products).
- Avoid toothpastes, toothbrushes and mouthwashes that promise antibacterial action to prevent gum disease. Look for triclosan on the label (for example, in Colgate’s Total® toothpaste).
- Avoid triclosan hidden in many other personal care items. Look for triclosan on the labels for products such as: face washes and skin wipes; cosmetics (powder foundation, lip products, mascara, lotions); deodorants; and first aid products.

Non-toxic Hand Sanitizer Recipe

Ingredients:

2 parts rubbing alcohol (isopropyl)
1 part aloe vera gel
A few drops essential oil (Optional. Many fragrant oils distilled from plant materials are available)

Directions:

Combine all ingredients in a bowl and mix with a whisk. Pour into a BPA-free bottle. Use a few drops to clean hands.

2. Fragrance for your body: Good smells make life pleasant, but personal care products with “fragrance” or “parfum” on the ingredient list mean that the product includes one or more of many thousands of synthetic fragrance chemicals that are exempt from disclosure and testing by manufacturers. Many people are allergic to synthetic fragrances, and these chemicals bioaccumulate in the environment. Alternatives:

- Buy fragrance-free products.

¹ US Food and Drug Administration, “FDA Taking Closer Look at ‘Antibacterial’ Soap,” Consumer Updates, last updated January 21, 2015 (www.fda.gov/forconsumers/consumerupdates/ucm378393.htm).

- Look for personal care products that list “no synthetic fragrance” or “no artificial fragrance” on the label.
- Essential oils are a safer source of pleasant aromas. Essential oils are distilled (usually by steaming) from a wide variety of plant materials, including citrus, flowers, herbs, spices, and trees.

Educate yourself on essential oils from plants by visiting <http://www.essentialoilsfromplants.com/>

DEET-free Bug Repellent

Ingredients:

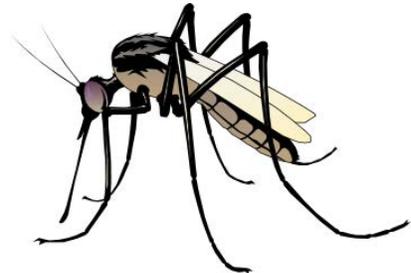
- 1/2 cup witch hazel
- 1/2 cup distilled water
- 20 drops oil of lemon eucalyptus
- 10 drops lavender oil
- 10 drops peppermint oil

Directions: Mix witch hazel and distilled water together in large bowl. Add essential oils and stir. Pour into spray bottle.

3. Insect repellent: Preventing insect bites, particularly the bites of disease-carrying insects, is an important public health goal. DEET (N,N-diethyl-metoluamide) is one of the most common options due to its proven effectiveness against a variety of biting insects. However, DEET causes skin and eye irritation in many people and is found widely dispersed in the environment with toxic effects on birds and aquatic species.

Alternatives:

- Cover up! Wear long sleeves, long pants, hats, and closed shoes to prevent skin exposure in areas where disease-carrying insects are prevalent.
- Several alternatives to DEET have been found equally effective by the Centers for Disease Control, among others, for protection against West Nile virus-carrying mosquitoes, Lyme-disease-carrying ticks, and other insect-borne illnesses.² These include:



- **Picaridin** is considered a “conventional” repellent widely used in Europe and Australia, it is a synthetic compound designed to mimic the natural substance piperine, which is found in plants used to produce black pepper.³
- **Oil of Lemon Eucalyptus** or its synthetic version, PMD (para-menthan-3,8-diol), are classified as “biopesticide” repellents derived from a naturally-occurring ingredient, the

² Roger S. Nasci, Emily Zielinski-Gutierrez, Robert A. Wirtz and William G. Brogdon, “Protection Against Mosquitoes, Ticks & Other Insects & Arthropods,” Centers for Disease Control, last updated August 1, 2013 (wwwnc.cdc.gov/travel/yellowbook/2014/chapter-2-the-pre-travel-consultation/protection-against-mosquitoes-ticks-and-other-insects-and-arthropods); Environmental Working Group, “EWG’s Advice for Avoiding Bug Bites,” 2013 (http://static.ewg.org/reports/2013/bug_repellents/2013_EWGs_Bug_Repellent_Tips.pdf?_ga=1.25959613.163123034.1424842325).

³ National Pesticide Information Center, “Picaridin: General Fact Sheet,” reviewed December 2009 (<http://npic.orst.edu/factsheets/PicaridinGen.html>); World Health Organization, “WHO Specifications and Evaluations for Public Health Pesticides: Icaridin (also known as hydroxyethyl isobutyl piperidine carboxylate), October 2004 (www.who.int/whopes/quality/en/Icaridin_spec_eval_Oct_2004.pdf).

leaves of lemon eucalyptus trees. Because biochemical repellents are not subject to the same level of safety testing as are synthetic chemical pesticides, oil of lemon eucalyptus is not recommended for use with children under the age of 3 years.⁴

- **IR3535** (or Ethyl butylacetylaminopropionate) has been used in Europe for more than 20 years. It is considered a “biopesticide” repellent, as it is structurally similar to the naturally occurring amino acid B-alanine. IR3535 can cause eye irritation.⁵
- Young children need protection from all insect repellents. Infants under 6 months should not be exposed to any insect repellents. Oil of Lemon Eucalyptus should not be applied to children under 3 years old.
- If insect repellent use is necessary, use the lowest effective concentration. Be sure to wash hands after application.

4. Phthalates: Hidden ingredients in cosmetics and other personal care products:

Phthalates add lubrication and flexibility to a variety of products and are used as fixatives to help make fragrances last longer. They often do not show up on product ingredient lists as they can be hidden in other substances, such as fragrance formulas. Phthalates have been linked to human hormonal and reproductive effects. Phthalates have also been found to cause a variety of toxic effects in aquatic species. Alternatives:

- Avoid phthalates in nail polish, body sprays, deodorant, hair sprays and gels, shampoos, aftershave lotions and other personal care products. There are many types of phthalates. Primary ones include diethyl phthalate (DEP), the most common phthalate in cosmetics, as well as dibutyl phthalate (DBP) and dimethyl phthalate (DMP).⁶
- Avoid products listing “fragrance” or “parfum” on the label, which commonly include phthalates. FDA regulations do not require the listing of individual fragrance ingredients, which means consumers are unable to determine from the ingredient list if phthalates are present in a fragrance.
- Look for products that state “no synthetic fragrance” or “phthalate-free.”

Learn about what the organic symbols mean at: www.aubreyorganicsuk.co.uk/what-do-the-organic-symbols-mean.html

5. Preservatives in personal care and food products:

Manufacturers add preservatives to protect consumers from microbial contaminants and to ensure product quality. These are valuable goals. Parabens and butylated hydroxyanisole (BHA)

⁴ Environmental Working Group, “EWG’s Guide to Bug Repellents: Repellent Chemicals,” July 17, 2013 (www.ewg.org/research/ewgs-guide-bug-repellents/repellent-chemicals); Marta Ferreira Maia and Sarah J. Moore, “Plant-based Insect Repellents: A Review of their Efficacy, Development and Testing,” *Malaria Journal* 10 (2011): S11 (www.ncbi.nlm.nih.gov/pmc/articles/PMC3059459/).

⁵ World Health Organization, “WHO Specifications and Evaluations for Public Health Pesticides: Ethyl Butylacetylaminopropionate (also known as IR3535),” April 2006 (www.who.int/whopes/quality/en/IR3535_eval_april_2006.pdf); US Environmental Protection Agency, “3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester (IR3535) (113509) Fact Sheet,” accessed 2015 (www.epa.gov/opp00001/chem_search/reg_actions/registration/fs_PC-113509_01-Jan-00.pdf).

⁶ US Food and Drug Administration, “Products and Ingredients: Phthalates,” updated September 19, 2014 (www.fda.gov/Cosmetics/ProductsIngredients/Ingredients/ucm128250.htm).

are two common preservatives found in a wide variety of personal care products, processed foods, and food packaging. Both preservatives raise cancer concerns, and parabens have been linked to human endocrine disruption and toxic effects in other species.

To reduce exposure to parabens:

- Avoid products with parabens, widely found in makeup, moisturizers, hair care products and shaving products, among others. There are many different parabens. The most common in personal care products are methylparaben, propylparaben and butylparaben.⁷
- Look for parabens on product ingredient lists. The law requires that parabens be listed on personal care product labels. Many products include more than one paraben. They are generally easy to identify, as most include “paraben” in the name. Parabens are derived as esters of p-hydroxybenzoic acid, which might also appear on an ingredient list and which has also been associated with endocrine disruption.⁸
- Look for products that explicitly state “paraben-free.”

To reduce exposure to BHA:

- Choose fresh foods over processed. BHA (along with its close chemical cousin BHT, butylated hydroxytoluene) is a synthetic antioxidant added to a wide variety of foods to prevent oils from becoming rancid. Examples include potato chips, breakfast cereals, packaged cookies, shelled nuts (walnuts, pecans, almonds, peanuts), snack foods, beer, processed meats, frozen dinners, butter, vegetable oils, and chewing gum. BHA is also used in dry dog and cat food.
- Check food ingredient lists for BHA and BHT.
- These preservatives are also frequently used in cosmetics and various personal care products such as lipstick and moisturizers. Check the labels.
- BHA and BHT are used in a variety of packaging materials that come in direct contact with food, not all of which are labeled. Examples include: the waxy plastic liners inside many breakfast cereal and other boxed foods, adhesives for labels or tapes applied to raw fruits and vegetables; food packaging: agents used in the manufacturing of paper, paperboard, and resinous coatings of items used for preparing, holding and packaging food; and production of rubber articles intended for repeated use in contact with food.⁹

6. Chemical sunscreen ingredients: Protection against the sun’s harmful rays is crucial for preventing skin cancer. Many commercial sun protection products rely on chemical sunscreen ingredients to address this concern, including avobenzone, benzophenone and oxybenzone.

⁷ US Food and Drug Administration, “Products and Ingredients: Parabens,” last updated December 15, 2014 (www.fda.gov/Cosmetics/ProductsIngredients/Ingredients/ucm128042.htm).

⁸ Ibid. Also see Environmental Working Group, “EWG’s Skin Deep Cosmetics Database: 4-hydroxybenzoic acid,” accessed 2015 (www.ewg.org/skindeep/ingredient/704450/4-HYDROXYBENZOIC_ACID/).

⁹ Victor O. Sheftel, *Indirect Food Additives and Polymers: Migration and Toxicology* (London: CRC Press, 2000): 345, summarizing rules set out in Title 21, *US Code of Federal Regulations*, Parts 173-178, for BHA food applications. See also Sharla Race, “Antioxidants: The Truth About BHA, BHT, TBHQ and Other Antioxidants Used as Food Additives,” Tigmor Books, 2009 (www.foodcanmakeyouill.co.uk/uploads/1/2/7/4/12746572/antioxidants.pdf).

These chemicals have been linked to endocrine disruption and allergic reactions in humans, and toxic effects in the environment, including coral bleaching. Alternatives:

- Avoid direct sunlight, particularly in the middle of the day. No sunscreen can provide complete protection from sun damage. Cover skin, protect eyes, and stay in the shade.
- Read the labels: nearly every chemical-based sunscreen currently used in the US contains both avobenzone and oxybenzone. These should be avoided.
- Mineral-based filters, including zinc oxide and titanium dioxide, have better safety records and are considered two of the most protective broad-spectrum sunscreen ingredients. There is little evidence that either of these substances penetrates the skin, and there have been no findings of endocrine disruption.¹⁰
- Wear a swim shirt or rash guard when swimming in natural bodies of water. This will reduce the amount of sunscreen needed to protect skin from the sun and will also protect aquatic species, including coral, from exposure to harmful substances.

Australians have a long history of public health education focused on sun protection, starting in 1981 with the “Slip, Slop, Slap!” campaign – slip on a shirt, slop on sunscreen and slap on a hat. Since then, two more messages have been added: seek shade and slide on some sunglasses. Sunscreen is just one of many important sun protection measures.

Source: Cancer Council Queensland, Australia
www.cancerqld.org.au/page/prevention/skin_cancer/



More Tips for Reducing the Household Chemical Footprint

Chemicals of concern are contained in many common household products. However, manufacturers are not required to list the proprietary mix of most chemicals found in these products. This makes it harder for consumers to inform themselves and to avoid specific chemicals of concern. Fortunately, there are options available for reducing exposures to chemicals around the house. Be aware of the following chemicals of concern and substitute with non-toxic, less toxic, or non-chemical alternatives.

1. **Triclosan, all around the house:** Triclosan can be found in a wide array of products used throughout the home. Though triclosan is very common, many products list “antibacterial” or “antimicrobial” with no information provided specifying chemical content. Given the human and environmental health concerns from triclosan use, and from use of unknown chemicals, consider the following:

¹⁰ Environmental Working Group, EWG’s 2014 Guide to Sunscreens, “Nanoparticles in Sunscreens,” accessed in 2015 (www.ewg.org/2014sunscreens/nanoparticles-in-sunscreens/); Warwick L. Morison and Steve Q. Wang, “Sunscreens: Safe and Effective?” Skin Cancer Foundation, accessed 2015 (www.skincancer.org/prevention/sun-protection/sunscreen/sunscreens-safe-and-effective/).

- Avoid household products with an “antibacterial” label. These products contain triclosan or some unspecified chemical. Triclosan has been added to cleaning solutions, kitchenware (cutting boards, knives, cleaning wipes), clothing (shoes, socks, undergarments), office and school supplies (pencils, binders, scissors), children’s toys, sports products, blankets, towels and numerous other items.
- Products featuring Microban® and BioFresh® protection often contain triclosan. These two technologies offer a proprietary mix of antimicrobial chemicals that do not require consumer disclosure. The Microban® formula is built into plastics, ceramics, liquids, textiles and other materials and can be found in food storage containers, kitchen and bathroom appliances, shower curtains, water filters, luggage, flooring materials, window coverings, TV remote controls and countless other products.¹¹ Microban® specifically notes that its antimicrobial protection is designed to protect products, not people, from microbes that can cause stains, odors and product deterioration.¹² BioFresh® can be found in acrylic fibers and is added to products such as socks, other apparel, pillows, pet beds, sleeping bags and wipes.¹³
- Products can be kept clean without built-in antimicrobial substances. Keep the spread of infection in check by regularly disinfecting surfaces and objects that come into contact with microbes. This includes bathroom and kitchen surfaces, sinks and toilets, and items such as cutting boards, door handles and appliances.
- Use nontoxic cleaners and disinfectants. You can make one yourself, or shop for “green” and environmentally friendly cleaners that do not contain triclosan. See the Environmental Working Group’s Guide to Healthy Cleaning, which gives an “A” grade to 39 all-purpose household cleaning products (9 percent of the 449 products reviewed, available at www.ewg.org/guides/categories/2-AllPurpose). Baking soda is included on the “A” list.
- Vinegar is a well-recognized cleaning and anti-bacterial agent. Studies have found most pathogens to be effectively treated with vinegar.¹⁴ Vinegar’s chemical properties make it a cleaner with several important advantages: It is a mild, organic, non-toxic acid that is easy to dispense, eliminates odors, is less likely than most chemicals to leave harmful residues, and is inexpensive. Use full-strength white vinegar in the bathroom sink, tub and toilet, and full or diluted vinegar solution for kitchen cleaning.
- Disinfect sponges and cleaning rags: Microbes in sponges can be killed with heat from the microwave (30 seconds on high) or the dishwasher cycle. Rags can be cleaned through regular washing (adding some white vinegar along with the laundry detergent if needed) and thorough drying.

Learn more about eco-friendly cleaning products:
<http://www.bobvila.com/articles/eco-friendly-cleaning-products/#.VTBvyiFViko>

¹¹ Microban, “What We Do: By Product,” accessed 2015 (www.microban.com/what-we-do/by-product).

¹² Microban, “Our Antimicrobial Additives for Liquids, Ceramics & Textiles,” accessed 2015 www.microban.com/what-we-do.

¹³ TextileWeb, “Product/Service: BioFresh,” Source: Sterling Fibers, Inc., accessed 2015 (www.textileweb.com/doc/biofresh-0001).

¹⁴ Vinegar Institute, “Cleaning with Vinegar,” accessed 2015 (www.versatilevinegar.org/usesandtips.html).

Non-toxic All-Purpose Cleaner Recipe

Ingredients:

12 oz hot water

1 teaspoon non-toxic liquid soap (such as *Seventh Generation*)

1 teaspoon white vinegar

Directions: Mix all the ingredients together in a spray bottle. Spray as needed, using a clean cloth to scrub and wipe clean.

2. Fragrance in household products: Artificial fragrance chemicals are all around. We are bombarded with fragrant products such as household cleaners, detergents, dryer sheets, scented facial tissues, diapers, toilet paper, shower curtains, kitty litter and a seemingly endless array of air fresheners. As with fragrances in personal care products, the numerous and undisclosed chemical fragrance ingredients (including phthalates) found in household products are linked to allergies, asthma and other respiratory conditions, as well as environmental bioaccumulation. Alternatives:

- Choose unscented or “fragrance-free” products.
- Recognize that artificial fragrances are often added to mask unpleasant odors, including chemical smells. Other options for removing odors:
 - Baking soda is a natural odor remover; place an open container in a room or the refrigerator.
 - Sprinkle baking soda in garbage pails, diaper bins and litter boxes.
 - A small pan of simmering vinegar can eliminate unpleasant kitchen smells.
 - Lemon or orange rinds in the garbage disposal are also effective kitchen odor removers.
- If you want fragrant cleaning products, use natural smells such as citrus in vinegar for cleaning, or add essential oils.
- Stay away from commercial air fresheners. Air fresheners are a fast-growing household product line with countless scent variations and many different fragrance-delivery options. Among other applications, air fresheners can be delivered through automatic spray dispensers that promise to deliver continuous fragrance; heated scent oils, scented candles and wax melts; solid room fresheners; and general room sprays. As the EPA notes, “There are four basic ingredients in air fresheners: formaldehyde, petroleum distillates, p- dichlorobenzene, and aerosol propellants.”¹⁵ These are dangerous chemicals to be breathing in and releasing to the environment.



¹⁵ US Environmental Protection Agency, “Learn About Chemicals Around Your House: Air Fresheners,” last updated June 10, 2014 (www.epa.gov/kidshometour/products/airf.htm).

- An alternative air freshener: cinnamon and cloves simmered in hot water. Or freshen your home by opening the window.

3. Plastics: Our homes are full of plastic-based products that are formulated with a wide array of chemicals. Two such chemicals of concern are phthalates and bisphenol A (BPA). Both plasticizing agents have been linked to reproductive and developmental effects in humans and other species. Since these chemicals are widely used and rarely listed, they are often difficult to avoid.

In general:

- Choose plastic products with recycling codes 2, 4 or 5:
 - Plastic 2, high-density polyethylene (HDPE) – Stiff plastic used for milk and water jugs, and personal care and cleaning product bottles.
 - Plastic 4, low-density polyethylene (LDPE) – flexible, easily sealed plastic used for grocery bags, frozen food packaging, and some disposable cups.
 - Plastic 5, polypropylene (PP) – strong and heat-resistant, used in yogurt cups and other broad-rimmed food containers, disposable plates and cups, and containers labeled as “microwaveable.”
- Be cautious with plastic 1, polyethylene terephthalate (PET/PETE). Scientists disagree on whether endocrine-disrupting phthalates might leach from these plastics to their contents. The research is ongoing.¹⁶ Meanwhile, these plastics are widely used as single-use water and soda bottles, and for many food products packaged in clear plastic containers, such as peanut butter jars, condiment and cooking oil bottles, and “clamshell” boxes used for packaging fresh produce. Many suggest that they are okay for single use, but the containers should not be reused.
- Steer clear of plastic products with recycling codes 3, 6 and 7. These plastics may contain phthalates and/or BPA.
 - Plastic 3, polyvinyl chloride (PVC) or vinyl (V) – phthalates are typically added for flexibility. PVC is used in water pipes, bubble packaging wrap, vinyl shower curtains, medical equipment, credit cards and various personal care and household cleaning product containers.
 - Plastic 6, polystyrene (PS) – used for a variety of flexible applications including Styrofoam™ products, such as disposable plates and cups, eating utensils, meat trays, egg cartons, carry-out containers and packing peanuts.
 - Plastic 7, all other plastics (OTHER) – used in some beverage containers and a variety of other products, but properties depend on the specific mixture of polymers. May contain BPA.
- Look for containers labeled as “BPA free” and “phthalate free.”

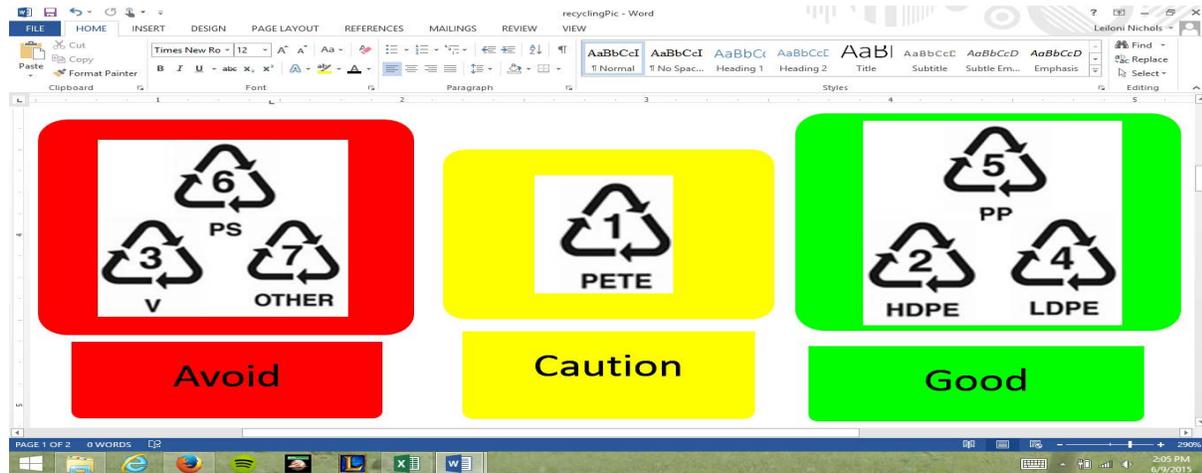


use,



¹⁶ Leonard Sax, “Polyethylene Terephthalate May Yield Endocrine Disruptors,” *Environmental Health Perspectives* 118, 4 (April 2010): 445-448 (www.ncbi.nlm.nih.gov/pmc/articles/PMC2854718/).

- Plastics contain other chemicals that may raise human health and environmental concerns as well. Reduce exposure to these chemicals by using glass, stainless steel, or ceramic containers instead of plastics whenever possible.
- Do not cook food in plastic containers or bags (even those listed as “microwave safe”). Plastic chemicals can leach into food when heated.
- Plastic chemicals can leach into the drain water when washed in a hot dishwasher.



To reduce exposure to phthalates:

- Stay away from scented products, which typically include phthalates to make the artificial fragrances last longer. The exceptions are those products labeled as fragranced with essential oils or botanical extracts.
- Soft plastic toys (such as rubber duckies) manufactured prior to 2009 may contain certain phthalates that have since been banned from children’s products.¹⁷

To reduce exposure to BPA:

- Reduce use of canned foods. Many canned foods and aluminum beverage containers are lined with BPA epoxy resin to reduce spoilage of the food inside. The problem: BPA can leach from the cans directly into food and beverages.
- Most canned products do not provide any information on their canning materials and substances. Look for products with a “BPA-free lining” message on the can label.¹⁸
- Avoid handling paper receipts, many of which contain BPA. These include store, restaurant and ATM receipts. If you cannot avoid the receipts, be sure to wash hands after

¹⁷ US Consumer Product Safety Commission, “Business Guidance: Phthalates,” accessed 2015 (www.cpsc.gov/en/Business--Manufacturing/Business-Education/Business-Guidance/Phthalates-Information/).

¹⁸ Inspiration Green, “A List of Cans With, and Cans Without, BPA,” accessed 2015 (www.inspirationgreen.com/bpa-lined-cans.html); Robin Shreeves, “Which Food Companies Don’t Use BPA-lined Cans?” Mother Nature Network, January 6, 2015 (www.mnn.com/food/healthy-eating/blogs/which-food-companies-dont-use-bpa-lined-cans).

handling to minimize absorption of the BPA through the skin and to prevent transferring the BPA to food, mouth, and other surfaces.

- Keep receipts out of the hands of children.
- Do not recycle receipts that might contain BPA to prevent BPA from making its way into future recycled paper products.

BPA coats many store receipts, and is easily rubbed onto skin.

Source:

www.foodsafetynews.com/2010/08/according-to-new-laboratory-tests/#.VTFPBSFViko

4. Surfactants and dispersants: These surface-active agents allow detergents and other cleaners to wet and penetrate fabric, loosen dirt, and keep the dirt suspended in the wash solution so they leave in the rinse water rather than getting redeposited on the items being washed. Common surfactants are derived from alkylphenol, nonylphenol and octylphenol, with many variations in use.¹⁹ Due to serious toxicity and endocrine disruption concerns, some surfactant applications are being phased out.²⁰

- Where to find surfactants: They are common in laundry detergents but are also found in many other household products for washing dishes, cleaning countertops and other surfaces, and absorbing and removing grease. These chemicals are also found in paints, adhesives, plastics (including plastic food packaging) and pest control products.
- Read the label. Current US law does not require manufacturers to list most household product ingredients and many products come with very little ingredient disclosure. Many laundry detergents list “surfactants” or “biodegradable surfactants” and nothing more. Products with this unspecific ingredient might be composed of any number of unsafe chemical substances.
- Safer products provide a full listing of ingredients and will typically list green certification from one or more sources. Many green companies are also proud to state what is NOT in their products, such as “NPE free” (does not contain nonylphenol), or free of SLS (sodium laureth sulfate, another common surfactant), synthetic surfactants, artificial fragrances, petrochemicals, phosphates, formaldehyde, and dyes
- See the Environmental Working Group’s Guide to Healthy Cleaning, which gives an “A” grade to 47 laundry cleaning products (6.8 percent of the 779 products reviewed, available at www.ewg.org/guides/categories/9-Laundry). The list includes detergents as well as bleach alternatives, spot removers, fabric softeners, and other substances used as laundry aids.
- Cleaning can be achieved with less – less laundry detergent, less dishwasher detergent. Most clothes do not need to be washed after a single wearing. The dishwasher should be run only when full. There are many benefits of using less: Fewer chemicals need to be produced; fewer chemicals are entering the water system; less money is spent on buying these products; and money is saved by protecting the appliances from detergent residue build-up.

¹⁹ See a list of surfactants made available by Dow Chemical Company in “Dow Surfactants: Products,” accessed 2015 (www.dow.com/surfactants/products/index.htm).

²⁰ Due to health and environmental concerns related to nonylphenol ethoxylates (NPEs), these have been eliminated from household laundry detergents. However, they are still in wide use in industrial laundry detergents and many other applications, though the EPA may be acting to phase these out. See: US Environmental Protection Agency, “Nonylphenol (NP) and Nonylphenol Ethoxylates (NPEs) Action Plan” [RIN 2070-ZA09], August 18, 2010 (www.epa.gov/oppt/existingchemicals/pubs/actionplans/RIN2070-ZA09_NP-NPEs%20Action%20Plan_Final_2010-08-09.pdf).

Tips for Reducing the Home Gardening Chemical Footprint

Home gardeners are at the front-line protecting nature. They should not be exposed to damaging chemical substances. However, chemicals of concern are found in pesticides and garden care products. These chemicals easily contaminate water systems when they are washed along via runoff directly to surface waters or into groundwater. Some of these ingredients remain in common use despite known human health and environmental concerns, and some are not listed on product labels where consumers can see them. Here are some gardening chemical concerns with ideas for substituting with non-toxic, less toxic, or non-chemical alternatives.



1. Pesticides: Numerous chemical substances are available to help fend off weeds, insects, diseases, rodents, and others not welcome as garden residents. Some of them, such as weed killers, have been broadly detected in water systems across the US and linked to serious hormonal and developmental changes in both aquatic species and humans. We have other options for our gardens:

- Do not insist on a weed-free garden. Weeds are not dangerous, but pesticides are.
- Carefully consider whether you really need a chemical pesticide application in your garden. Most pesticide ingredients (numbering in the thousands) are not required to be listed on product ingredient labels.²¹ This means that consumers do not know what specifically they will be releasing into their yards where people, pets, property, garden produce and wildlife will be exposed and water runoff contaminated.
- Avoid the synthetic chemical weed killers atrazine, glyphosate, and Roundup® (with glyphosate as the active ingredient), aggressively sold as valuable lawn care products.
- Hand-dig weeds; there are several hand tools for this purpose. Among other benefits: fewer weeds, exercise and time spent enjoying the garden and supporting nature without use of chemicals.
- Common, non-toxic household products can help with weed control: Spray vinegar directly on weeds at the roots to kill them; baking soda spread directly on weed-ridden areas, including in pavement cracks, discourages weed growth; cornmeal lightly broadcast over established lawn and landscaping areas attracts worms while discouraging seed growth; covering bare soil with mulch prevents many weeds from taking root.
- Common, non-toxic household products can also help with plant-damaging insects and other pests: Vinegar sprayed in the garden leaves an odor that discourages ants, slugs, and cats; a strong spray of water (or a hard rain) can remove certain pests, such as aphids on tree buds and leaves; hand-picking destructive insects is sometimes the most effective removal approach.

²¹ For pesticide registration and labeling requirements, see the EPA pesticide registration document “Label Review Manual,” last updated December 24, 2014 (www2.epa.gov/pesticide-registration/label-review-manual).

There are many gardening experts who can suggest other remedies, drawing on extensive research and practice.²²

- Garden diversity (including some weeds) provides habitat for many species, including beneficial insects and other wildlife that will eat insect pests. Strong-smelling herbs, spices and flowers dispersed throughout the garden will keep larger pests away (such as deer and rabbits).
- Make your own bug-repellent. A recipe can be found on page 3 of this chapter.

2. Gardening tools: Work around the garden often involves tools, such as garden hoses, gloves, shovels, trowels, and kneeling pads. Many of them also include toxic substances, though you probably will not find them listed on the labels. Substances of concern include phthalates, BPA, and lead.

● Many garden hoses are made from polyvinyl chloride (PVC), which often contains phthalates for flexibility and a coating of BPA to seal the surface. Lead is added as a stabilizer or pigment in the tube. Lead can also be found in the brass hose fittings. Phthalates, BPA, and lead can all leach into the water and spread to plants, soils, and runoff. Leaching is particularly likely when water sits in the hose for long periods of time, and most especially when sitting in the sun.

- Avoid drinking from a garden hose unless you know it is free of PVC and lead; if you have no other choice but to drink from the hose, let the water run for a couple of minutes before drinking. Be sure to use that water on your lawn or other non-food growing area. And store your hose in the shade.
- Look for hoses that are labeled as lead-free and made with rubber or food-grade polyurethane, a plastic foam substance. Natural-rubber hoses don't need plasticizers or chemical stabilizers to keep them flexible.
- Gardening gloves are often made of PVC or have a vinyl coating that includes phthalates and BPA. Some garden hand tools also have vinyl components. Avoid them.
- Be sure to wash your hands after handling PVC hoses, gloves, or tools.
- Look for non-PVC garden tools and work gloves.



Summary

Alternatives abound. Easy, low-cost, and effective options are available to address most personal care, household and home gardening needs without relying on chemicals of concern. Tips covered in this chapter provide a range of opportunities to reduce chemical footprints. Making your own products and avoiding or replacing products containing known chemicals of concern with less toxic or non-toxic alternatives will go a long way towards reducing one's overall chemical footprint. Recipes to make your own personal care and household products can be found under the educational resources page for the CFP Project on the IES website. Doing it

²² Colorado State University, Denver County Extension, "Ask a Colorado Master Gardener: Insects and Pests," last revised January 5, 2010 (www.colostate.edu/Dept/CoopExt/4DMG/Pests/pests.htm).

yourself is the most secure way of avoiding chemicals due to the use of “trade secrets”. Using less also helps. Pick and choose the options that will work for you.

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