

The Healthy Kitchen: Reducing Toxins and Chemical Exposures

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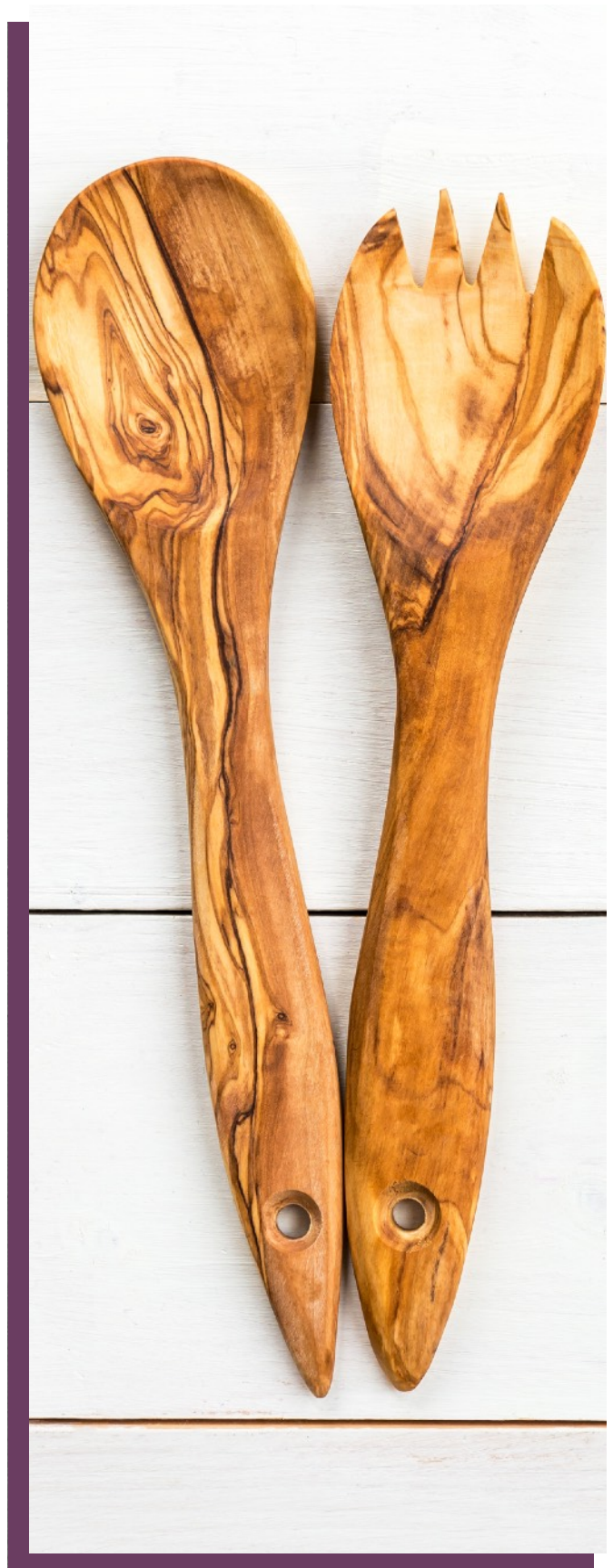


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In this e-book, we will cover these Healthy Kitchen topics:

- * A little science
- * Cookware (Pots and Pans) and Bakeware
- * Appliances
- * Utensils (Tools and Gadgets)
- * Food Storage and Bottles
- * Food Contact Materials
- * Cleaning
- * Summary of Healthy Kitchen Tips





Most people consider the kitchen “the heart of the home” for good reason: humans have always gathered and bonded around food. So it’s fitting that the word “companion” comes from the Latin meaning “with bread”, or, “one who breaks bread with another.” The idea that this central place in our homes and lives might be filled with toxins is hard to believe or accept.

However, there’s both good and bad news: the bad news is that the modern kitchen can—and often does—contain thousands of chemicals of concern. The good news is that by making informed purchasing decisions, yours doesn’t have to.

Before we get started, I promised just a *little* science. I’d like to bring your attention to two important classes of harmful chemicals common in most kitchens.



EDCs, or Endocrine Disrupting Chemicals. These are chemicals known to interfere with hormone regulation in the body. Examples of EDCs are BPA and phthalates. EDCs from the environment have been shown to affect sperm count and viability, neurodevelopmental deficits, obesity, and more. Many EDCs are associated with several different cancers, including breast cancer (1), and testicular cancer (2), which has been on the rise, especially among younger men. (The book *Countdown*, by epidemiologist Shanna H. Swan, explores how EDCs are lowering sperm counts and altering sexual development.)

To learn more about EDCs, please see [this clearly written article](#).

PFAS (Per- and polyfluoroalkyl substances) **chemicals** are a very large family of compounds — over 9,000 are currently registered with the EPA. Different PFAS compounds have been shown to affect human hormones, growth, and learning behavior; decrease female fertility; and increase cholesterol. PFASs also affect the immune system and increase the risk of developing certain kinds of cancer. PFAS molecules have some of the strongest bonds on earth, which is the reason **they are often called “forever chemicals”** — they do not break down in the environment. **In the kitchen, these chemicals are associated with non-stick pans and utensils, and food contact materials.**



I'll be referring to these **two classes of harmful chemicals throughout this e-book**. To create a healthy kitchen, you'll want to limit the number of kitchen items that contain these chemicals. How to do that? **I can summarize the answer in one simple sentence:**

Avoid plastics and non-stick materials.

Unfortunately, most kitchens are full of items made from plastics and non-stick materials.



Let's look at some examples of places where we frequently find plastics and non-stick (PFAS) chemicals in the kitchen:

Plastics can be found in:


- Appliance tubing (like coffee machines)
- Kettles
- Water filters
- Cutting boards
- Utensils
- Straws
- Ice cube trays
- Plastic wrap
- Food contact materials
- Storage containers

PFAS chemicals can be found in:

- Pots and pans
- Muffin tins and cookie sheets
- Ovens, griddles, instant pots
- Microwave popcorn bags
- Straws
- Take-out containers
- Processed food packaging
- Baking papers
- Pizza boxes
- No-stain textiles
- Food contact materials

Most of us use these items on a regular basis, and they are readily available to purchase without any warning labels. So, what can possibly be so bad about them?





First, let's look at some worrisome facts about plastics.

- * **All plastics have the potential to leach unwanted chemicals and to create microplastics** (microscopic plastic fragments frequently found in drinks bottled in plastic, as well as in cosmetics, clothing, seafood, and elsewhere).
- * **Leaching of plastic chemicals increases with increased length of contact time.** Some notorious chemicals known to leach from plastics include BPA (and other members of the bisphenol family) and phthalates. **These chemicals are potent hormone disruptors (EDCs).**
- * Leaching can also increase with exposure to fatty or acidic foods, or heat.
- * Many of the chemicals that leach or migrate from plastic into food are chemicals of concern, toxins, carcinogens, and/or endocrine (hormone) disrupting chemicals (EDCs). As noted above, EDCs can interfere with the normal function of hormones in the body.
- * **Styrofoam™ can leach styrene** from the plastic polystyrene #6. **Styrene has been classified as a probable carcinogen** by the International Agency for Research on Cancer (IARC). It can also have numerous negative effects on the nervous system.

In 2011, researcher George Bittner at the University of Texas studied plastics for their leaching potential. Bittner's team tested almost 500 different plastic containers of all types, numbers 1-7. When the researchers stressed the materials under "real world" conditions of simulated sunlight, microwaving, and dishwashing, **about 95% of the products tested positive for leaching chemicals that acted like estrogen.** This included most of the products labeled as BPA-free. (3) Chemicals that act like estrogen are a type of EDC — that is, they are capable of disrupting human hormones.

Scientists have found that within 10-12 minutes of exposure to BPA, BPA metabolites (breakdown products) can be found in human blood and urine. These levels peak but then quickly decline, and are eventually excreted within 24 hours. That's the good news.

Here's the bad news: More than 90% of Americans have BPA in their bodies, because we are continually exposed to this chemical during the course of each day.



Now let's look at the problem with non-stick (or PFAS) chemicals. Bear with me for a minute as I get into a little science related to non-stick.

As I mentioned above, PFAS chemicals are very harmful to our bodies in a number of ways — by increasing cancer risk, affecting hormones, growth, learning behavior, fertility, cholesterol, the immune system, and more. The final compound in non-stick pans and utensils may not in fact be PFAS, but instead a fluoropolymer called PTFE. PFAS chemicals are used to manufacture PTFE. PTFE by itself is considered chemically inert (inactive), and when ingested, it passes right through us.





So what's the problem with non-stick? Well, three things.

First, **typically there is some PFAS residue present** in new non-stick pans, left over from the manufacturing process.

Second, at between 450 to 500 degrees, **the coating can begin to burn.** This temperature can easily be reached in a pan when a burner is set too high. In some ovens (particularly newer ones), this burning can produce an odor, familiar to those who have used the self-cleaning feature. **These fumes are toxic, and can kill birds. Humans can get what is known as "Teflon flu"** (which can cause chills, headache, fever, and coughs) from inhaling these chemicals. (Please note that if your oven has a steam cleaning function, that's OK to use.)

Third, **since PFAS is used in the manufacturing of PTFE coatings, this leads to environmental contamination with PFAS chemicals** during the production process. (To learn more about PFAS chemicals in pans and bakeware, [see this excellent summary](#))

You may have seen some non-stick pans marketed as “PFOA-free”. PFOA is a PFAS chemical that was removed from the market about a decade ago, so this claim is for marketing purposes and doesn’t actually tell you anything about the safety of the pan or whether it really is PFAS-free.

My advice? Toss out non-stick pans that are scratched and worn. When you can, replace all your non-stick pans with items made from stainless steel, cast iron, or ceramic, and replace your utensils with items made from stainless steel or wood.



Silicone

Another material commonly found in kitchen items is silicone.

Silicone seems to be everywhere in the kitchen, including in utensils and bakeware. Silicone is also present in ceramic-coated pans (though not in pans that are pure ceramic.) But what the heck is it? Silicone is a synthetic polymer made from the element silicon and other chemicals, including colorants, adhesives, and sealants.

There are two types of silicone.

Medical Grade Silicone has been tested on animals for safety.

Food Grade Silicone is what is used in kitchen products, but it has not gone through thorough testing for safety.



Recent research has shown that silicone in bakeware can leach compounds called siloxanes into our foods. (4) Some of these siloxanes have been identified as EDCs. Leaching has been found to increase with increased food fat content. When heated during ordinary oven use, as with baking mats and cups, silicone can release **volatile organic compounds, or VOCs**. VOCs are gasses emitted from solids or liquids, some of which can be harmful.



OK, so what is your actual exposure to these chemicals and how do you reduce your risk?

First, you may be wondering how these chemical compounds used to make kitchen items actually get into our bodies. There are three principal routes of exposure: **inhalation** (from VOCs and small particles); **ingestion** (what we eat and drink), and **absorption** (what goes in via our skin). (Note: some VOCs are composed of small gaseous molecules that can enter through the skin as well as through inhalation.)

I am often asked to describe the true health risk of all these exposures. Toxicologists use a rough formula when evaluating toxicity:

Hazard x Exposure = Risk to Health.

Key to evaluating risk is the frequency and/or the duration of time we are exposed to a hazard. First, think about **frequency**: How many times a day do you use that utensil? Then, think about **duration**: How long is that smoothie stored in the container? The key way to control exposure to chemicals of concern is to try to avoid buying products containing them.

That said, whether for reasons of price or functionality, some exposure is inevitable. **Ultimately, limiting frequency and/or duration of exposures is a sensible approach to reducing risk.**

So, where do you begin? A simple, fun answer to this is: ***What would grandma (or great-grandma) do?***



When I owned a green living store, customers would frequently ask my advice about which products to trust and which household items were safest. Often, I was able to come up with answers by asking myself what people did 70 or 80 years ago before household products contained so many harmful chemicals. For example, in a world before plastic wrap, grandma would have used a plate to cover a bowl, and a damp tea towel to wrap lettuce.

Let's zero in on some common items in the kitchen as we think about how to reduce exposures.



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Cookware (Pots and Pans) and Bakeware

As discussed above, non-stick pans can expose users to PFAS chemicals and other toxins.

Tips: Use stainless steel, cast iron, or ceramic pots and pans. Try using half-teaspoon of olive oil (only 20 calories) in pans to keep food from sticking.

Don't buy non-stick pans, and toss those that are scratched or worn. If you do use non-stick pans, try not to overheat or scratch them. Overheating can cause the release of toxic fumes.

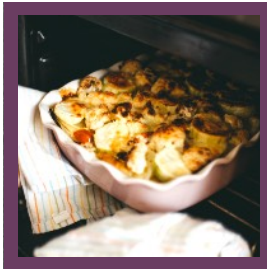
Now let's clear up some common sources of confusion about pots and pans that are safer to use:



Aluminum pans may leach aluminum, which can then be ingested. But due to the large particle size, very little is absorbed into the body. **Still, it's best not to use aluminum cookware on a frequent basis.** Note that acidic foods, like tomato sauce, will cause more aluminum to leach.



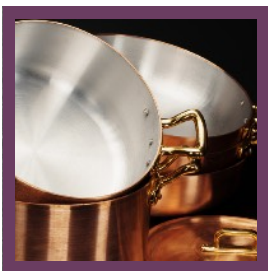
Cast iron is a great choice for pans. Cast iron is known for its durability and even heat distribution, and can be safely used at high heat. It can leach a small amount of iron, but not in sufficient amounts to cause a problem, unless you have an inherited condition called hemochromatosis. Proper seasoning of the pan (meaning heating it with a light coat of oil) will help make it more non-stick. See [here](#) for a guide to seasoning cast iron pans.



Ceramic cookware is clay cookware that's kiln-baked to high heat, rendering the quartz sand surface somewhat non-stick. It is non-toxic, eco-friendly, and long-lasting - **a great choice for cookware.**



Ceramic-coated pans are metal pans (aluminum, cast iron, or stainless steel) with a thin hardened silica gel layer on top. This surface usually degrades over time and often wears out within one to two years. Ceramic-coated pans are generally more non-stick than true ceramic. They are subject to scratching from metal utensils. **There has not been a lot of research on the safety of the silica gel coating for humans.**



Copper cookware is safe to use if it is lined, either with tin or stainless steel, so that the copper does not leach into the food. Tin linings are smoother but wear out more quickly, and pans must be re-tinned when this happens. The advantages of copper are that it heats quickly and responds rapidly to changes in heat. The principal disadvantage is that copper cookware is more expensive, and it does tarnish.

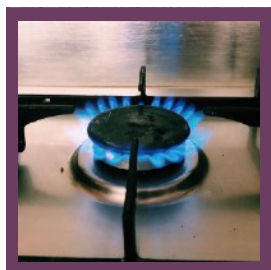


Enamel pans are not the same as ceramic. Enamel is like a glass coating that can be applied to ceramic, cast iron or steel. Ceramic cookware is ceramic (high-temperature fired clay) all the way through. Real ceramic and enamel do have some concerns about lead contamination, so it's ideal to test them with a simple and inexpensive kit you can buy at most hardware stores.



Stainless steel is a great choice for cookware. It can leach tiny amounts of some metals, in particular nickel and chromium. But both of these are essential micronutrients, meaning you need them in small amounts in order to live. The dose makes the poison! The very small amounts that may leach are perfectly OK unless you have an extreme allergy to nickel or chromium.

Appliances



Gas and electric stoves, ovens, countertop convection ovens, griddles, and grills. Each of these may have PFAS chemicals, VOCs, fumes, PTFE, flame retardants, and other hazardous chemicals associated with them.

Tips: Vent, vent, and vent when you cook. Do not overheat, avoid charred foods, and use the back burners when you can.



When it comes to **microwaves**, a couple of simple recommendations.

Tips: First, stand 6-10 feet away from the device when using it, in order to limit electromagnetic field exposure. Second, **never heat in plastic.** Chemicals in plastic can leach into the food (no matter what the manufacturer says!)



Electric kettles often contain BPA, polypropylene, polyethylene, and microplastics. In 2019, German researchers tested four plastic kettles and one made of glass. In each of the four plastic kettles, they found microplastics (microscopic fragments of plastic), and none were found in the glass. One kettle had almost 30,000 bits of microplastics.(5) I call that a big “ick” factor. No one knows the long-term effects of microplastics in the human body.

Tip: Use stainless steel or glass to heat your water instead.



The concern with **electric coffee makers** is their internal plastic components, especially tubing, which can be lined with antibacterials. Plastic water compartments are often made with BPA.

Tip: use a French press, or ceramic drip coffee makers (being sure to use unbleached filters.)



Countertop water filters are often made of polycarbonate, which usually contains BPA. You can use them, however, consider duration.

Tip: After filtration, pour the filtered water into a glass container for storage.

Utensils (tools and gadgets)



Cutting boards. Plastic cutting boards can splinter into microplastics which may end up in your food. Also, they are frequently coated with anti-bacterials.

Tip: Use wood or bamboo instead. Condition these with plant-based oils, avoiding mineral oil.



Cooking Utensils are frequently made of plastic or silicone. The problems with these materials have already been touched on.

Tip: Use metal, wood, or bamboo instead.



Wax paper typically contains paraffin, a petroleum derivative, which can be contaminated with unwanted toxins, including polycyclic aromatic hydrocarbons (PAHs), which are a class of chemicals that occur naturally in coal, crude oil, and gasoline.

Tip: Use silicone parchment paper instead. (In paper, the silicone is used simply as a coating, and does not contain as many additives as found in utensils.)



Coffee filters can contain bleach and contaminants.

Tip: Use brown unbleached paper, or metal screens.



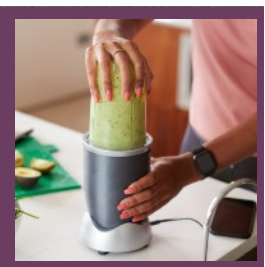
Straws, whether plastic or biodegradable, have been found to contain PFAS chemicals. A University of Florida toxicologist tested 38 brands of straws and found PFAS contamination in 36 of them (6). These highly dangerous “forever” chemicals were presumably added to promote water resistance.

Tip: Use stainless steel or glass straws.



Ice cube trays are often made from plastic or silicone.

Tip: Use stainless steel because there is a lot of contact time during which the water sits in the tray.



Plastic juicers are, well, plastic, and mostly polycarbonate, a type of plastic made with BPA, which is a potent EDC.

Tip: these are fine to use, but it's best to pour out the juice immediately into a glass container for storage.



Plastic mixing bowls have all the usual worries about plastics: chemicals leaching into the food, and the potential to create microplastics. **Tip:** Use glass, metal, or ceramic mixing bowls. Note that some of the old ceramic bowls may have some lead contamination. You can purchase inexpensive lead testers at a home supply store.

Food storage and bottles



Plastic wraps are typically made from low-density polyethylene (LDPE) or polyvinylidene chloride (7). LDPE may contain a compound called DEHA, which is an endocrine disruptor. However, grocery stores often still use the very clingy PVC plastic wraps — the type you see wrapped around the chicken and fish trays — which are typically made with phthalates.

Phthalates are EDCs (endocrine disrupting chemicals) that have been associated with many health concerns, including breast cancer.

Tips: If you have to use plastic wrap, use the least-clingy type. These tend to have fewer noxious chemicals capable of leaching into food. If you use plastic wrap to cover a bowl, be sure it does not actually touch the food. Or, cover with a plate. Try wrapping foods like cheese, crackers, or sandwiches in beeswax wraps.



Plastic food storage containers

can expose foods to bisphenols (like BPA), antimicrobials, and other chemicals and compounds that you don't want in your food.

Tips: Find a set of glass food storage containers with hard plastic lids. Try to keep the plastic lids from touching the food. These sets are easily and affordably available at many home goods stores like Target, Walmart, or Bed, Bath, and Beyond. Even hardware or grocery stores often carry individual glass storage containers. You can also use ceramic or stainless steel bowls to safely store food. (Note that plastic Ziploc-type bags are OK to use for temporary storage of less absorbent foods such as sandwiches or crackers. However the beeswax wraps mentioned above are safe, cleanable and reusable, and ideal for wrapping non-liquidy foods.)



Bottles

For environmental and health reasons, try to avoid disposable, single-use plastic bottles. These inevitably contain microplastics (microscopic bits of plastic) - sometimes thousands of microscopic plastic bits per liter. Reusable plastic bottles may contain BPA and other chemicals of concern.

Plastic bottles labeled “BPA-free” typically use other similar chemicals that will also leach.

Aluminum bottles are lightweight but are always lined with an epoxy of plastic. These linings usually contain EDCs such as BPA or other bisphenols, which can leach and shed microplastics as the lining deteriorates.

So what to use?

The best options for water bottles are:

- **Glass** is non-porous and typically does not leach.
Cons: it can break, and it's heavy.
- **Stainless steel** doesn't break, and has minimal to no leaching.
Con: it tends to be heavy.

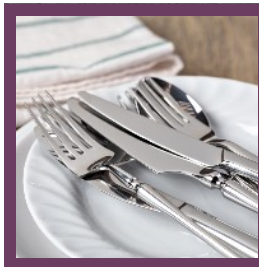
Personally, I use glass or stainless steel water bottles. Period.

Food Contact Materials



Cans and plastic containers often have claims on their labels that they are “BPA-free”. While this is technically accurate, they often contain close BPA relatives, such as BPS or BPF, which have been shown to be as harmful as BPA. (In green chemistry, this type of switch is called a “regrettable substitution”, and is often done for marketing purposes.)

Tips: Buy food (especially acidic products like tomato sauce) in glass. Or buy fresh frozen food. Many dried foods are available in bulk.



Plates and glasses are often made from plastic, melamine, or acrylic.

Tips: Do not use these. Use instead ceramic, metal, or glass. Cutlery should be metal. Compostable plates and cutlery are often not really compostable, except under high temperatures achieved by industrial composting. If you do use them, be sure they are labeled as PFAS-free.

Food packaging usually contains unwanted chemicals, such as anti-static compounds in boxed foods, or the PFAS chemicals found in grease-proof food wrappers. As I mentioned earlier, Styrofoam™ is made from polystyrene, which contains the chemical styrene. Styrene has been linked to cancer, vision and hearing loss, impaired memory and concentration, and nervous system effects.(8) **Note that microwavable popcorn bag linings contain PFAS chemicals.** People who reported eating microwavable popcorn on a daily basis over the course of a year had PFAS levels that were up to 63 percent higher than average.

Tips: Reduce packaged food consumption where you can: buy in bulk, buy fresh, make food from scratch. If you buy a hot drink in Styrofoam™ or plastic or a PFAS-lined paper cup, transfer immediately to a ceramic, glass, or metal cup. And make popcorn like Grandma did! Hot air poppers or metal poppers are easily available online.



Non-intentionally added substances (or NIAS) are chemicals that might be present during the production process. Though not added intentionally, they may migrate into food. Food processing and recycling can introduce many different contaminants. More than one hundred thousand of these have been identified. These chemicals have not been well studied, but at least some of them (including bisphenols and phthalates) are certainly harmful (9).

Tip: reduce or avoid processed and packaged foods in your diet.



Cleaning



Basic cleaning

Many kitchen cleaners contain VOCs, EDCs, carcinogens, and allergens. Since manufacturers are not required (except in California and New York) to list all cleaning ingredients, many chemicals in these products are undisclosed.

Tips: Use products from reputable companies with complete ingredient lists. Check the Environmental Working Group's Healthy Cleaners database when deciding which products to purchase. EWG has a downloadable app that you can use to scan products.

In my house, I use soap and hot water, or diluted white vinegar and baking soda to clean most everything! If you really need to disinfect, try to avoid using bleach or ammonia. Try 70% isopropyl alcohol and let it sit for ten to thirty seconds. Always rinse with plain water after any type of cleaning. Wet mopping your kitchen floor is preferred over sweeping.

Oven Cleaning

The concern here is with the high temperatures used in self-cleaning mode, for two reasons. One, as I mentioned earlier, the high heat can produce chemicals that can be toxic to humans and even kill birds. Two, at such high heat, food residue will burn to ash and release unhealthy fumes and small particles, as well as carbon monoxide.

Tips: If your oven features a self-cleaning mode that uses steam (versus heat), this is fine to use. Avoid the heat-cleaning mode. I clean my oven very effectively with a loose paste made from baking soda and water. I apply the paste to my oven interior, let it sit overnight, wipe off the next day, and voilà!



Burnt stainless steel pans

Tip: the best way to clean these is to liberally sprinkle baking soda into a burnt pan, pour in boiling water, and let soak overnight.

Pests

Many people resort to pesticides to rid their kitchens of pests, including ants, mice, and fruit flies. In a healthy kitchen, we try to avoid the use of pesticides.

Tips: the most effective solution is to deep clean. Pests are in your kitchen because there are things there to eat. Put ripe fruit in the refrigerator. Empty the compost daily. Hang nontoxic sticky ribbons (easily available at home goods or hardware stores) to trap flies. You can buy little traps for fruit flies, or, try leaving out a bowl of apple cider vinegar with a drop of dish soap. Ant traps are effective for small ants.

Sponges

Sponges can accumulate mold and bacteria. You can throw them in the dishwasher weekly, or if necessary, replace them.



Congratulations!

You now have all the information you need to start creating a truly healthy kitchen. I'd like to leave you with a summary of some basic tips to keep in mind:

- * Minimize or eliminate the use of plastics and non-stick materials.
- * Always vent, vent, vent. If you have gas appliances, ask your appliance person to do a maintenance check to be sure they are not leaking gas. Appliances can begin to decalibrate over time.



- * Use safe cleaning practices.
- * Stand back from the microwave when using, and never heat in plastic.
- * Consider exposure time and frequency when making food contact decisions.
- * Minimize the consumption of processed and packaged foods.
- * Check tap water for contaminants. (For guidance, see my webinar titled A Clear Look at Tap Water under the Events tab on the Anticancer Lifestyle website.)



* Remember to ask yourself:
What would grandma do?

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6. PFAS chemicals found in most straw brands tested
7. Chemicals in Plastic wrap and other plastic consumer products
8. Chemicals in food packaging
9. Non-intentionally added substances to food

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