



— 49 —

TIPS & TRICKS
TO IMPROVE YOUR
AIR QUALITY IN
HOMES & OFFICES

— ©foobot —

v 1.2- 2017

For years, our users have asked for ways to breathe cleaner air when Foobot detects a pollution spike. This guide compiles tons of tips and many of the lessons learned over the last 4 years from our users and each of their environments. So be prepared, this will go beyond Granny's wise advice to "open your window".

Just in case you forgot, improving indoor air quality (IAQ) is beneficial for human health, and helps boost productivity in industrial and commercial settings.

Although the methods available to improve IAQ are varied, they can be summarized into 5 broad categories:

- 1 Developing Good Habits. Behavioral changes are key to contribute positively to indoor air quality.
- 2 Buying the Right Products. By picking products adequately, you can avoid bringing objects in your home that can cause pollution.
- 3 With Light Equipment - adding a device such as an air purifier in a room can be enough to make a difference.
- 4 With Heavy Equipment - This includes implementing building upgrades and best practices that enhance HVAC performance, focusing on filtration and ventilation systems.
- 5 By Using Plants in indoor spaces, since they are natural solutions to degrade pollutants.



INTRODUCTION

Indoor air quality is a relatively new concept, and it was developed in response to the challenges brought forth by modern HVAC systems. Human society relied on open windows during most of its history, but the advent of space heating and air conditioning required buildings to become more insulated and air-tight to isolate them from outdoor conditions. This helps us control temperature, but at the price of causing more pollutants and moisture to get trapped indoors.

There are many approaches to improve IAQ, but they all have two common goals: reducing the concentration of air pollutants and keeping humidity within acceptable levels. This can be accomplished proactively by preventing the ingress of pollutants and moisture or reactively, by getting rid of them as soon as possible when their concentrations rise in the home.

As stated by ASHRAE, humans in modern society spend 90 percent of their time indoors, and 65 percent of that time is spent in their homes. Consequently, indoor air quality has a significant influence on human health and well-being with impact that can be positive or negative.

On average, pollutant levels are two to five times higher indoors than outdoors, and in dire cases they can be over 100 times higher. This trend applies even for urban areas with high traffic.

Better air, better life



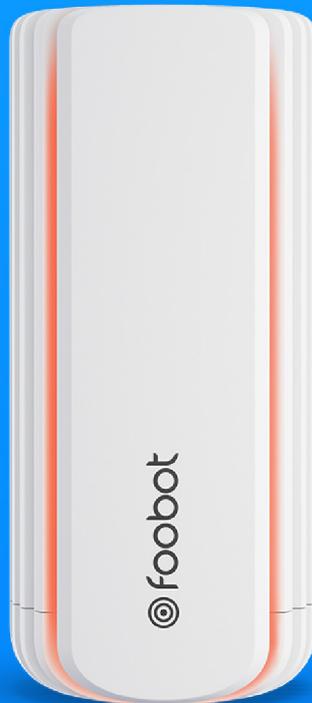
Stay focus
and productive



Reduce
allergies



Avoid kids
respiratory issues



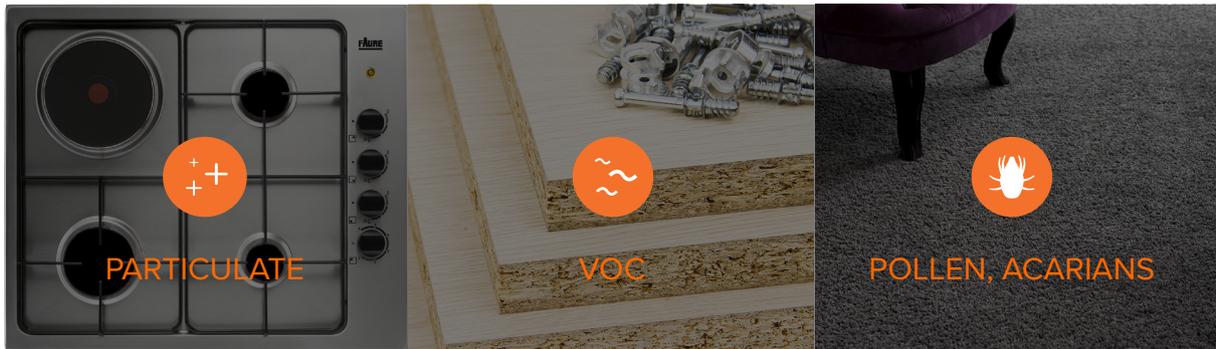
Feel
better



Get better
nights' sleep

First step is to know what you breathe
Second is to clean your air.

The US Environmental Protection Agency classifies indoor pollutants into 3 main categories:



- Combustion By-Products are the flue gases and particles released by heating or cooking appliances that rely on combustion, as implied by their name. Carbon monoxide can be particularly dangerous because it is very poisonous for humans, despite being a colorless and odorless gas.
- Volatile Organic Compounds (VOCs) are a very broad category of substances found in construction materials, cleaning products and personal care products, among other sources. A simple and effective way to control VOCs is getting familiarized with them, and avoiding any products that mention them in their label. Indoor plants are also effective VOC filters, removing them from the air while producing oxygen and pleasant odors!
- Allergens and Asthma Triggers include dust, pollen, mites, pet dander and mold. The susceptibility to these compounds tends to vary by person. Reactions to allergen triggers may range from mild discomfort to severe respiratory ailments.

When multiple members of a family or company experience health issues simultaneously, **IAQ issues are highly likely**. This is especially true if symptoms worsen after the affected individuals have spent plenty of time indoors, but improve when they are away from the building.

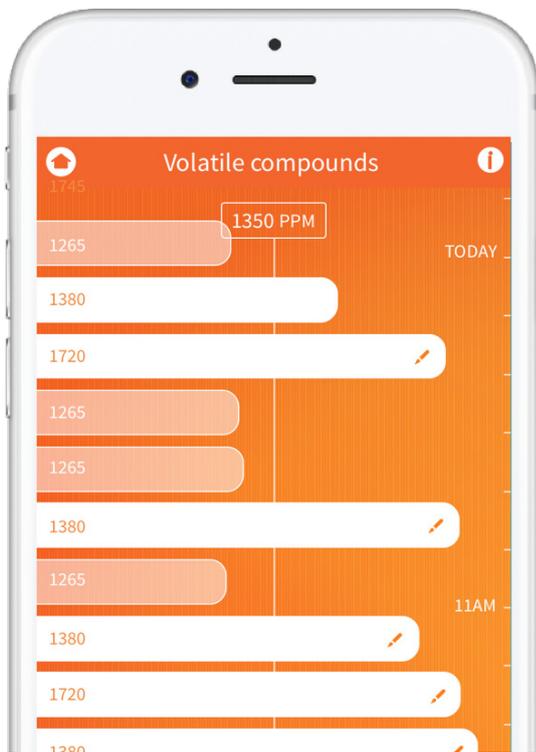
If vacations have such a healing effect on your family, it might actually be due to your home failing to be a safe shelter.

So how exactly can you improve air quality if your home has pollutants present and already harming you and your family's health?

First, identify the Source(s) of the Pollution

Before knowing what to do, it's better to actually know what is causing pollution events, especially if they occur repeatedly, and in which room.

Imagine you observe a pollution spike in your Foobot app:



First question is: Can you think of any specific behavior or product used at the time of the event?

If you can answer this question, then it usually becomes easy to get rid of this pollution in the future. If cooking was involved, then open the window, and turn on the cooking exhaust if you have one. If a new piece of furniture came in your home recently, consider wrapping it or take it outside, to see if the pollution levels drop off. If they do, then you know the furniture is made from chemicals that could be harmful to you and your family.

However, you won't always find an obvious behavior or product used at the time of the pollution spike. That's when we get users who contact us - some of them thinking that Foobot is "not working". Well, 99.5% of the time, Foobot is working just fine, but to find the culprit emitting the dangerous pollutants, we must sometimes investigate further and even employ a few tricks!

Here Are a Few “Sneaky Culprits” Behind the Pollution Spikes Detected by Foobot:

- In the Grammel family case study, Sigrid finally realized that it was her neighbor smoking in the courtyard who triggered pollution events--so although Foobot was detecting the pollution perfectly, the source wasn't even in the home!
- Mark Hughes from the BESA Group could not understand why his home had PM2.5 spikes every morning, even before he woke up... One day, he woke up earlier to finally discover the problem. A bus was stopping by his house for a few minutes, engine on, before starting its journey.
- Chris Orris's wife came back to her home one day, and VOCs reached an unprecedented level.; It took them a while before realizing it was dying her hair that was releasing a great deal of chemicals just a few inches from her nose and causing the high levels of VOC's.

As we can see from these examples, the pollution is very real even if you can't identify it at first. So What can you do when you face a situation with a clear pollution event but , no clear idea about where it comes from?



While there is no set protocol, here are 8 questions to help you isolate the source of pollution being detected by your air monitor device:

- 1 Check at what time the pollution peaks are occurring. Is it always around the same time of day? Does the event happen Every day? Is there some scheduled or automated event that could be triggering the spike in pollution levels, like your AC or heating system activating at a pre-set time?

- 2 Were there a windows open or did the ventilation activate during the time of the mysterious peak in pollutants? If so, the pollution spike could be caused by an outdoor pollutant entering via the open window(s) or ventilation system.
- 3 Any new product(s) introduced to the room where the pollution levels spiked?
- 4 Is there a correlation with a temperature or a humidity event? If one or the other goes up along with the VOCs, the problem could be gases escaping from the construction materials used to make your home.
- 5 If you have several indoor air quality monitors, are the values stronger in one specific room during the pollution event? If so, then the source of the pollution is closest to or in the same room as the Foobot device detecting higher pollution levels.
- 6 If you have one Foobot, move the device to another room of the house for a few days., If pollution levels are higher, then you are closer to source of the pollutants and farther away if pollution levels are lower or non-existent.
- 7 If the air monitor is always orange, then it's possible the surface where the device is placed is the source of the pollution (perhaps due to recent cleaning, varnish, etc.). Just move the device to a new surface and see if that lowers or eliminates the detected pollution levels.
- 8 Try changing the products you use for household cleaning. You don't have to change everything at once. Try changing bathroom or kitchen products first, monitor pollution levels, and see if there are any differences between products.

Using your IAQ monitor device and a little detective work can and will help you isolate the source of your pollution. But then what? Let's now look at how you can reduce the pollution levels you have isolated and ultimately improve overall air quality by starting a few "good habits".



HOW TO IMPROVE INDOOR AIR QUALITY THROUGH HABITS

The advantage of positive habits is that they don't have a monetary cost. Indoor plants and a properly-designed HVAC installation keep the air clean and fresh, but their effectiveness is enhanced when occupants make a conscious effort to reduce the amount of air pollutants that must be handled in the first place. This section will provide a list of the most effective habits to improve indoor air quality.

1) Avoid Combustion Sources (Fireplace, Boiler, etc.) Without Ventilation

Any burning object without a dedicated system to extract its emissions is detrimental for air quality. Two examples of common combustibles in the home without dedicated ventilation systems are candles and cigarettes. Also, you want to avoid any heating or decorative appliances that produce combustion without including a proper ventilation system. The basic rule to follow is very simple: If there is a flame then there must be an extractor, or air quality is compromised.

The main issues with combustion-based appliances is that they emit fine particles aka PM2.5, and carbon monoxide. Poorly-vented combustion appliances are also susceptible to backdraft, which occurs with a flame deprived of oxygen is suddenly exposed to a large amount, triggering a flashover or explosion. So not only will non-ventilated combustion sources reduce air quality and compromise long-term health, they can literally cause deadly accidents.



2) Always Turn On The Exhaust Hood When Cooking

Just because your nose can't "detect" the odor or fumes of food after cooking, this doesn't mean that pollutants aren't still present. For instance, you may stop smelling that steak after using the ventilator for about 15 minutes, but Foobot actually shows that the pollution level remains high for up to 8 hours after cooking is complete: always use an exhaust hood during & after cooking to ventilate your air.

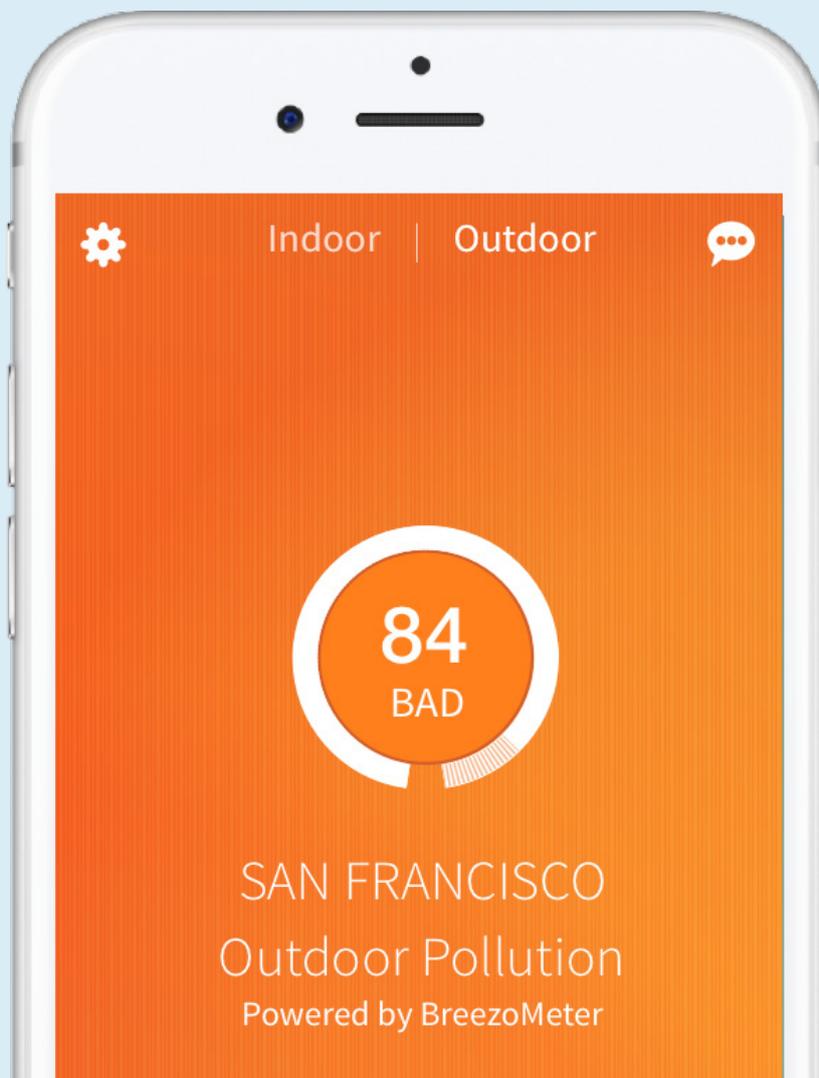
3) Open the Windows Daily...When the Outdoor Air is Clean Enough

Outdoor air is almost always less polluted than indoor air, even for industrialized cities. Therefore, opening the windows daily is a simple and effective way to get rid of carbon dioxide and other harmful substances that accumulate in your home.

There are only specific situations when opening the windows is not recommended., Times of heavy traffic or when there is a high concentration of pollen outdoors due to the flowering cycle of plants are both examples of when you should probably keep the windows closed..

There is a way to be absolutely certain whether it's better to open the windows or keep them closed: Just go to your Foobot app and look at the "outdoor" section to see if the air is better or not.

Granny's advice is still a good one, most of the time. But our times are definitely more complicated.



Look at these graphs sent to us by Cristina, a user in London who actually saw the incredible results after opening her windows wide:

At this moment in time, Cristina opens her windows and as expected, the VOC and CO₂ level drops

But the air from the outside also brought in more PM2.5



And this was a sunny day with very little pollution according to the authorities. So, it's better to watch out depending on where you live.

4) Stop Drinking Wine!

OK, OK, we push it too far. A glass of wine is certainly not bad for your home's air quality and can be enjoyable (if done with moderation...). Please note though that Foobot detects alcohol vapors and ethanol based chemicals very easily so don't be surprised when these levels spike when you enjoy your glass of wine.....).

5) Clean the Filters of Your HVAC Equipment Frequently

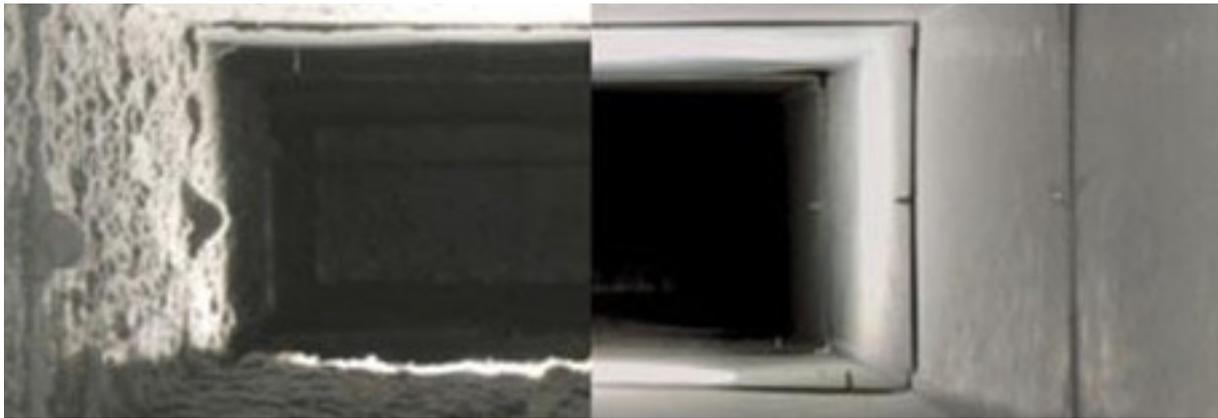
HVAC equipment is normally equipped with filters, but their effectiveness is drastically diminished once they become saturated with dust and other pollutants. Congested filters are detrimental for air quality, bringing more harm than benefit:

- They restrict airflow, which does not allow HVAC equipment to operate effectively. Fans must consume more energy to push the air through the congested filter.
- When the filter is removed for cleanup, there is a chance of releasing a large amount of pollutants at once. Less dirty filters are easier and safer to handle.

Cleaning the filters in HVAC equipment should be a normal part of maintenance activities: a clogged filter is harmful for indoor air quality, which defeats its own purpose.

6) Get your air ducts cleaned every 3 to 5 years

An HVAC system can only be effective if it is properly cleaned and maintained. Therefore, the same logic applied to filters applies to air ducts, eg if ducts are dirty, the fresh air will be polluted along the way and spread throughout your home..



The worst case seen so far was when a customer found out that his air intakes were full of mold... So while the inside of the house could be perfectly clean, and even without activity, Foobot was consistently reporting high levels of VOCs.

There's a simple trick to check if your HVAC system is dying and needs maintenance: Put a piece of paper on a vent, if it doesn't stick, call your favorite contractor now!

7) Dry Clothes Outside or in a Ventilated Room

Drying clothes indoor increases humidity up to 30%. Also, the chemicals contained in the detergent and softeners are released in the air during the drying. So it's better to dry your clothes outside, or to air out/ventilate the room if it's inside.



8) Wash New Clothes Before Use, and Aerate Dry-Cleaned Clothes Outside

Dry-cleaning products often release VOCs in large quantities, and these are impregnated in clothes. Leaving dry-cleaned clothes outside allows more time for these compounds to be released, and is especially recommended when the scent of chemical compounds is evident.

The same logic applies for new clothes. Textile manufacturing processes use vast amounts of chemicals. Washing new clothes before using them for the first time is highly recommended, or otherwise they can release harmful compounds indoors. Also, consider that whoever wears the garment is inhaling these compounds directly and at close range so definitely wash all new clothes immediately or store outside until you can..

9) Avoid Scented Candles

Lighting up a candle, a stick of incense or a scented candle for Valentine's day is so romantic, let's not give that up! The problem is, we realized that some of our users had a habit of using candles daily or so often that it was causing alarming levels of pollutants in the home. The combustion of the candle emits particulate matters and the fragrance usually releases VOCs.

Keep incense and scented candles for special occasions and when you feel up for it, try to pick natural products.

10) Avoid Storing Harmful Compounds in Occupied Spaces

Paints, solvents, pesticides and similar compounds are all capable of releasing air pollutants, and therefore they must not be stored in occupied spaces. These products should be stored where they will not have a chance to affect indoor air quality if an accidental release occurs. Sealed plastic containers can be used to minimize release of pollutants if stored properly.

11) Use Doormats for all Building Entrances

A considerable amount of air pollutants is brought indoor by shoes. Installing doormats is a quick and effective solution that greatly controls the ingress of pollutants.

12) Make Your Home a Non-Smoking Location

No need to say more where air quality is concerned. A lot has been said about the harmful effects of cigarette smoke, not only for smokers but for those around them. Make clear to all visitors that your home interior is a non-smoking area. You can use a sign if you don't feel comfortable saying it directly.

Ok, now that we have discussed some of the “good habits” that will help you improve indoor air quality, let's now look at the best products to get the job done right.



13) Special Care for Homes with Pets

Pets aren't a danger to air quality but pet dander is and can cause asthma or allergic reactions like itchy eyes, skin allergies, running nose and more.

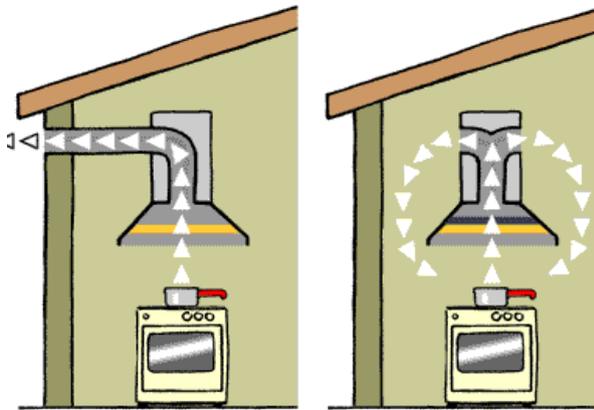
To minimize the impact of pets on indoor air quality, consider taking these steps:

- Air out your home regularly.
- Restrict pet movements around your home, especially in bedrooms.
- Keep pets off carpets, upholstered furniture, and beds.
- Perform regular dusting, washing and vacuuming of areas where pets spend most of their time to minimize pollutants

HOW TO CHOOSE THE RIGHT PRODUCTS TO IMPROVE YOUR HOME'S AIR QUALITY

14) Fireplace

Closed fireplaces are less harmful to your lungs than open ones.



On the left is an exhaust with extraction and on the right the air is recycled.

15) Electrical stove

When you cook, fine particles are released because of the combustion, especially when you use gas stoves. Try to use electrical stoves: they emit much less harmful particles. In either case, be sure the stove is well-ventilated with a dedicated exhaust fan properly installed and vented out of the home.

16) Organic Personal Care Products Don't Pollute

Shampoos, cleaning products, and personal hygiene products made with synthetic ingredients can produce harmful air pollutants detectable by the Foobot. Where possible, try to buy organic personal care products. Our tests show that more often than not, organic products emit less or no VOCs. Our tests show that more often than not, organic products emit less or no VOCs.

17) Avoid Synthetic Fragrances

A product can smell good and still be detrimental for indoor air quality. In fact, many cleaning and air freshening products release vast amounts of VOCs despite their pleasant fragrances. To improve indoor air quality, make sure the fragrances are of natural origin and avoid aerosol sprays at all costs. It is impossible to tell apart harmful chemicals based on smell alone. The cleanest air has... no smell at all. Of course, you can also eliminate artificial fragrances completely and use aromatic plants instead: They can fill interiors with pleasant odors that are 100% natural, while filtering out harmful compounds (or at least releasing less of them).



18) Organic Cleansing Products

Harsh detergents eliminate viruses, fungi, and bacteria but require a complete air renewal for you not to breathe its damaging fumes into your body. Making matters worse, Vapors from cleaning products made with harsh chemicals remain in the air long after usage. A gentle and regular cleaning is better for the air and your health. . Harsh detergents like bleach aren't recommended for daily use. And remember: Airing the room out is as important as cleaning it.

The best smell at home is no smell at all! Remember that cleanliness has no smell. Try to use Do it yourself products like white vinegar sprays where possible.

19) Solid Wood Furniture Instead of Plywood or Particle Bboard

Most modern furniture is not made out of solid wood. Instead, the majority of furniture made today is crafted from plywood or particle board that contain glues which emit volatile organic compounds that continue emitting for years into your indoor air.

Plain wood is the best warranty for low chemical emissions. Where possible, look for solid wood furniture finished with shelac instead of a synthetic sealer which also emits harmful chemicals.

20) Invest in Appliances with HEPA Filters



Some allergens and particles are so small that conventional filters are unable to capture them. However, the issue can be solved with High Efficiency Particle Arresting (HEPA) filters, a technology that was developed in the nuclear industry to deal with fine radioactive particles. When you purchase an air purifier or a vacuum cleaner, invest in a product with a HEPA filter, especially if someone in your household or company is vulnerable to allergies.

Keep in mind that the term HEPA is often used to describe high-efficiency filters in general. A true HEPA filter removes 99.97% of all particles with a size of 0.3 microns, so make sure you check product specifications before any purchase. Not all filters advertised as HEPA meet the requirements.

21) Avoid Mothballs

These products emit several types of VOCs, most notably naphthalene. Moths can be naturally deterred by cleaning clothes before storage, improving IAQ in the process.

22) Replace Insect Repellents

Insect repellents and pesticides for houseplants contain harmful chemicals that poison insects and you as well. With plants like lemon balm, citronella, basil, lavender you can obtain the same repellent effect! Plus, there are a number of 100% natural insect repellents on the market as an alternative to making your own--so, there's no excuse to keep using those dangerous chemicals! Repellents are often sprayed on the visible parts of the body such as ankles, arms and... the neck, which make them very easy to be inhaled during a long time after being applied.



23) Change your windows

Alright, this measure is not trivial but it may be the best solution for flats/houses surrounded by a high-traffic roadway. Some old windows are not capable of properly filtering the air coming from the outside, nor seal the house, even when shut. This is a problem because your indoor air quality is constantly linked to the outdoor air quality and there are times when that may not be desirable.

Also, there are some window models that can't be opened at all and thus provide no ventilation. Their use is not recommended, since it becomes difficult to vent the house when high concentrations of pollutants are released at once. For example, the use of cleaning products and paints is not recommended with shut windows as both product types release VOCs in large amounts.

When you have the right products and employ good habits, keeping your indoor air clean and safe is much easier. Now, let's take a look at some light devices and equipment to help improve air quality even more to keep you and your family safe, healthy and happy!



LIGHT DEVICES AND EQUIPMENT TO CLEAN YOUR HOME'S AIR BASED ON FOOBOT DATA

Even if you don't identify the specific source of the pollution, something must be done. This is what we call the "Curative Approach" where you may not find the source of the pollution but you take steps to eliminate it.

Here are two smart home automations that will eliminate your indoor air pollution so you can forget about it:

24) Foobot + Smart Air Purifier

With a device such as the Blueair Classic or the Holmes Wemo, the idea is pretty straightforward: Whenever Foobot sees the pollution levels rise above a pre-determined threshold, it triggers the air purifier via the WiFi connection.

Cost: From \$129 for the Wemo to \$399 for the smaller Blueair Classic and up to more for bigger office space.



25) Foobot + Google Nest Thermostat

The Nest thermostat allows you to change the temperature or the ventilation speed remotely from your iPhone, whether you're on your sofa or driving home from the office. Usually, this "smart" thermostat is installed by a contractor who connects it properly to your home's HVAC system*.

From the Foobot app, you can connect Foobot and Nest via WiFi. Once connected, Foobot interacts with Nest and therefore your HVAC system.

This connection allows Foobot to boost the ventilation rate whenever pollutants get too concentrated in your home. And when the air is renewed and pollutants have been eliminated, the ventilation returns to normal operation.

We looked at all our users who set up this smart automation and the results were impressive:

- ***53% less time spent in air polluted by particulate matters***
- ***35% less time spent in air polluted by chemicals (VOC)***

Cost: \$249 for the Nest Thermostat

*This depends on your installation. Please check with Nest that your HVAC system is compatible.

With smart automation and Foobot, you don't need to worry about the sources of air pollution because they work together to keep the air safe and clean at all times!



IMPROVING AIR QUALITY WITH HVAC UPGRADES

Heating, ventilation and air conditioning systems play a critical role in preserving indoor air quality. A properly designed and maintained HVAC installation is both energy efficient and always beneficial for IAQ.

26) Hire Qualified Professionals for HVAC Design

There are indoor air quality issues associated with both undersized and oversized HVAC installations. A properly-sized unit not only offers the highest performance available, but also enhances indoor air quality by keeping temperature and humidity at optimal levels for human comfort and health. Mismatched HVAC equipment offers poor control of temperature and humidity conditions, and oversized ventilation systems can result in drafty indoor environments, potentially leading to health issues.

Ideally, an HVAC system should be sized through a precise analysis of heating and cooling loads, as well as the air renewal rate according to the intended occupancy. When HVAC installations are sized with some outdated “rules of thumb”, the result is generally a poor match between demand and installed capacity which is always bad news for you and your indoor air quality.

27) Keep Humidity Within the Range Recommended by ASHRAE

ASHRAE recommends that relative humidity be kept in the range of 30 to 60 percent to offer the best conditions for human comfort and health. Low humidity leads to eye, skin and nose irritation while high levels stimulate the growth of bacteria, dust mites, mold and fungi. Viruses are notorious for their ability to thrive with both low and high humidity so the moderate levels recommended by ASHRAE minimize their proliferation.

The best moment to implement humidity control is during HVAC design, since these features can be built into the system when it is first installed. Doing so afterwards just makes everything more expensive and leads to disruptive upgrades and modifications that are often compromises at best.

However, existing buildings with humidity issues can deploy dedicated humidifiers or air dryers, depending on their specific needs.

28) Use Dedicated Air Extractors for Kitchens and Bathrooms

Kitchens and bathrooms produce pollutants and odors in significant amounts, and therefore they must be equipped with a direct means to exhaust air outdoors. If the building layout allows it, there can be a common extraction system for both areas making sure that the air removed is not circulated through any other area before being released outdoors.

This approach should also be applied for any other area where high pollutant concentrations can be expected, such as laundries and boiler rooms.

29) Avoid Placing Air Intakes Where They May Draw in Pollutants

HVAC systems typically have outdoor air intakes, and it is important to make sure these are not located where they can draw in large amounts of



pollutants. For example, if a building has both a chimney and a rooftop AC unit, care must be taken not to install them too close to each other.

Keep in mind that poorly-placed air intakes may also draw in the exhaust air from surrounding buildings. For example, if your neighbor has a bathroom exhaust directed at your property, avoid installing air intakes anywhere near it. As an example, a partner who we work with has his office polluted and realized that the air intake was actually... in the parking lot.

30) Design the Ventilation System to Provide a Slight Pressurization

Indoor air pressure plays a very important role in preserving IAQ:

Negative pressure occurs when the air exhausted from indoor spaces is more than the air injected. This can cause unwanted air to be drawn in from outdoors, above the ceiling or from service areas, degrading IAQ.

On the other hand, positive pressure is achieved when air injection is slightly higher. Positive pressure prevents unwanted airflows into a room, making it much easier to preserve IAQ.

The advantage of pressurization is that it keeps pollutants out of indoor spaces, regardless of their concentration. It is impossible for polluted air to move into a pressurized area by itself.

31) Minimize HVAC Noise

Strictly speaking, noise is not an air pollutant. However, it can be distracting and bothersome, making indoor spaces less appealing for occupants.

For this reason, noise is often addressed along with IAQ. The following are some recommendations to minimize HVAC noise:

- **Use speed controls to reduce fan RPM during partial-load conditions.** This way, it is no longer necessary to cycle them on and off.
- **Avoid sizing air ducts too small:** This causes air to speed up, producing a constant noise, especially when the ventilation system is running at full capacity.
- **Modern air conditioning units** with variable-speed compressors operate more silently than older window-type units.

Your HVAC system is the key to maintaining healthy IAQ and it's easier to set the system up right from the start than to try and modify later at much greater expense.

Now let's take a look at some effective "low-tech" solutions to improving air quality in your home.



TEN PLANTS TO IMPROVE INDOOR AIR QUALITY

It is possible to enhance indoor air quality with plants, as a complement to adopting favorable habits and ensuring adequate HVAC design. This section will provide an overview of the plants that offer the most benefits in terms of IAQ. Keep in mind there are two benefits common to all plants: They absorb carbon dioxide and emit fresh oxygen.

Plants are the air filters of nature, and must be kept in optimal conditions to do their job properly. Other than requiring soil, water and sunlight, their leaves must be kept clean to allow for proper respiration (emitting oxygen while absorbing carbon dioxide).



1) Lavender

Lavender is well-known for its pleasant and soothing scent, which helps induce sleep and reduce anxiety. The benefits of lavender are backed by medical evidence: Studies have demonstrated that the plant reduces blood pressure and heart rate. Given the popularity of lavender, there are many artificial fragrances that replicate its smell. However, none of them can substitute the actual plant - fragrances often include VOCs, and none of them are capable of replacing carbon dioxide with oxygen!



2) Snake Plant

Thanks to its large leaves, the Snake Plant can absorb significant amounts of carbon dioxide and replace it with oxygen. However, the Snake Plant does this even at night, when most plants actually consume oxygen in the air. For this reason, it is highly recommended for bedrooms, where it can significantly improve air quality.

In addition to replenishing the oxygen content in the air, the Snake Plant is capable of filtering many harmful compounds, according to NASA. This plant can absorb volatile organic compounds such as trichloroethylene, formaldehyde, benzene and xylene.

To finalize the list of positive qualities, the Snake Plant is very sturdy and requires little maintenance.



3) Aloe Vera

Like the Snake Plant, Aloe Vera is also an extremely effective air filter that requires minimal care. An added advantage of Aloe Vera is that the gel in its leaves can be used to treat burns, bruises, insect bites and other skin ailments. It should come as no surprise that the Ancient Egyptians called it the plant of immortality.



4) Spider Plant

This plant is another excellent natural air filter, remarkable for its ability to cleanse formaldehyde, a known carcinogen. According to NASA, the Spider Plant can remove 90% of the formaldehyde concentration in the air around it. As if that wasn't enough, the plant can absorb unpleasant odors effectively.



5) English Ivy

English Ivy can effectively remove mold and other particles from the air, and the extract of its dried leaves can be used to treat the symptoms of asthma or allergies. There is only one issue to consider: the leaves are moderately toxic in their natural state, so the plant must be kept out of the reach of children or pets.



6) Peace Lily

Peace Lily is another effective filter for airborne substances like benzene and formaldehyde. The plant also releases moisture and can increase indoor humidity by up to 5%, reducing the workload on air humidifiers.



7) Lady Palm

Lady Palm is known for its ability to cleanse the air of ammonia, a substance commonly emitted by textile products. Just keep in mind that lady palm is a large plant, so you might want to consider other options when space is a limitation.



8) Golden Pothos

This plant can effectively absorb carbon monoxide, a substance that is odorless and colorless but extremely harmful for humans. For the best effect, place this plant where the presence of combustion by-products is likely. For example, if you have a window that opens to a car garage, place it there to control the emissions entering the house.



9) Areca Palm

Areca palm is another effective plant for absorbing carbon dioxide and providing oxygen and is more active during the day. Keep in mind that it can grow relatively tall, so take the space factor into account before purchasing it.



10) Rubber Plant

This is an excellent indoor plant due the characteristics it offers: It grows easily and with indirect sunlight, it can remove air pollutants effectively and is an excellent source of oxygen. You just have to take care not to water it more than necessary, since it can damage its leaves.

CONCLUSION

As we have learned, improving indoor air quality doesn't have to be expensive nor a massive time-consuming effort. With some increased awareness and some conscious effort, you can easily improve air quality and thus reduce risk of serious health problems, boost energy and focus, and create a safe and secure environment for you and your family.

Our suggestions for improving indoor air quality can be broken down into 5 simple steps:

- **Developing Good Habits**

Simple things like using exhaust fans while cooking, opening windows to air out the home, and even avoiding combustion sources are all simple but effective good habits that make it easy to keep your indoor air clean and safe.

- **Buying Right Products**

The products we buy and bring into our homes can play a huge role in the level of toxins and air pollutants present at any given time. By taking the time to search out "safe" product alternatives such as electric stoves, organic cleaning products, safe personal care products (no aerosol sprays), and even solid wood furniture can keep air polluting items out of your home so you never have to worry about them.

- **Light Equipment**

Sometimes finding the source of indoor air pollution is very difficult but you can eliminate the pollutants without locating their source with the right equipment. Foobot, paired with a home automation device like Google Nest Thermostat (just one of many options on the market today), can automatically boost your home's ventilation to eliminate toxins/air pollutants detected in the home. So thanks to technology, you can keep your home free from dangerous levels of indoor air pollution automatically.

- **Heavy Equipment**

Your HVAC system is the heart and soul of your home's ventilation system and key to keep the home free from dangerous levels of air pollution. Paying special attention to air intake placement, creating a slight pressurization of the home via the HVAC system, and making sure humidity levels remain within acceptable ranges are all factors you can control with your HVAC system and set-up.

- **Buy the Right House Plants**

Although all plants will produce fresh Oxygen while removing CO₂, some are actually well-suited to removing airborne toxins. You certainly don't need to create a greenhouse in your home but a few strategically placed plants in areas of high pollution (check your Foobot device!) can significantly and naturally reduce indoor air pollution and improve overall air quality.



As you can see, keeping your home safe and improving air quality are actually very easy with the right information. Even if you are unable to implement all of our suggestions immediately, just try making improvements where possible and keep monitoring air quality with your Foobot device.

To learn more about keeping your home safe from air pollution, make sure to subscribe to the «Good Air» newsletter at <https://foobot.io/resources>.