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The charity for environmental illness

Air Purifiers

An **air purifier** is not a cure for Multiple Chemical Sensitivity (MCS), but it can provide significant relief. Air purifiers can filter out small particles and chemicals like chloroform, benzene, formaldehyde and other Volatile Organic Compounds (VOCs). VOCs are released from stain-resistant furniture, flame retardant clothing, pressed wood products, carpeting, upholstery and lots of other things.

Air purifiers can be extremely helpful to reduce levels of VOCs in the home or workplace. However it is important to do what you can to reduce levels of pollutants in your environment first. Since people with MCS can become sensitised to the chemicals in the machines and filters, it is better to use them occasionally rather than rely on them being on all the time: Fragrance free policies are available for the workplace, and the helpsheet 'Creating a Low Allergy Bedroom' can be used to lower the amount of problem chemicals all over the house.

Everyone is different. If you can't get your head around all the different types of filters etc then just make a list of what you want to remove, and contact a company like Healthy House who are used to advising people with MCS. Make sure they will let you return the machine if you react to it, even after several weeks. Details of suppliers are at the end of this helpsheet. Air purifiers designed for "allergies" are not necessarily helpful for people with severe MCS, more information below.



If you have severe electro-hypersensitivity (EHS) as well as MCS then it's even more important not to rely on an air purifier to make your environment tolerable. Some plants can detoxify chemicals like formaldehyde and ammonia, so if you're not sensitive to mould this might be helpful (there is a full article on plants in the autumn 2014 MCS-Aware Magazine). Otherwise air purifiers without moving parts are likely to have lower electromagnetic fields. Other alternatives are bowls of bicarbonate of soda, zeolite, or activated charcoal which can help to absorb odours. Having said all this, you might tolerate an air purifier perfectly well, or you might be able to switch it on in the house when you're out or in another room, so they are worth a try.

Since everyone has different levels of sensitivity to different chemicals and electromagnetic fields, make sure you ask about the company's returns policy before you buy. Some companies that understand MCS know you'll need to run in a product to outgas it, and so will need a longer than usual trial period. Always keep all the packaging for a month or so in case you need to return something. It is possible to be fine with an air purifier to start with but then become sensitive to the chemicals in the filters or the machine. You should know within 6 weeks, and it's a good idea not to use the air purifier all the time.

What to look for

Size: Air doesn't move around a house very much, so portable air purifiers are designed just to work in the room they are in; leaving the door of the room open is not likely to purify the air in the rest of the house. Purifiers come in different sizes. Some are designed just to work on the small space eg in a car. Others will cope with a large room and are designed to be left on all the time.

What do you want to remove?

Environmental allergens include small particles like smoke, cat dander/ pet hair, moulds, dust and dust mite faeces. These can be taken out of the air with a filter which acts like a sieve. HEPA (High Efficiency Particulate Air) filters are the most common. HEPA filters are often made of synthetic fabric. They can be glued together and may need outgassing for 3-6 weeks if you are hypersensitive.

Some odours/ smells can be removed with a small particle filter (like the HEPA), although this isn't very effective. Others can be 'trapped' in something like activated carbon.

VOCs (volatile organic compounds) are chemicals like formaldehyde, benzene, fire retardants, solvents in paints, printer cartridges and some cleaning products. These are usually what someone with MCS is trying to remove. They do not always have a scent. In effect they are scentless gasses. Activated charcoal is useful to remove these.

Bacteria and viruses are very tiny and can either be trapped in a filter (some HEPA filters clean to 0.3 microns), or killed using heat or ultra violet light. Heat, ozone and ultra violet are also useful for killing moulds rather than filters which just trap the spores.

Which Machine?

1. Decide which area you want to purify – usually your main living space or your bedroom. Make sure the machine you want will cover the size of that area.
2. Decide what you want to get rid of then check the machine will actually remove that substance. Don't assume all air purifiers get rid of all chemicals. Some filters are designed for specific chemicals like ammonia, formaldehyde or traffic fumes, so check it's going to do what you want.
3. How noisy is the machine? This is important if you are going to be in the room when the machine is running or if you are hypersensitive to noise. Noise is measured in decibels (dB). On the decibel scale, the smallest audible sound (near total silence) is 0 dB. A sound 10 times more powerful is 10 dB. A sound 100 times more powerful than near total silence is 20 dB. A sound 1,000 times more powerful than near total silence is 30 dB. Here are some common sounds and their decibel ratings:
 - Near total silence - 0 dB
 - A whisper - 15 dB
 - Normal conversation - 60 dB
 - A lawnmower - 90 dB
 - A car horn - 110 dB
 - A rock concert or a jet engine - 120 dB
 - A gunshot or firecracker - 140 dB

You know from your own experience that distance affects the intensity of sound; if you are far away, the power is greatly diminished. All of the ratings above are taken while standing near the sound. An air purifier with a fan that measures 45dB may seem quiet in a room full of people with conversation going on but will seem loud in a bedroom while you are trying to sleep.

4. How much does it cost to run? There are two main running costs with an air purifier: electricity and replacement filters. The cost of the electricity will depend on the size of the motor, the speed that it runs at and whether you run it continuously or just for short bursts. How often you run the

machine will also affect how often you need to change the filters. Some filters cost more than others, and if you have a very polluted area to keep clean the filter will need changing more often.

5. Do you want automatic sensors? Some machines will sense the level of pollution in a room and turn themselves to a higher or lower power as needed. If you are putting the machine in a bedroom this can be particularly useful as it should run on a quieter setting for most of the time. Some machines also have a sensor that tells you when the filters need changing. This can be useful if you only use the machine occasionally.

Other things to look out for

If you have severe MCS you might react to the materials the machine is made of. Companies that make machines especially for people with MCS have thought about this. They make sure the motor parts (the fan) are not varnished, the VOC filters absorb any fumes from the motor, and the filters are not glued/treated with chemicals or solvents. The housing for the air purifier can be made of metal which doesn't need outgassing, or made of hard plastic which should be fine once it's outgassed (aired). Even metal units will have rubber electrical cables that are likely to need airing (also a wipe with a soapy cloth will remove some chemicals – DON'T do this when the machine is plugged in and use a damp cloth, not a wet one!!)

If you are hypersensitive you will know by now that there are very few things you can buy and use straight away! The air purifier is likely to need airing or running in a spare room for a week or so to get rid of manufacturing fumes. After that you are likely to tolerate it ok. Remember to bear this in mind when you order new filters – they might need to be 'run in'. Some companies are happy to do this for you and post them once they are 'used'. That's fine if the office is fragrance free. If you have mild or moderate MCS you might not have any problems at all with a new air purifier.

Different types of filters for VOCs:



Please note: Some people with MCS are not able to tolerate ozone generators and ionic air cleaners as in a few cases higher levels of ozone can combine with household fumes (like terpene-containing cleaning products or air fresheners) to create new gases like formaldehyde and carbonyls. That said, some people with MCS have no problem with these products at all and find them very effective. If all this information about different filters is too much to take in, then just make a list of what chemicals you want to remove, in what rooms, and

contact a company like Healthy House who are used to advising people with MCS. Make sure they will let you return the machine if you react to it, even after several weeks.

Charcoal filters work by absorbing the gases and odours in the air. When the available cells are full of absorbed gas, the charcoal filter needs to be replaced. Charcoal filters can be made from anything 'burnt'. That can be petrochemical-based or from wood, bone or coconut. People with severe MCS may react to one type of charcoal and be fine with another. Check the charcoal has not been treated with additional chemicals.

Activated carbon is a form of carbon that has been treated with oxygen to make it extremely porous giving it a very large surface area available for the adsorption of chemical compounds. See information above about the charcoal used in these filters. Activated carbon works well for the removal of volatile organic compounds (VOCs) but is less effective for semi-volatile organic compounds (SVOCs) such as formaldehyde or inorganic chemicals such as hydrogen sulfide.

Electrostatic filters are made from layers of polyurethane and polypropylene blends. They act like a magnet attracting particles of all sizes. As dust and other airborne particles pass through a positively charged layer they are given a positive charge. The second layer of the filter is negatively charged. The positively charged particles are attracted to the negatively charged surfaces and stick to it. They act like a sieve for small particles.

Ionisers generate negative ions which are particles that have one or more extra electron giving them a negative charge. Ionisers don't trap any particles themselves but increase the ability of other filters to remove particles. They also cause particles to fall to the floor making them easy to vacuum. Airborne particles like dust, pollen, cigarette smoke and pet dander are positively charged and are attracted to the negative ions in a similar way that static from your television attracts dust. Some people tolerate these well, others can't tolerate them at all.

A UV lamp uses a specific type of bulb that emits germicidal ultra violet light. Germicidal ultraviolet light has a wavelength shorter than visible light making it invisible to the human eye. A UV lamp will kill any bacteria, viruses or other germs trapped in the air purifier. This means that their effectiveness is dependent on the air purifier's ability to trap particles. When combined with an efficient filter a UV lamp helps to create a clean, sterile environment.

Photo-catalytic (titanium dioxide) plates absorb the UV light from specially designed lamps, producing strong hydroxyl radicals (-OH), which attack and decompose the cells of the contaminants into minute amounts of harmless water and carbon dioxide. The 'Radic8' machines do not depend upon drawing the air through the unit to purify it. Instead they fill the air with super oxidants giving constant protection against pollutants. These super oxidants eliminate bacteria, mould, fungi, viruses and dust mites, allergens, odours and VOCs, both from the air and from surfaces. 'Radic8' units are for one room. A large 9mg bulb emits a low level of ozone

Air Sterilizers The 'Airfree' purifier does not have any moving parts. Instead it has a core which heats up. This pulls air in and sterilises things like viruses, bacteria, ozone, dust, dust mite faeces, pet dander and mould spores. The sterilised air is then cooled and returned to the room. Its unique design allows an air steriliser to clean the air silently and without the use of a filter.

A plasma air purifier produces positive and negative ions to destroy bacteria and viruses and sterilise the air. This combination of negative and positive ions also destroys harmful chemicals including formaldehyde and absorbs odours.

Suppliers:

There are many different suppliers. Here are just some in case you don't have internet access. You can also request a copy of the MCS-Aware Suppliers Directory. Some companies will ship overseas.

UK Companies: www.allergybestbuys.co.uk Tel. (UK +44) 01274 565699
www.healthy-house.co.uk/ Tel. 01453 752216

USA companies: www.achooallergy.com/ Tel. 1-800-339-7123
www.foustco.com Tel. 800.353.6878 or outside US and Canada: 630.834.4952

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