

Carbon dioxide and moist in your home

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Pollution sources

In our home, pollution with carbon dioxide and moisture typically comes from four sources:

- 1) People (carbon dioxide and moist).
- 2) Cooking (carbon dioxide and moist).
- 3) Bathing, washing the floor, and drying clothes (moist).
- 4) Penetration of water from the outside (humidity/moist).

Many plants and aquariums can also increase the humidity, but only in extreme cases is that a major challenge.

Carbon dioxide and moist are not in themselves harmful to your health. But a high content of carbon dioxide in the indoor environment is a sign of poor air quality in your home, which increases the risk of headaches, fatigue, and difficulty in concentrating. High humidity increases the risk of both mould and house dust mites, which can cause serious allergic reactions. House dust mites are a particular problem in beddings and where our pets sleep. Aeration and sensible habits can often reduce the content of carbon dioxide and humidity levels in your home.

It must be emphasized that moist and carbon dioxide are rarely a problem in newer houses with mechanical ventilation. Here, however, dry air (especially in the winter) can cause mucosal irritations, damage to wooden furniture, and it may be necessary to turn down the ventilation system and dry your wet clothes in the living room to keep up humidity during the winter season.

In energy-renovated houses, special care must be taken to ensure that moisture problems do not arise, as air exchange is often lower after renovation due to sealing. The risk of moisture problems is also high in houses where the temperature is not the same in all rooms, or where thermal bridges give rise to local condensation on walls, etc.

Long-lasting steamy windows and earthy/musty smells in kitchen cupboards or rooms are signs of moisture problems. Dark spots on wallpaper (in corners, windowsills and behind furniture on exterior walls) can be mould and must always be removed, e.g., with Hysan, Protoxskimmel, Rodalon or chlorine (pay attention to possible discolouration).

Measurements

It is always a good idea to **buy an electronic hygrometer with a thermometer**. It costs 15-30 euros, and then you can monitor the humidity level in the room yourself. The humidity should be 25-45 percent in the winter and not exceed 65 percent during summer (guidelines for Northern Europe). However, you must be aware that the hygrometer only measures the humidity where it is placed. If you place furniture against exterior walls, there is a risk of increased moisture behind the furniture, which can result in mould that can contaminate the entire room with spores. The hygrometer cannot measure this if it is placed elsewhere.

It is also a good idea to **buy an indoor (carbon dioxide) CO₂ sensor**. Simple ones cost some 30 euros and then you can monitor the CO₂ content in the room yourself – in particular in the bedrooms at night.

The good thing about measuring is that you can investigate for yourself what effectively removes CO₂ and moisture in the room, and what fits into your everyday life and habits: how much does it help if you aerate with draughts 3-5 times a day - or if you let ventilation dampers in windows/doors stay open – or leave the window ajar in the bedroom?

1) People

We all exhale carbon dioxide and water vapour when breathing, just as we release water vapour when sweating. A person typically releases around 2 litres of water per day by exhaling and sweating. For a family of 4, this corresponds to 8 litres of water – almost a full bucket. That moist must be removed from your home by aeration to avoid moisture problems.

Aerate with a draught (open all windows) for 5 minutes 3-5 times a day (once before going to bed, e.g., while brushing your teeth) - remember to turn off the radiators in the meantime to minimise heat loss. If there are ventilation dampers in doors and windows, they should be open and regularly cleaned from dust, pollen, etc. Preferably sleep with the window ajar and a low temperature in the bedroom. But close the window during the day in the winter and turn on the heating so that the bedroom is not constantly colder than other rooms in your home, as this can increase the moisture content and thereby the risk of mould and house dust mites.

If you use treadmills, exercise bikes, etc. at home, you should always ventilate thoroughly afterwards with a through draught, i.e., open all windows in your home for 5 minutes - remember to switch off the radiators.

Leave doors open between all rooms in the house during the day and keep the same temperature in all rooms.

2) Cooking

Cooking releases carbon dioxide and large amounts of water vapour.

Always use lids on pots and a powerful cooker hood running on the high setting with an outside exhaust discharge (a recirculation hood does not reduce the amount of carbon dioxide or humidity levels) - always use the toaster under the cooker hood on the high setting. Do not use tabletop ovens and cupboard ovens that are not under a cooker hood. Start the cooker hood 5 min. before you start cooking and let it run for 10 min. after you finished cooking (new cooker hoods with timers make this easy). Buy a low-noise cooker hood, if necessary, with an external motor if the cooker hood is too noisy. If you cannot get a cooker hood with an outside discharge, always open the window in the kitchen as much as possible while cooking. Remember to clean the filters in the cooker hood often to maintain efficiency.

Always close the door to connecting rooms when you are cooking, so that cooking fumes do not disperse to the rest of your home.

3) Bathing, washing the floor and drying clothes

Bathing, washing floors and drying clothes increases humidity levels. Drying 5 kg of laundry on a rack releases 2-3 litres of water.

Never dry clothes in your home (unless you have mechanical ventilation and low humidity). Clothes should be dried outside or alternatively in a tumble dryer if outdoor drying is not possible. Clothes can easily be dried outdoors also during winter season.

Never wash your floor with an excess of water and always aerate with a draught for 5 minutes after washing the floor.

Install mechanical ventilation in the bathroom, which switches on automatically when the humidity level is high. Keep the bathroom door closed during and after bathing. Scrape off water in the shower cabinet after bathing to lead it down the drain. Dry the walls afterwards with a towel and dry the towels outside. Then you also get fewer limescale on the fittings, shower cabinet, etc. If you cannot install mechanical ventilation, turn off the heat while you thoroughly aerate the bathroom after bathing.

4) Water penetration from outside

Water in the building's construction, due to water damage, downpour or moist, as well as high levels of ground water around the foundation, can cause mould both on and inside the walls (if walls contain organic material). In these cases, you should always get help from professionals.

Dehumidifiers are often necessary after water damages but are a symptomatic treatment that does not prevent the sources of moist mentioned above from causing problems.

More about indoor air pollution and solutions:

www.healthyindoorenvironment.org