

# Common houseplants can improve air quality indoors

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Ordinary potted house plants can potentially make a significant contribution to reducing air pollution in homes and offices, according to

new research led by the University of Birmingham and in partnership with the Royal Horticultural Society (RHS).

During a series of experiments monitoring common houseplants exposed to [nitrogen dioxide](#) (NO<sub>2</sub>)—a common pollutant—researchers calculated that in some conditions, the plants could be able to reduce NO<sub>2</sub> by as much as 20 percent. The results are published in *Air Quality Atmosphere and Health*.

The researchers tested three houseplants commonly found in UK homes, easy to maintain and not overly expensive to buy. They included Peace lily (*Spathiphyllum wallisii*), Corn plant (*Dracaena fragrans*) and fern arum (*Zamioculcas zamiifolia*).

Each plant was put, by itself, into a [test chamber](#) containing levels of NO<sub>2</sub> comparable to an office situated next to a busy road.

Over a period of one hour, the team calculated that all the plants, regardless of species, were able to remove around half the NO<sub>2</sub> in the chamber. The performance of the plants was not dependent on the plants' environment, for example whether it was in light or dark conditions, and whether the soil was wet or dry.

Lead researcher Dr. Christian Pfrang said: "The plants we chose were all very different from each other, yet they all showed strikingly similar abilities to remove NO<sub>2</sub> from the atmosphere. This is very different from the way indoor plants take up CO<sub>2</sub> in our earlier work, which is strongly dependent on environmental factors such as night time or daytime, or soil water content."

The team also calculated what these results might mean for a small office (15 m<sup>3</sup>) and a medium-sized office (100 m<sup>3</sup>) with different levels of ventilation. In a poorly ventilated small office with high levels of [air](#)

[pollution](#), they calculated that five houseplants would reduce NO<sub>2</sub> levels by around 20 percent. In the larger space, the effect would be smaller—3.5 percent, though this effect would be increased by adding more plants.

While the effects of the plants in reducing NO<sub>2</sub> are clear, the precise mechanism by which they do this remain a mystery. Dr. Pfrang added: "We don't think the plants are using the same process as they do for CO<sub>2</sub> uptake, in which the gas is absorbed through stomata—tiny holes—in the leaves. There was no indication, even during longer experiments, that our plants released the NO<sub>2</sub> back into the atmosphere, so there is likely a biological process taking place also involving the soil the plant grows in—but we don't yet know what that is."

Dr. Tijana Blanusa, principal horticultural scientist at the RHS and one of the researchers involved in the study said: "This complements RHS efforts to understand scientific detail behind what we know to be a popular passion. Understanding the limits of what we can expect from [plants](#) helps us plan and advise on planting combinations that not only look good but also provide an important environmental service."

In the next phase of the research, the team will be designing sophisticated tools for modeling air quality indoors encompassing a much wider range of variables. The new project, funded by the Met Office, will use mobile air quality measuring instruments to identify pollutants and test their effects in both residential and [office](#) spaces, producing a wealth of data to inform the tool's development.

**More information:** Curtis Gubb et al, Potted plants can remove the pollutant nitrogen dioxide indoors, *Air Quality, Atmosphere & Health* (2022). [DOI: 10.1007/s11869-022-01171-6](https://doi.org/10.1007/s11869-022-01171-6)

Provided by University of Birmingham

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