Air purification via plants and trees

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Credit: Wageningen University

In addition to improving the ambiance in buildings, plants also purify the air. But how does this work, and which conditions are best for this filtering? Three scientists from Wageningen University & Research discuss the potential of plants as air purifiers.

A NASA study in 1989 showed that some common houseplants can purify the air in buildings from toxic particles such as benzene, formaldehyde and trichloroethylene. Research by Fytagoras showed that

the Adiantum fern is master air purifier, with the highest capacity per leaf area. Led by plant physiologist Pieter de Visser, the Greenhouse Horticulture business unit of Wageningen University & Research will be working with other parties in the ornamental plant chain to perform further research into these frontrunners.

"The NASA study dates back nearly 30 years. Measuring equipment has become much more advanced, and extra studies are carried out since then" says De Visser. "We want to know if we can draw the same conclusions. We also want to learn how exactly plants purify the air. We know how the particles are captured by the plant, but it's not yet clear what happens next. Do the particles remain somewhere in the plant or are they processed in the assimilation chain? We hope to use the acquired knowledge to develop methods for optimising the purifying function of plants. This is a strong desire in practical terms too."

Credit: Wageningen University

Reducing absence through illness with houseplants

Charlotte Lelieveld from Wageningen Environmental Research (Alterra) is coordinating the project Plants for a good indoor climate. In this project the effects of ornamental plants on the health and wellbeing of people in office buildings and care institutions are being studied. "Many buildings have a poor indoor climate," says Lelieveld. "Lab studies show that plants can have a positive impact on a variety of health issues among employees and residents. Plants remove moisture and harmful substances from the air, and also create a pleasant ambiance in buildings".

"As part of a consortium of knowledge institutes and companies we are researching how plants contribute to the air quality and wellbeing of people in practice situations. We are measuring the effects on the indoor environment as well as looking at the costs and benefits. Building owners often see 'plants' as a cost item. By translating our results into financial figures we offer building owners insight into the possibilities for cost reduction on energy-consuming air treatment systems. We are also studying whether there is a link between the presence of plants and a lower absence through illness and a higher productivity."

Adiantum fern is master air purifier, with the highest capacity per leaf area. Credit: Wageningen University

Trees and shrubs for more fresh air

While Lelieveld studies the purifying effect of plants in offices, her colleague Tycho Vermeulen from the Greenhouse Horticulture business unit focuses on the health effect of greenery on an urban level. Vermeulen: "Many cities are interested in the effect of trees and shrubs on air quality. Where previous Dutch research was critical about the possibilities, German and British scientists have concluded that trees and shrubs can capture 10 to 15 per cent of harmful substances in urban areas. We are now working with the municipality of The Hague to see

how green areas can contribute to reducing particulate matter in the city. As a scientist, I see plenty of possibilities."

Provided by Wageningen University