Comparative Study of Indoor Plants for PM2.5 Absorption

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Abstract:

Indoor PM2.5 air pollution, which varies due to ventilation, indoor habits, and urban outdoor sources, has garnered growing interest in using ornamental plants for mitigation. The project herein was conducted to explore whether leaf hair density, surface area, and stomatal density are effective determinants of PM2.5 reduction through comparative studies on six common household plant species: spider plants, aloe vera, rubber plants, peace lily, English ivy, and Boston fern. Conducted in homemade semi-airtight growth chambers with a household Temtop PM Monitor to monitor the released tobacco smoke and PM2.5 concentration over time, the experiment revealed significant differences in reduction of PM2.5. English ivy demonstrated the highest real average absorption rates per hour (6.21%), followed by peace lily (6.00%) and spider plant (5.33%), calculated with leakage accounted for. Still, control trials revealed that leakage could confound the relationship between plant species and PM2.5 absorption, but does not greatly impact the comparativeness of English ivy's effectiveness out of the six species. As English ivy and peace lily also rank highly in leaf surface area, stomatal density, and morphology, these data suggest that strategically choosing ornamental plants with these traits would be helpful in mitigating indoor PM2.5 levels. Further research could isolate any of the plant characteristics, particularly stomatal density, to explore its implication on PM2.5 capture.

Keywords:

PM2.5, ornamental plants, indoor air quality, household health.