

## Improving Indoor Air Quality by Increasing Bio-Based Negative Air Ion Release

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**Abstract :** Indoor air quality could be improved through traditional air purifiers. However, they may not be environmental products. Here, a bio-based method was employed to improve indoor air quality by increasing negative air ion (NAI) release from ornamental plants. A total of 60 plant species has been screened by evaluating their ability to release NAIs, from which four candidates were selected to further study. All of them are from the Dracaena or fabids clade. These four candidates were then subjected to survey their ability to reduce the concentration of particulate matter with diameter of 2.5 or 10 microns (PM<sub>2.5</sub> and PM<sub>10</sub>) in the growth chamber. High concentrations of PM<sub>2.5</sub> and PM<sub>10</sub> were artificially generated by burning a stick of incense for 2 minutes in the closed growth chamber (80cm length × 80cm width × 80cm height), in which the PM<sub>2.5</sub> and PM<sub>10</sub> concentration were generally around 500 µg/m<sup>3</sup> and 1500 µg/m<sup>3</sup>, respectively. Both PM<sub>2.5</sub> and PM<sub>10</sub> were naturally reduced to 410 and 670, respectively after two hours in case that no plants were placed inside the chamber. Interestingly, these two sizes of particulars were reduced to 170 µg/m<sup>3</sup> and 210 µg/m<sup>3</sup>, respectively after two hours when plants were placed to the chamber. It took 4 hours for the plants to reduce particular concentration to acceptable level at less than 55 µg/m<sup>3</sup> for both PM<sub>2.5</sub> and PM<sub>10</sub>, respectively. However, the PM<sub>2.5</sub> and PM<sub>10</sub> concentration were still above 200 µg/m<sup>3</sup> and 300 µg/m<sup>3</sup>, respectively after 4 hours in the growth chamber without any plants. These results suggest the contribution of plants to the particulate deposition. However, all of these data are preliminary and the results may be updated by further studies. In addition, the roles of plants in absorbing indoor formaldehyde have also been explored and their absorbing ability is being improved by optimizing their growth conditions and treating with various exogenous agents. Thus, our preliminary studies provide an alternative strategy to improve indoor air quality.

**Keywords :** bio-based method, indoor air, negative air ion, particulate matter

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