Urban particulate matter reduction by four green roof species

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The adverse effects on health of atmospheric particles have been the subject of a growing number of studies in recent years. Urban residents are particularly at risk from certain anthropogenic sources and a rapidly increasing urban population worldwide gives these studies additional importance.

Using plants as passive filters is being seen as a practical remediation method, however, there are problems with lack of space in cities to implement urban greening programmes with trees.

Greening roofs is a viable and attractive alternative solution as roofs can form up to 35% of the urban land area.

Previous modelling studies have found significant quantities of air pollutants can be removed by green roofs, with intensive roofs having a larger impact than extensive roofs, however this is the first study to undertake an empirical investigation of particulate matter (PM) capture by green roof species.

Magnetic analysis techniques were used to quantify PM removal by four green roof plant species. Differences in leaf PM accumulation were seen between the four species investigated, with grasses of the Agrostis and Festuca genera having a larger impact than the invasive weed Plantago, and Sedum. The latter is commonly employed as an extensive green roof component.

It is demonstrated that, while not as efficient as urban trees, green roofs can nonetheless aid in reducing urban particulate pollution under reasonable green roofing scenarios.

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