THE USE OF SPIDER WEBS TO DETERMINE THE EFFECT OF METAL AIR POLLUTION ON COMMUNITIES

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Exposure to air pollution can lead to adverse human health effects that are linked to pulmonary and cardiovascular morbidity and mortality. According to the World Health Organization, each year about seven million premature deaths is due to air pollution. Metal air pollution focuses on the heavy metals carried within particulate matter. Particulate matter (PM) is a small discrete mass of solid particles or liquid droplets suspended in air and is considered an atmospheric pollutant. PM can be measured by size in micrometers with larger particles (PM10) and smaller particles (PM2.5) negatively impacting major organ systems. The size of the particles is of interest as the smaller particles are considered more dangerous. The main sources of metal carried by PM are traffic/motor emission and industrial emission. Spider webs are easily identifiable, densely woven, low cost, easy to sample, and are active all year round. For this reason, spider webs present as a method that is most suitable for indicating metal pollutants.

By using an effective means of measuring air quality, the potential human and environmental risks can be assessed. Data was sampled from funnel spider webs collected using a grid design in the Curtis Bay/Brooklyn neighborhood of Baltimore city, an area that has historically high levels of air pollution. ICP MS at the UMBC's MCAC was used to determine the concentration of the five metals of interest for human health in the webs. It is expected that high levels of metal air pollution will be sampled from heavy metal releasing sites. To conclude, this work presents a cost-effective means of monitoring air quality to establish methods that citizen scientists can use to educate themselves on their exposure to metal air pollutants.