Environmental Science Graduate Program Student Seminar Series

Improving indoor microbial measurements to help characterize potential human exposures

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Abstract:

We all spend a large portion of our day indoors, and we can be in many different highly complex building environments, especially as students. In these environments we can be exposed to a variety of contaminants from office machines, cleaning products, perfumes, cigarette smoke, water damaged building materials, and microbial growth. These exposures can be in the form of gases or particles, but for microbial exposures we are interested in settled particles. Settled dust is used as a representative sample of once airborne particles. Indoor microbial exposures have been related to allergy and respiratory disorders. The mechanisms between exposure and health effects has been difficult to ascertain due partly to lack of standardized sampling methodology with known efficiencies. Additionally, we are only starting to understand microbial activity in dust. The research I do examines the sampling efficiencies associated with two different sample collection methods. Both involve the removal of embedded dust within carpet, which is a common sampling technique in our lab. Our research also examines the chemical and microbial degradation of phthalate esters in house dust. Phthalates are commonly added to plastics to make them flexible and are used in the backing of carpets. The most commonly observed type of phthalate is DEHP, and it is seen at elevated concentration in house dust. I also collaborate on the Humidity and Microbial Growth in ISS Dust (HUMID) project. My portion of the project looks at the active metabolism of fungi growing in dust from the International Space Station. Continuing to characterize microbial communities in indoor environments will contribute to our growing understanding of potential human exposures. Hopefully, with a better understanding of these aspects of sample collection efficiency, microbial chemical degradation, and microbial activity, we can start to form a clearer link between exposure and disease.