

## Mosquito coil emissions and health implications

### ABSTRACT

Burning mosquito coils indoors generates smoke that can control mosquitoes effectively. This practice is currently used in numerous households in Asia, Africa, and South America. However, the smoke may contain pollutants of health concern. We conducted the present study to characterize the emissions from four common brands of mosquito coils from China and two common brands from Malaysia. We used mass balance equations to determine emission rates of fine particles (particulate matter < 2.5 microm in diameter; PM(2.5)), polycyclic aromatic hydrocarbons (PAHs), aldehydes, and ketones. Having applied these measured emission rates to predict indoor concentrations under realistic room conditions, we found that pollutant concentrations resulting from burning mosquito coils could substantially exceed health-based air quality standards or guidelines. Under the same combustion conditions, the tested Malaysian mosquito coils generated more measured pollutants than did the tested Chinese mosquito coils. We also identified a large suite of volatile organic compounds, including carcinogens and suspected carcinogens, in the coil smoke. In a set of experiments conducted in a room, we examined the size distribution of particulate matter contained in the coil smoke and found that the particles were ultrafine and fine. The findings from the present study suggest that exposure to the smoke of mosquito coils similar to the tested ones can pose significant acute and chronic health risks. For example, burning one mosquito coil would release the same amount of PM(2.5) mass as burning 75-137 cigarettes. The emission of formaldehyde from burning one coil can be as high as that released from burning 51 cigarettes.

**Keyword:** Aldehydes; Mosquito coil; PAHs; Particulate matter; Smoke