Exposure Assessment to Airborne Particulate Matter in Agriculture

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Abstract : Airborne particulate matter is a known hazard to human health, with a considerable body of evidence linking agricultural dust exposures to adverse human health effects in exposed populations. It is also known that agricultural workers are exposed to high levels of soil dust and other types of airborne particulate matter within the farming environment. The aim of this study was to examine exposure to agricultural dust among farm workers during the seeding season. Twenty-one wheat-belt farms consented to participate in the study with 30 workers being monitored for dust exposure whilst seeding or undertaking seeding associated tasks. Each farm was visited once and farmers' were asked to wear a personal air sampler for a 4-hour sampling period. Simultaneous, real-time, tractor cabin air quality monitoring was also undertaken. Data for this study was collected using real-time aerosol dust monitors to determine in-tractor cabin PM exposure to five size fractions (total, PM10, respirable, PM2.5 and PM1), and personal sampling was undertaken to establish individual exposure to inhalable and respirable dust concentrations. The study established a significant difference between personal exposures and simultaneous real-time in-cabin exposures for both inhalable and respirable fractions. No significant difference was shown between in-cabin and personal inhalable dust concentrations during seeding and spraying tasks, although both in-cabin and personal concentrations were two times greater for seeding than spraying. Future research should focus on educating and providing farm owners and workers with more information on adopting safe work practices to minimise harmful exposures to agricultural dust.