MS Thesis Defense

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CHEMICAL CHARACTERIZATION AND REACTIVE OXIDANT POTENTIAL OF INDONESIAN BIOMASS BURNING EMISSIONS

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Atmospheric fine particulate matter (PM2.5) have adverse impacts on air quality, climate, and human health. Primary emissions from biomass burning (BB) in Indonesia can substantially contribute to PM2.5 concentrations; however, its chemical composition remains unresolved. In this study, we examined the chemical composition of PM2.5 primarily emitted from laboratory burns of Indonesian biomass fuels and ambient PM2.5 collected from Singapore when it was influenced by air masses originating from Indonesian peatland fires. We also applied the dithiothreitol (DTT) assay to assess if these samples have oxidative stress potential. We found that laboratory samples generated greater DTT activity compared to previous studies examining diesel particles. Ambient samples generated smaller DTT activity, suggesting that fresh BB-derived PM2.5 likely have greater oxidative stress potential than aged BB-derived PM2.5. Levoglucosan, an abundant chemical tracer of primary BB emissions, was not associated with DTT activity, suggesting that other primary BB constituents are more DTT active.

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