

Title : Evaluation of the Oxidative Potential (OP) of $PM_{0.49}$ during Smoke-haze and Non-smoke haze periods in Urban Chiang Mai, Thailand

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ABSTRACT

Air pollution is a significant environmental issue that impacts public health, especially during the smoke haze period, which typically occurs between February and April each year in Chiang Mai. $PM_{0.49}$ had an aerodynamic diameter equal to or smaller than $0.49 \mu\text{m}$ and accounted for 60% of $PM_{2.5}$. Due to its small size, $PM_{0.49}$ can penetrate the bloodstream and vital organs more easily, potentially posing even greater health risks. This study aims to determine the oxidative potential (OP) of $PM_{0.49}$ collected during smoke-haze and non-smoke haze periods in the urban Chiang Mai in 2024. $PM_{0.49}$ samples were collected during February to June 2024 for 24 hours using a high-volume air sampler with a 5-stage cascade impactor, operating at an airflow rate of 1,000 L/min, at the Northern Meteorological Center, Chiang Mai, Thailand. The result shows concentrations of $PM_{0.49}$, OP_v, OP_m across different periods. A study shows a low correlation ($R^2 = 0.403$) between $PM_{0.49}$ concentration and OP_m value. Because a OP_m value depends on the mass of particles and Coarse particles cannot penetrate in our body as a fine particles. During the smoke-haze period, both $PM_{0.49}$ concentration and OP_v were relatively higher compared to the pre- and post-smoke haze periods and shows a strong correlation ($R^2 = 0.8187$), suggesting that poor air quality during the smoke-haze periods may lead to higher level of oxidative stress and increase potential health risk.