

ABSTRACT

THE TOXICITY OF QUINONES IN PARTICULATE MATTER THROUGH THE PRODUCTION OF HYDROPEROXIDES UNDER LUNG-LIKE CONDITIONS

Particulate matter is an air pollutant that is correlated with asthma exacerbation and incidences of certain cancers. Quinones are present within particulate matter. Additionally, quinones have the ability to catalyze a series of reactions to produce reactive oxygen species (ROS), which are toxic to cells. If these reactions occur within the lungs due to quinones delivered by inhaled particulate matter, damage to the lung tissue may result. Assays using dithiothreitol (DTT) were developed to determine the relative ability of quinones to generate ROS within cells by determining the rate of H_2O_2 production of quinones from stock solutions and ambient samples. It was determined that 3 of the 12 quinones examined generated H_2O_2 at levels significantly higher than the blanks. Furthermore, it appears that these 3 quinones account for all of the H_2O_2 produced by ambient samples. Therefore, these quinones may be largely responsible for the ROS generated from the particulate matter when inhaled.

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