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Impact of Ozone Produced by Vehicular Emission on Chronic Obstructive Pulmonary Disease

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Abstract : Air Pollution is caused by the introduction of chemicals in the biosphere. Primary pollutants on reaction with the components of the earth produce Secondary Pollutants like Smog. Ozone is the main ingredient of Smog. The ground level ozone is created by the chemical reactions between Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs) in the presence of Sunlight. This ozone can enter inside and call as indoor ozone. The automobile emissions in both moving and idling conditions contribute to the indoor ozone formation. During engine ignition and shutdown, motor vehicles emit the ozone forming pollutants like NOx and VOCs, and the phenomena are called Cold Start and Hot-Soak respectively. Subjects like Chronic Obstructive Pulmonary Disease (COPD) and asthma associated with chronic respiratory diseases are susceptible to the harmful effects of Indoor Ozone. The most common cause of COPD other than smoking is the long-term contract with harmful pollutants like ground-level ozone. It is estimated by WHO that COPD will become the third leading cause of all deaths worldwide by 2030. In this paper, the cold-start and hot-soak vehicle emissions are studied in the context of accumulation of oxides of nitrogen at the outer walls of the building which may cause COPD. The titanium oxide coated building material is further discussed as an absorber of NOx when applied to the walls and roof.

Keywords : indoor air quality, cold start emission, hot-soak, ozone
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