

ABSTRACT

Transport fuels emit particulates of varying chemical nature and size. These particulates are known to cause respiratory problems of medical concern. The need to simulate the breathing characteristics of particulates generated from combustion events is very important in estimating the respiratory clearance of these particles. Consequently, this study examines the nature of particulate matter from the pyrolysis of a mixture *Croton megalocarpus* biodiesel and fossil diesel, and pure biodiesel. The study was explored at an optimum temperature of 600°C in an inert nitrogen environment at a contact time of 2 sec. Scanning electron microscope was used to examine the surface of the particulates. Multiple-Path Particulate Dosage (MPPD Ver. 3.04) model was used to determine the breathing phenomena of infants, teenagers and adults at different orientations. Co-pyrolytic Char particulates and pyrolytic croton thermal char were classified as ultrafine, PM_{0.03} and PM_{0.02} respectively. The MPPD model results indicated that ultrafine particles tend to be deposited in pulmonary regions more than head and trachea regions, due to high probability of diffusibility of ultrafine particles. It was noted that 8 years old exhibits a unique trend with high total deposition and poor respiratory clearance when compared to an adult of 21 years old.

Keywords

Particulate Emissions, Respiratory Clearance, MPPD, Combustion Events