

Black Carbon Investigation in Fine Particulate Matter at the University of Jordan during Post-COVID19 Hybrid Classes: An Experimental Comparative Study

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ABSTRACT

Air pollution has attracted considerable attention from scientists in various fields overall the world due to its harmful effects on the ecological system and human health. One of the harmful elements detected in the atmosphere is black carbon (BC). Black carbon mainly originates from anthropogenic activities, such as fossil fuel and biomass burning. Besides its negative impact on human health, it also affects atmospheric visibility and both local and global climate changes due to its strong radiative absorption nature.

This study is solely interested in black carbon investigation in fine particulate matter (PM_{2.5}) at the University of Jordan (UJ) during the first semester of the 2021-2022 academic year. This semester was the first semester of hybrid classes after the COVID-19 pandemic. Student classes were hybrid (i.e., both in-person and online) on all workdays of the week except Thursdays, where all classes were totally online. Aerosol samples were collected on Teflon filters over the period from 1st November to 31st December 2021. PM_{2.5} mass concentrations were obtained using gravimetric measurements, and BC content in aerosol samples was measured using reflectance measurement, a nondestructive technique available at JUVAC Auxiliary Laboratory at UJ.

It was observed that PM_{2.5} and BC concentrations decreased during weekends compared with their values during workdays. Moreover, samples collected on Thursdays recorded lower concentrations of both PM_{2.5} and BC compared with their values during other workdays. However, such concentrations recorded on Thursdays were still higher than those recorded during weekends. Correlation between BC and PM_{2.5} concentrations implied that BC content represents about 18% of PM_{2.5} in Amman.