ARC'18

مؤتمر مؤسسة قطر
السنوي للبحوث
QATAR FOUNDATION
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البحث والتطوير: التركيز على
الأولويات، وإحداث الأثر

**R&D: FOCUSING ON PRIORITIES,
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19-20 مــــارس
19-20 MARCH

Energy and Environment - Poster Display

Determination of the levels of Particulate Matter 25 and 10 and their elemental Composition in Qatar

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Particulate matter (PM) pollution is one of the major environmental pollution issues severely affecting human health and air quality all over the world. Based on the recent World Health Organization (WHO) report, PM levels were considered relatively high in Qatar. This might mainly be attributed to arid climate, but also due to rapid industrialization and urbanization as well as traffic. The literature on PM pollution and its source is limited in Qatar and the region. Therefore, this study was carried out to assess the air quality at different locations in Qatar, identify the levels of PM2.5 and PM10, and determine the elemental composition of PM2.5 and PM10 to trace their sources. A total of 100 samples (60 for PM2.5 and 40 for PM10) were collected using SKC Deployable Particulate Sampler (DPS) System for 24-hr during the months of September 2016 to December 2016. The sampling was conducted at five different locations, namely, Qatar University (QU), Education City (EC), Al Waab street area (AD), Whole Sale Market area (WM), and Al-Wakrah City (AW). The elemental composition of PM samples was determined using an inductively coupled plasma optical emission spectrometry (ICP-OES). The relationship between the environmental conditions and PM levels were also established. The health risks associated with different PM levels was calculated using the US EPA Air Quality Index (AQI) tool. The overall mean concentrations of 24-hr PM2.5 ranged from 49.88 µg/m3 to 64.28 µg/m3, while PM10 levels were between 126.69 µg/m3 and 184.55 µg/m3. The four months mean concentrations of PM2.5 were determined to be 49.88, 64.28, 55.47, 58.84, and 56.52 µg/m3 at Qatar University, Education City, Al Waab, WSM, Al Wakrah city, respectively. The average 24-hr PM10 levels were 138.24 µg/m3 at QU, 156.44 µg/m3 at EC, 126.69 µg/m3 at AWb, 184.55 µg/m3 at

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WM, and 160.24 μg/m3 at AW. The concentrations of PM2.5 detected at each station exceeded the WHO guideline (20 μg/m3) by 2.5 to 3 fold during the study period. The presence of high concentrations of Ca, Fe, Al, Fe, Sr, Mn, Na, and Mg indicated the major sources of PM to be soil/crustal. The identification of Ni, Co, Cr, Cd, Ba, Pb, V, and Zn were directly related to anthropogenic sources, specifically due to fossil fuel combustion and vehicular emission and these levels were reported at the highest levels at the wholesale market station. The AQI levels reported at all stations indicated that overall air quality at Qatar University and Al Waab street area was considered to be Moderate for PM10 and Unhealthy for sensitive group for PM2.5 levels. While in Education City, Whole Sale Market, and Al-Wakrah city areas had unhealthy and unhealthy for sensitive group ratings for PM2.5 and PM10 levels, respectively. The statistical analysis on determining the effect of meteorological factors (temperature, humidity, and wind speed) on the concentrations of PM2.5 and PM10 showed that there is a significant relationship (P 0.05) between wind speed and temperature and PM levels at all stations. These findings highlight the need for more research on PM pollution 1) to determine seasonal levels since this study only covered four months (September-December), 2) to better understand the source of PM pollution (in addition to elements, the levels of Poly Aromatic Hydrocarbons should also be determined), and 3) to establish more effective control measures to protect public health and preserve the environment in Qatar.