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Dynamics (seasonal and intra-diurnal) of air-borne fungal spore population of Doha area, Qatar

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ABSTRACT

The availability and dynamics of airborne fungal spores in the atmosphere are strongly influenced by the meteorological parameters and by other factors such as air pollutants. The aim of this study was to update the knowledge about the seasonal and diurnal variations in airborne fungal spores of Doha area and to correlate these variations with meteorological factors, and to investigate the influence of atmospheric CO₂ concentrations and different culture media on the availability of fungal spores. From 106 settle plate exposures (on alternative days) throughout the period April 2015-March 2016, a total of 1197 mould- and 283 yeast colony-forming units (CFU), twenty one genera and 62 species were retrieved. The highest fungal spore's concentration was recorded in February 2016, whereas the lowest concentration occurred in August 2015. The main constituents of the fungal airspora were attributed to *Cladosporium* (60.2%), *Aspergillus* (10.4%), *Fusarium* (9.4%), *Alternaria* (8.5%), and *Ganoderma* spp. (2.3%). *Cladosporium* showed two peaks in April and February, while *Fusarium* and *Alternaria* peaked in July. *Aspergillus* had one peak in August. The prevalence of *Ganoderma* spp. were exclusively detected in February and March. Temperature was significantly and negatively correlated with the total colony count and fungal species, however no significant correlation was found between relative humidity and both the total colony count and fungal species. Wind speed was significantly and positively correlated with the total colony count and fungal species. The correlation between rainfalls and either total colony count or fungal species was non-significant. Intra-diurnal fluctuations of fungal spores was investigated during the period of 1st of Feb – 31st of March 2016. The highest dispersal of fungal spores favored 18:00 h, whereas at 00:00 h (midnight) the lowest fungal spores release was recorded. No significant difference was observed in total number of fungal colonies or species collected with the two media Potato Dextrose Agar (PDA) and Rose Bengal media. Nevertheless, certain fungal taxa were highly selective and thus their growth rate was on one media much higher than with another. There were no significant differences in the composition and diversity of the airborne fungal population between two different study sites under the influence of atmospheric CO₂ concentration, though daily concentration of CO₂ was higher at the Industrial area site than at Qatar University Campus. Remarkably, the concentrations of *Alternaria* spp. and *Fusarium* spp. were significantly higher at Industrial area site in corresponding to CO₂ than at Qatar University site.

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