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Online Monitoring of Airborne Bioaerosols Released from a Composting, Green Waste Site

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Abstract : This study is the first to employ the online WIBS (Waveband Integrated Biosensor Sensor) technique for the monitoring of bioaerosol emissions and non-fluorescing “dust” released from a composting/green waste site. The purpose of the research was to provide a “proof of principle” for using WIBS to monitor such a location continually over days and nights in order to construct comparative “bioaerosol site profiles”. Current impaction/culturing methods take many days to achieve results available by the WIBS technique in seconds.The real-time data obtained was then used to assess variations of the bioaerosol counts as a function of size, “shape”, site location, working activity levels, time of day, relative humidity, wind speeds and wind directions. Three short campaigns were undertaken, one classified as a “light” workload period, another as a “heavy” workload period and finally a weekend when the site was closed. One main bioaerosol size regime was found to predominate: 0.5 micron to 3 micron with morphologies ranging from elongated to elipsoidal/spherical. The real-time number-concentration data were consistent with an Andersen sampling protocol that was employed at the site. The number-concentrations of fluorescent particles as a proportion of total particles counted amounted, on average, to ~1% for the “light” workday period, ~7% for the “heavy” workday period and ~18% for the weekend. The bioaerosol release profiles at the weekend were considerably different from those monitored during the working weekdays.

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