

## MICROORGANISMS IN BIOAEROSOLS IN INDOOR AIR OF HOSPITAL AND NON-HOSPITAL SETTINGS

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### Dear Editor,

Bioaerosols are particulate matter of biological origin, comprising of micro-organisms and fragments, and their metabolites (toxins and particulate waste products)[1]. Reports indicate the presence of pathogenic bacterial and fungal species in healthcare settings, especially air,[2,3] and a possible link to cause nosocomial infections and occupational health hazards is described[4]. Though several methods are available for airborne microbial measurements, petri-plate gravitational settling (passive) method of sampling is widely used due to simpler methodology and technical feasibility[5]. Since varying sampling durations ranging from 10 min to 30 min are being used as sampling protocol,[2,3] this study was designed to compare the extent of recovery of microorganisms from the indoor air at varying durations of time exposures.

This study was undertaken during February – April 2007 to determine the microbial loads in indoor air of areas in hospital and non-hospital settings, using petri-plate gravitational settling (passive) method using two different exposure periods, 15 minutes and 30 minutes and to characterise the organisms isolated. A preliminary walk-through was conducted to determine the level of activity in the sampling locations. Sampling was done in locations with minimal activity and in places where routine activities are known to generate aerosols. Nutrient agar, blood agar, MacConkey agar and Sabouraud Dextrose agar were the media used for sampling. The plates were incubated at 37°C for 24-48 h and processed for the identification of predominant Gram-positive and Gram-negative bacteria and fungi grown using standard methods of microbiological analysis[6]

The locations sampled were coded in order to maintain confidentiality of areas sampled. The microbial loads obtained at 15 min and 30 min is shown in Fig. 1. The extent of isolation of microorganisms was uniformly high when exposed at 30 min than at 15 min irrespective of the sampling locations. It was observed that the recovery of microorganisms increased with increased duration of exposure. For example, only Micrococci were isolated in

location VII when exposed for 15 min, whereas exposure for 30 min enabled the recovery of *Staphylococcus aureus* along with Micrococci, and the microbial loads obtained also increased. Similarly, *Aspergillus niger* was isolated from location VII only when exposed for 30 min. This increased recovery of microorganisms at 30 min may be attributed to the size of the airborne microbial particles; larger particles once airborne take time to settle. Gram-positive cocci (GPC) were more frequently isolated than Gram-negative bacilli (GNB). Staphylococci and Micrococci were the predominant GPC. GNB and moulds recovered included *Klebsiella oxytoca*, *Pseudomonas* sp. and *Enterobacter* sp., and *Aspergillus niger*, *Aspergillus fumigatus*, *Aspergillus flavus*, *Penicillium* sp. and *Trichophyton* sp. GNB and moulds were isolated from areas with high activity.

In the context of a developing country, where resources are limited, use of petri-plate gravitational settling (passive) method of sampling will be beneficial, as it is simple, cost-effective and facilitates the use of media available in the laboratory for routine diagnosis. Increased durations of sampling exposures at 30 min can be used to determine the indoor air quality in hospitals. This may be of use in locations with minimal activity where expected loads are thought to be less or in sensitive patient care areas to obtain a more accurate estimate of level of contamination.

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