AIRBORNE PARTICLE CLEARANCE USING LIQUID-IONS

Introduction

Airborne pollutants including dust, dander and allergens can reduce air quality and can contribute to respiratory-related problems.

Using the unique technology developed by Atrium Innovation Ltd to produce specialised long-lifetime droplets from Cleanaer™ devices, it has been possible to demonstrate a fast action effect in increasing the rate of removal of particles from the air.

These trials examined the rates at which a dose of contaminant particles were removed from the air with and without the technology.

Ultra-violet aerodynamic particle sizing (UV-APS) methodology was used to distinguish between the partially-charged droplets (Liquid-ions) generated using Cleanaer units and nebulized latex spheres. The Liquid-ions were fluorescently-labelled in order to differentiate them from the latex contaminants.

Results

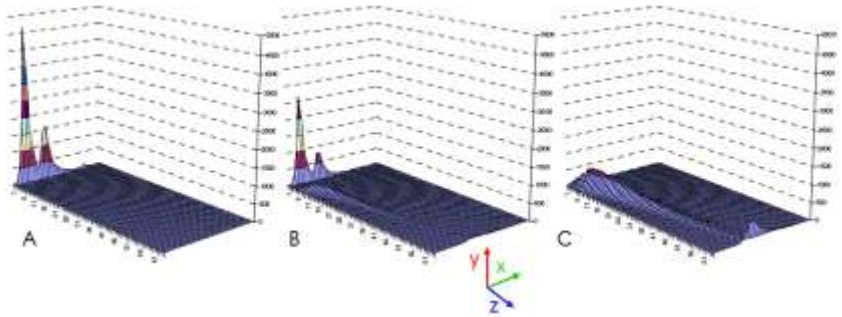

Figure 1 UV-APS fluorescence correlation data (y-axis particle counts; x-axis aerodynamic particle size; z-axis relative fluorescence) showing (A) initial latex challenge, (B) latex challenge + *Liquid-ion* treatment (+2 hrs), and (C) *Liquid-ion* treatment alone (+2hrs).

Using UV-APS, it was possible to distinguish between latex challenge and Liquid-ion particle populations (**Figure 1**). The technology-produced Liquid-ions shortened the airborne half-life of the latex challenge to 2hrs, compared with 4hrs in the untreated condition where the latex challenge was allowed to precipitate under gravity alone.

When the duty cycle of the Cleanaer dispensing devices was increased (to 82%), the half-life of the latex was reduced to a third of its untreated time.

Conclusions

Atrium Innovation's technology delivering Liquid-ions from its Cleanaer devices was able to accelerate the reduction of airborne contaminants from the air. The technology, which forms part of a whole room sanitization system, more than doubled the rate of air clearance compared to the untreated control.

Experimental information

Two Cleanaer devices using activated (29% duty cycle unless otherwise stated) in a 45 m^3 test chamber containing a latex nebuliser (sphere diameters: 0.6, 1.0 and 3.0 µm) and UV-APS (TSI UV-APS model 3314; sampling period 30s/1 min).