Reviewer's report

Title: Inactivation of an enterovirus by airborne disinfectants

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Reviewer: Jochen Steinmann

Reviewer's report:

The manuscript entitled “Inactivation of an enterovirus by airborne disinfection” describes a test method with is coming into focus in hospitals and other medical settings to replace formaldehyde fumigation.

The present work is not clearly written and needs substantial editing. Some key literature in the introduction is missing and the experimental design is questionable as a control after disinfectant treatment without the use of columns is missing. The following comments need consideration before the manuscript is published.

Major Compulsory Revisions

Page 6, line 125: here the cytotoxicity is given as 1:1,000 dilutions. Is this the data of the cytotoxicity of the products of Laboratoires Anios (1260 and 2500 ppm respectively) as they are used in the machine or the cytotoxicity of the culture medium after vortexing the swabs? It seems strange that after fumigation of the discs in a treated room a wet swab which is vortexed in 1 ml culture medium (dilution) produces such cytotoxicity. The cytotoxicity of the culture medium after vortexing the swab should be low and not requiring columns. Please explain the cytotoxicity value.

Page 6, line 129: following the experiments as described in figure 1 the virus titres (controls) are determined with and without columns without any difference visible. Despite this result with the control a determination of the virus titre on the discs after exposure to the disinfectant with and without columns is necessary in order to show that in the presence of disinfectant no virus reduction by the columns is possible. Any residual virus in the assay without columns gives hints that virus might restraining in the columns leading to false positive results. A control as described with test virus suspension (virus controls) after drying only is not sufficient in these experiments.

Page 6, line 127: The importance of the columns is stressed in this article. Were the columns be able to reduce cytotoxicity from 1:1000 to no toxicity in 1:10? Please mention the log reduction.

Page 3, line 58: the virucidal effect after fumigation is more often described as cited here showing that the authors are not familiar with the complete literature:

Heckart RA et al.: Efficacy of Vaporized Hydrogen Peroxide against Exotic
Animal Viruses.
Pottage T et al.: Evaluation of hydrogen peroxide gasous disinfection systems to decontaminate viruses.

Li D et al.: Inactivation of Murine Norovirus 1, Coliphage phiX174, and Bacillus fragilis phage B40-8 on surfaces and fresh-cut iceberg lettuce by hydrogen peroxide and UV light.

Page 5, line 87: please add data of peracetic acid concentration, temperature and relative humidity in the room. These data would be of great interest for comparing with those of Tuladhar (126-127 ppm peroxide) concerning inactivation of poliovirus.

Page 5, line 94: was there any control of efficiency of suppression of product activity? Obviously the columns were used for elimination of cytotoxicity only. Please show that there is no "after-effect".

Page 4, line 84: Location: some more details of the room should be necessary: position of the carriers in the test room (distance of the machine to the carriers)

Page 7, line 132: the exact reduction including a mean value with 95% CI must be given.

Figure 2: there is a bar visible after 90 and 150 minutes after treatment. Is this representing cytotoxicity (not mentioned) or any residual virus? In this case the virus titres after 2 different treatments seem completely identical after 2 exposure times. Please explain this.

Page 10, lines 190-193: this conclusion only describes technical aspects like the swabs and the gel filtration. It should mention that hot fogging with peracetic-based disinfectant is possible to reduce poliovirus titres on surfaces.

Minor Essential Revisions

Page 4, line 81: the cleaning of the discs should be described (autoclaving).

Page 4 line 85: exact name of company Laboratoires Anios not Anios

Page 6, line 117: what was the titre of the test virus suspension before drying? This would be of interest

Page 9, line 182 add citation Tuladhar et al. who used the swabs after hydrogen peroxide vapour disinfection

Page 13, line 229 citation bold type

Page 13, line 247 citation

**Level of interest:** An article of importance in its field
Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests