Virucidal Effectiveness of Two Commercial Disinfectants on Porcine Circovirus Type 2

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Introduction
Porcine Circovirus type 2 associated disease (PCVAD) is caused by Porcine Circovirus type 2 (PCV2) in the presence of other co-factors such as parvovirus, Mycoplasma hyopneumoniae and PRRS (1, 2, 3). The situation is even more complicated in Asia as the industry is still impacted by sporadic outbreaks of classical swine fever, Aujeszky’s disease (4), Foot and Mouth Disease and more recently highly virulent PRRS virus (High Fever disease). Commercial PCV2 vaccines have been found to be effective in controlling the disease. However, ensuring clean environmental conditions (proper biosecurity and disinfection) and eliminating co-factors remain essential for successful control of PCVAD. In this study two virucidal effectiveness tests were conducted to demonstrate the efficacy of two commercial disinfectants against PCV2.

Materials and Methods
The studies were conducted under laboratory conditions to evaluate the virucidal activity of 2 commercial disinfectants (Microbiotest, Virginia, USA).

Study 1: GPC8 (Gutaraldehyde).
Study 2: FAM 30 (Biocide 30) * (Iodine).
Both studies were designed to meet the requirements for 40CFR § 160 of US EPA.
To simulate the field conditions, the tests were carried out in virus carrier tests, at 10±2 °C, and the viral (PCV2) stock used contained >5% organic load. The contact time was set at 30 minutes. The following dilutions were used for both GPC8 and FAM30 (Biocide 30):

- 1:50 (1mL test agent +49 mL diluents)
- 1:100 (1mL test agent +49 mL diluents)

These studies were performed in two phases
- Phase I: Determine the cytotoxicity level
- Phase II: Spiking study-the test agent-treated samples were assayed both by titration and large volume sampling methods.

The 50% tissue culture infectious dose (TCID₅₀/mL) was determined using the Spearman-Karber method. Validity of both tests was verified with controls (Plate recovery control, cell viability control-cytotoxic and spiking test).

Results
The inactivating results demonstrated that when GPC8* (Lot No. 64757) and FAM30* (Biocide30) (Lot No. 70923) were tested as described, the agents inactivated PCV2 by ≥ 3.43 log₁₀ and ≥ 3.51 log₁₀ respectively (Table 1). In accordance with US EPA Virucidal Effectiveness Test, both GPC8* and FAM30* (Biocide30) are effective in significantly reducing PCV2 titre.

Table 1. Reduction factor

<table>
<thead>
<tr>
<th>Test Agent</th>
<th>Dilution</th>
<th>Initial Load (Log₁₀TCID₅₀)</th>
<th>Output Load (Log₁₀TCID₅₀)</th>
<th>Log₁₀ Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAM 30*</td>
<td>1:50</td>
<td>5.60 ± 0.28</td>
<td>&lt; 2.09</td>
<td>&gt; 3.51 ± 0.28</td>
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*FAM30 is Evans Vanodine’s brand name for Biocide 30 (Pfizer’s trademark)
^New formulation

Discussion
Successful disease control is generally achieved by environmental control, biosecurity, vaccination and strategic antibiotic treatment. Use of effective virucidal disinfectant will be an essential “intervention” approach to improve the success of PCVAD control.

References