

Inactivation of Foot-and-Mouth-Disease Virus

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Introduction

Foot and Mouth disease virus (FMDV) is a global disease occurring in domestic and cloven-hoofed animals. As a result of the characteristics of the virus and because of difficulties in effective control, FMD is considered one of the most infectious diseases known to exist. Although mortality rates in adult animals are low, FMDV severely impacts production and imparts critical international trade restrictions on animals and livestock products. Due to the non-endemic status of FMDV, the US agriculture sector remains vulnerable to the intentional or unintentional introduction of this disease. Rapid containment and eradication of infected herds and disinfection of contaminated livestock holding facilities is essential in order to minimize industry losses.

Methodology

Foot and Mouth Disease Virus (FMDV) type O1 Bruge was propagated in Lamb Kidney (LK) cells and subsequently propagated in Baby Hamster Kidney 21 (BHK-21) at the Plum Island Animal Disease Center. Equal parts virus (FMDV O1) was added to each test disinfectant (Sandia DF-200, 2% sodium hydroxide, 4% sodium carbonate, 0.4% Oxy-Sept, 5% acetic acid, 10% bleach, 1% Virkon S, 70% ethanol, or 0.01 M PBS as neg control) and exposed for 10 or 20 minutes. For organic challenge testing, 10% bovine feces (collected from healthy 7 month holstein steer) was added to test disinfectants for a final 10% or 50% concentration and samples were exposed for 10 or 20 minutes. Following exposure, samples were washed prior to recovery by infecting BHK-21 cells in 96 well format (for determining TCID₅₀) or were extracted using the Qiagen RNeasy RNA extraction kit. Extracted samples were then amplified using a real time RT-PCR protocol specific for FMDV (Tetracore). Results to date include TCID₅₀ data for the 0, 10, and 50% organic challenge with 20 minute exposure and are shown in the figures below.

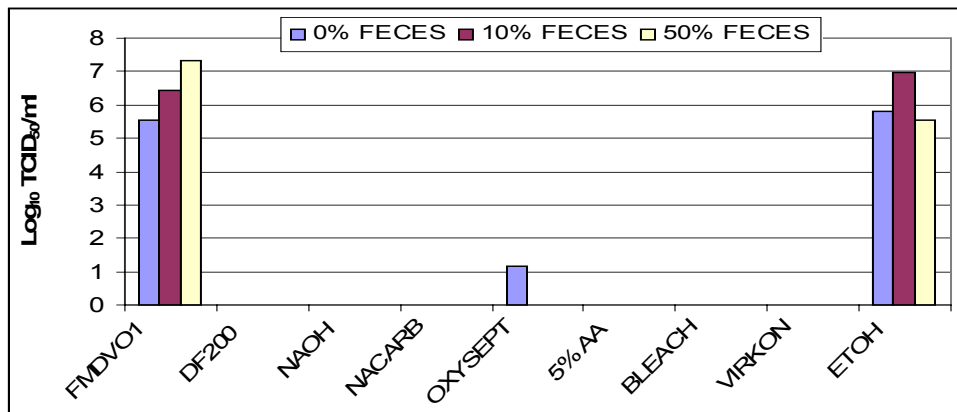


Figure 1: Amount of infectious FMDV recovered post-treatment (20 min)

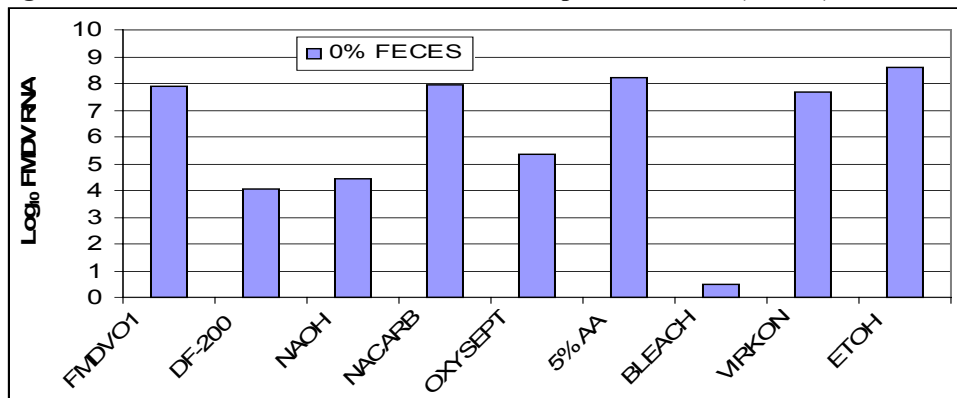


Figure 2: Amount of FMDV RNA recovered post-treatment (20 min)