Disinfection of African Swine Fever virus: The OxiScience solution

Dr. Jeff Williams, CTO, OxiScience LLC

Background: The epidemic of African Swine Fever (ASF) now sweeping through China and other Asian countries and spreading steadily across Europe is caused by a highly contagious virus. Infected pigs die; there is no treatment possible, and there is no vaccine to prevent infection in animals not yet exposed. ASF persists in the environment, in pig carcasses and meat, and is readily and quickly carried beyond farms that experience outbreaks. More effective disinfection measures are needed in the face of a looming disaster. This is already the worst animal disease outbreak in the history of the world: (https://www.vox.com/2019/6/6/18655460/china-african-swine-fever-pig-ebola)

The magnitude of the problem: ASF first appeared in China in 2018 but was detected in wild boars in Eastern Europe several years ago. ASF does not affect humans or animals other than pigs. While no direct health risks are posed to people or their ruminant livestock, the impact of the disease on domestic pork supplies and the knock-on effects on social stability are huge. Pork accounts for sixty % of Chinese meat consumption, half of the worldwide pork market. Prices are skyrocketing as about half of the 300 million pigs in China have either died or been culled since the outbreak began. In 2019 ASF spread from China to other Asian nations, including So and N Korea, Vietnam, Laos, Philippines & Indonesia. This year the virus moved across Europe to Belgium and France; so far only wild boars are infected but spread into domestic pigs has already happened in the Eastern region. Pork prices in China are up 70%, causing escalating imports from ASF-free regions, like the US, to try to meet the animal protein needs of the population. A pork-driven social breakdown is feared if the outbreak is not contained.

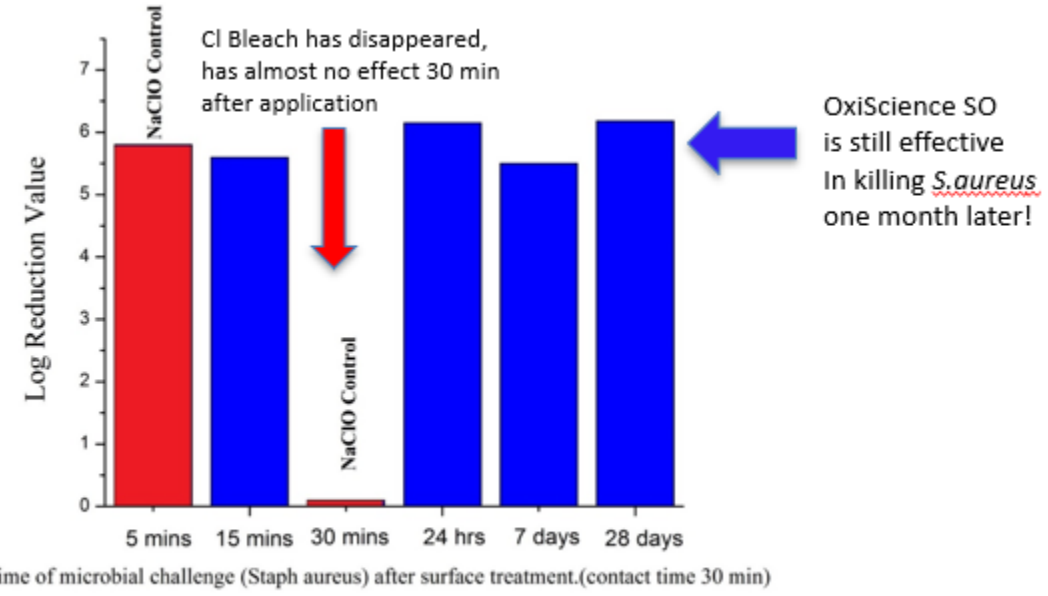
Control measures and needs: ASF belongs to a peculiar class of viruses. Research on ASF is difficult and costly because of the risks of contagion and transmission. Countries such as the US with large pig populations are on high alert to prevent importation of virus in contaminated pork products or waste streams from Asia and EU.

No disinfectants have ever been tested and approved by the US-EPA for use *versus* ASF. A national EPA Emergency Measure has been issued allowing for the use of concentrated chlorine bleach (3000 mg/L) for environmental decontamination if ASF arrives in the US. No other disinfection measures are allowed under this measure. (https://www.aphis.usda.gov/animal_health/emergency_management/downloads/SodHypo_FMDvASFvCSFv_LABEL.pdf). Concentrated Cl bleach is being used in China, both for environmental surfaces and animals, However, this solution is extremely corrosive, hazardous to personnel, damaging to farm housing and equipment, and moreover, it has only a very short-acting effect, so it offers inadequate protection in the face of such a contagious virus. What is needed is a safer formulation with the power of bleach that can persist on treated surfaces or skin to maintain effective virus killing for a long time. OxiScience technology meets that need.

The OxiScience Solution: The Stabilized Oxidant disinfectant (SO) formulation made by OxiScience LLC, protected by US Patent # 10,028,482 (2018), has been tested under rigorous

conditions at Case Western Reserve University, a major US research institution. It was shown to be just as effective in the short run as concentrated chlorine bleach in killing germs that are even more resistant than ASF (Figure 1). But in striking contrast to bleach, the effectiveness of OxiScience SO persisted at high levels not just for days after treatment of surfaces but for weeks. Treated surfaces were still capable of killing antibiotic-resistant *Staphylococcus aureus* one month after the original application. Chlorine bleach-treated surfaces had no useful effect on these bacteria after 30 minutes, and almost none remained 15 minutes after the application.

Figure 1: OxiScience SO disinfection compared to Chlorine bleach on treated surfaces challenged with *Staph aureus* bacteria



Time of microbial challenge (Staph aureus) after surface treatment.(contact time 30 min)

OxiScience SO:

- Is used at 1/6th of the concentration recommended level for Cl-bleach
- Is much safer for personnel, the environment and animals
- Poses no threat of resistance development
- Is much less corrosive than chlorine bleach
- Contains an EPA-registered biocide in an entirely novel formulation
- Can be made up at high volume manufacturing scale from a proprietary concentrated mix in water
- Is cost-competitive in use with bleach

When these advantages are added to the value of persistent high-level efficacy over days to weeks after single applications, the need for Oxi SO to be put into widespread use in ASF and other contagious disease control measures is obvious.

OxiScience can make samples of SO available immediately for testing in China *versus* ASF virus isolates from the current outbreak in order to prove effectiveness and safety.