**Technical Bulletin**

# Enhanced inactivation of avian influenza virus at -20°C by disinfectants supplemented with calcium chloride or other antifreeze agents

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## ABSTRACT

**Avian influenza viruses (AIVs) continue to be a threat to the poultry industry. Since 2004, there have been at least 6 outbreaks of AIV infection in Canada, and several of these occurred in regions where winter temperatures as low as -20°C are common. Canada's eradication policy to control these outbreaks requires euthanizing all birds on infected premises, safely disposing of carcasses and wastes, and then cleaning and decontamination of buildings, vehicles and equipment.**

**Avian influenza viruses are enveloped and are readily inactivated by chemical disinfectants under warm conditions. It is understood, however, that as the temperature drops, chemical reactions slow and the contact time required for effective disinfection increases. At the same time, the disinfectant may freeze on contact with various materials, halting the disinfecting process altogether. As a result of these concerns, a comprehensive analysis was undertaken to evaluate virus inactivation by two commercial disinfectants, Accelerated Hydrogen Peroxide® (Accel®) and potassium monopersulfate (Virkon), with the addition of antifreeze agents.**


## STUDY

The purpose of this study was to evaluate the effectiveness of Accel (5% and 6.25%) and Virkon (2%) when supplemented with 30% propylene glycol, 20% methanol or 20% calcium chloride as antifreeze agents, at inactivating a representative AIV strain at -20°C. The 2nd-tier quantitative carrier test was used to evaluate the virucidal activity of the disinfectant solutions. Brushed stainless steel disks were prepared by applying virus to the surface of each disk, then air drying for 1 h in a biosafety cabinet, before placing the disks in vials housed into wells of custom-made metal blocks to maintain the test temperature (-20°C or 21°C) for specific periods of up to 30 min. At the end of each contact time, neutralizer solution was immediately added to each vial to stop the activity of the disinfectant. After treatment, the amount of virus remaining was quantified.

## RESULTS

This study showed that preparations of either Virkon or Accel®, supplemented with propylene glycol, methanol or calcium chloride as antifreeze agents, could be effectively applied at temperatures as low as -20°C for disinfecting premises after an AIV outbreak.

## CONCLUSION

**Antifreeze agents can be added to Accel® to ensure the disinfectant remains in liquid form at -20°C, without compromising the efficacy of AHP® against AIV. The advantages and disadvantages of each antifreeze agent were not evaluated; however, Virox Animal Health favours propylene glycol.**

## IMPLICATIONS FOR AHP®

**AHP® Disinfectants provide the perfect balance between safety and efficacy**

- AHP® has low levels of Hydrogen Peroxide at the in use dilution, lower even than some products used every day by consumers to whiten teeth, clean contact lenses or even disinfect a wound, and therefore is designed to be easier on employees and occupants resulting in protocol compliance
- AHP® provides a HMIS rating of "0", meaning it has been proven to be non-toxic, non-irritating to eyes and skin and non-skin sensitizing and does not require the use of personal protective equipment to handle

**AHP® Disinfectants are One-Step Disinfectant-Cleaners**

- AHP® has powerful surfactants, which means it cleans while it disinfects surfaces and equipment, resulting in lower cost and faster results

**AHP® Disinfectants have realistic contact times**

- Short contact times ensure surfaces remain wet for the required contact time, providing comfort and confidence that disinfection has occurred

**AHP® Disinfectants are compatible**

- AHP® formulations are tested to ensure compatibility that preserve your investments in equipment, furniture, and building surfaces

**AHP® Disinfectants are environmentally sustainable**

- AHP's® active ingredient, hydrogen peroxide, breaks down into water and oxygen leaving no active residues
- AHP® is formulated to ensure that it will not negatively impact indoor air quality

***REFERENCE***

*Guan, J., Chan, M., Brooks, B. & Rohonczy, E. Enhanced inactivation of avian influenza virus at -20°C by disinfectants supplemented with calcium chloride or other antifreeze agents. Can J Vet Res 2015; 79; 347-350*