Virkon® S

Disinfectant and Virucide*

LANXESS BIOSECURITY SOLUTIONS

Does Your Disinfectant Work In Winter?

Virkon® S is effective at cold temperature†, 5°C, against the following viruses:

- **Avian Adenovirus Type 2**
- **Avian Infectious Bronchitis**
- **Avian Influenza virus**
- **Marek's Disease Virus**
- **PEDv**
- **PRRS**
- **Porcine Rotavirus**

Fall and winter pose new challenges as well as opportunities to enhance biosecurity protocols on the farm.

Environmental temperature can play a large role in the efficacy of a disinfectant. The ability of a disinfectant to work well at low temperatures contributes to the value of its use on a daily basis. It is well documented that the efficacy of some disinfectant chemistries, such as aldehydes (glutaraldehyde) as well as quaternary ammonia compounds can decrease as temperatures decrease within the environment. This can result in the disinfectant solution becoming ineffective against the disease-causing organisms of concern[1].

In order to compensate for any loss of efficacy under cold conditions, the corrective action would be to increase the contact time of the solution on the surface or, in some circumstances, increase the concentration of the disinfectant itself in order to achieve similar results.

Increasing the contact time (more than 10 minutes) could help however; the extended contact time is only effective if the surface remains wet, which might not be possible in freezing temperatures. Increasing concentration may speed up the rate of kill but comes at a risk of increased toxicity and higher cost in use.

Conversely, Virkon® S maintains effective activity against disease causing organisms at 5°C/41°F, eliminating the need to increase contact time or concentration of the disinfectant solution. Virkon® S is an oxidative chemistry and therefore is not impacted by cold temperature. Numerous independent studies show Virkon® S is just as effective at cold temperature as it is at room temperature.

Virkon® S - Independently proven efficacy

Pathogen	Concentration	Contact Time	Temp.
Avian Adenovirus Type 2	1:200	10 min	5°C
Avian Infectious Bronchitis	1:200	10 min	5°C
Avian Infectious Bronchitis	1:200	1 min	5°C
Avian Influenza	1:200	10 min	5°C
Avian Influenza	1:200	1 min	5°C
Avian Infectious Laryngotracheitis	1:200	10 min	5°C
Marek's Disease Virus	1:200	10 min	5°C
PEDv	1:200	10 min	5°C
PEDv	1:200	1 min	5°C
PEDv	1:600	10 min	5°C
PRRS	1:600	10 min	5°C
Porcine Rotavirus	1:600	10 min	5°C

† - Not approved for this use in California
Please consult the Virkon® S product container label for a comprehensive list of organisms and directions for use.
Efficacy is specific to noted viruses based on dilution rate, contact time and/or temperature.

Chemical Reactions In Cold Temperature

In order to understand how low temperatures can negatively affect the efficacy of certain disinfectants, we must understand the chemical reaction, which takes place.

Aldehydes mechanism of disinfection is based on the inhibition through polymerization or gelation of the membrane of the microbe. The rate of this reaction is dependent on the ability of the protein coming into contact with the antimicrobial. This reaction rate decreases with decreasing temperature, which may ultimately affect the efficacy of the disinfectant[1].

Data from a glutaraldehyde manufacturer, shows the dramatic decrease in efficacy that temperature has on glutaraldehyde. A 4-log reduction is required for disinfection. Their data shows that in order to achieve a 4-log reduction of E.coli at **22°C (72°F)** a contact time of **60 minutes** is required.

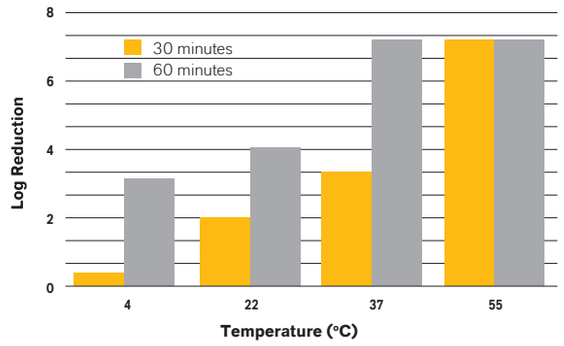
Quaternary ammonia compounds disinfect based on denaturation (disentanglement or unraveling) of the protein shell of the microbe. Denaturation of the protein is heavily based on mobility and is highly dependent on temperature. As temperature decreases, it affects the denaturation speed and therefore may decrease the efficacy of quat-based disinfectants.

Oxidative Chemistry

The mechanism of oxidizing disinfectants is based on radical-ion reactions. The oxidation of the cell is a continuous reaction, which creates new radicals and ions independent of temperature. The radical ions break up the protein found inside of the membrane of the microbe. Cold temperatures tend to not interfere with this reaction and therefore, the efficacy remains relatively stable[1].

Effect of Temperature on Efficacy

organism: E.coli pH: 7.5 concentration: 20ppm active



Effect at cold Temperature - Glutaraldehyde

During cold temperatures:

- 4°C, 39°F efficacy is 2.8 Log Reduction, 60 minutes.
- 22°C, 72°F efficacy for a 4 Log Reduction, 60 minutes.

During cold temperatures, this results in longer contact times or higher concentration (than originally stated on the label).

Therefore, oxidizing compounds can be used during warm or cold weather conditions without showing a large decrease in reaction rate or efficacy of the disinfectant. Virkon® S maintains effective activity against disease-causing organisms at 5°C/41°F and below, eliminating the need to increase contact time (10 minutes) or concentration of the disinfectant solution. Ten minutes is all it takes to prevent disease-causing organisms from affecting your live production, in cold and warm weather conditions.

References

1. Low Temperature Performance of Disinfectants. Axcentive. The Poultry Site. February 2016. http://www.thepoultrysite.com/articles/3610/low-temperature-performance-of-disinfectants/

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Energizing Chemistry

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Note: The information contained in this publication is current as of July, 2023. Please contact LANXESS Corporation to determine if this publication has been revised.