

## General Guidance for Cleaning and Disinfection of Rabbit Hemorrhagic Disease Virus (RHDV) Contaminated Premises

April 2020

(These instructions are general guidance and are not to supersede cleaning and disinfection requirements from the State Animal Health Official (SAHO))

### Environmental Persistence of Rabbit Hemorrhagic Disease Calicivirus

- Rabbit Hemorrhagic Disease (RHD) calicivirus is spread by oral, nasal and parenteral transmission
- The virus is present in urine and feces from infected rabbits, thus contaminated bedding can be a source of infection
- Contaminated foods can be a source of infection
- The virus survives at pH 3.0, is stable at pH 4.5-10.5, but is inactivated at pH>12
- The virus can survive for long periods outside the host. For example:
  - Viable virus has been detected for as long as 105 days in its dried state on a fomite (cloth) at room temperature.
- Environmental temperature and protection by organic material are important factors in the survival of the virus
  - Virus may persist in chilled or frozen rabbit meat and the lengthy persistence of infective virus in carcasses may provide a reservoir of disease after outbreaks in the wild, as viable virus has been found in decaying tissue after 90 days outdoors
  - At 50C (122F) the virus survives for 1 hour



Photo by Canva.com

- It can remain viable for 22-35 days at 22C (72F) but only for 3-7 days at 37C (99F). It also survives freeze-thaw cycles.

### Disinfectants

- The RHD calicivirus is inactivated by sodium hypochlorite (dilution of ½ cup of 6% or 8.25% household bleach concentrate in 1 gallon of water to create a approximately 2300 ppm solution of sodium hypochlorite) and 1% potassium peroxymonosulfate (e.g. Virkon S).

### Practical Cleaning and Disinfection Recommendations

#### Preparation: Disinfectants Household Bleach

- A diluted solution of sodium hypochlorite, household bleach, is the most accessible disinfectant available to rabbit owners. To prepare the correct dilution add ½ cup of 6% or 8.25% sodium hypochlorite bleach concentrate to one gallon of potable water. Contact time needed is 5 minutes. Wear nitrile, silicon or rubber gloves and eye protection and work in a well ventilated area when mixing and handling the bleach or bleach solution. Wear protective clothing to avoid contact with the skin.

- Bleach concentrates lose potency over time. Be sure to store bleach concentrates in a cool, dark, place and use recently purchased bleach concentrates to mix solution to be used for disinfecting purposes. New dilute bleach solutions should be mixed every 24 hours to maintain effectiveness.
- Follow the link for information on what to do if you have accidental exposure <https://www.thecloroxcompany.com/wp-content/uploads/2020/04/Clorox%C2%AE-Germicidal-Bleach3.pdf>.

### Virkon S

- Virkon S is a disinfectant often used by Animal Health Officials. A 1% solution is effective for disinfection for RHDV-2. To achieve a 1% use dilution, add Virkon S (depending on formulation type, either 1 sachet, 8 tablets, or 1.3 ounces of powder (or 1 Virkon S scoop)) to 1 gallon of water. Stir thoroughly until fully dissolved, then use per label. Contact time needed is 10 minutes.
- Wear protective gloves and eye/face protection. Use only in a well-ventilated area. Avoid breathing dust. Wash hands thoroughly after handling. Wear protective clothing to avoid contact with skin. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials and food and drink. Dispose of contents and container in accordance with all local, regional, national and international regulations
- Follow the link for information on what to do if you have accidental exposure <http://virkon.us/wp-content/uploads/sites/15/2017/11/Virkon-TM-S-USA.pdf>

### Pre-Cleaning (Dry Cleaning)

Because of the hardy nature of the virus, removal of all organic material (bedding, feces, fur, material on hutches or cages etc) via scraping, brushing, sweeping or digging before cleaning and disinfection is critical for cleaning and disinfection to be effective.

- Remove all visible debris from items to be disinfected (cages, hutches, feeding equipment, waterers, etc.).
- Remove all bedding from cages, hutches, or ground and safely discard by deep burial or double bagging in plastic bags, disinfecting the outer bag by spraying with disinfectant solution, and disposing of in a licensed landfill or as otherwise directed by your SAHO. Items made of wood are best burned, safely discarded either by deep burial, or by double bagging in plastic bags, disinfecting the outer bag by spraying with disinfectant solution, and disposing of in a licensed landfill or as otherwise directed by your SAHO.
- For wood that cannot be discarded, remove organic material and then clean and disinfect as instructed below.
- Rabbit feces should be removed and safely discarded by deep burial or double bagging in plastic bags, disinfecting the outer bag by spraying with the disinfectant solution and disposing of in a licensed landfill or as otherwise directed by your SAHO.
- Soil beneath rabbit hutches that has been contaminated with rabbit urine, feces, or bedding should be removed to a depth beyond visible contamination and buried.
- Any feed that has the possibility of being contaminated should be safely discarded by deep burial or double bagging in plastic bags, disinfecting the outer bag by spraying with disinfectant solution, and disposing of in a licensed landfill or as otherwise directed by your SAHO.

### Cleaning and Disinfection (C&D):

- Once organic material has been removed by dry cleaning, wash items or structures thoroughly with soap and potable water; rinse well with potable water and let dry.
- Then, submerge or saturate items or structures with spray with the proper dilution of one of the two disinfectants provided above. Allow the appropriate contact time for the disinfectant used (5 minutes for diluted bleach and 10 minutes for 1% Virkon S). Contact time means leaving the item saturated with disinfectant for the specified time. If the item dries before the specified time the disinfectant solution should be reapplied. After the contact time has been achieved, rinse with potable water and let dry before further contact.

### Further Virus Elimination

- After cleaning, disinfection and drying of all hutches, water, feed containers, other rabbit equipment or materials is completed, a fallow period during which no rabbits are introduced is recommended. The fallow period timeframe will be specified by the SAHO. In situations where C&D is complicated by the conditions (such as large amounts of organic material, wooden structures, a large number of infected animals, etc), a 90 day fallow period is recommended.

### References

1. Rabbit Hemorrhagic Disease. June 2016. The Center for Food Security & Public Health, Iowa State University. Available at: [http://www.cfsph.iastate.edu/Factsheets/pdfs/rabbit\\_hemorrhagic\\_disease.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/rabbit_hemorrhagic_disease.pdf)
2. Rabbit Hemorrhagic Disease Standard Operating Procedures: 1. Overview of Etiology and Ecology. October 2013. Foreign Animal Disease Preparedness & Response Plan (FAD PReP). USDA-APHIS-VS. Available at: [https://www.aphis.usda.gov/animal\\_health/emergency\\_management/downloads/sop/sop\\_rhd\\_e-e.pdf](https://www.aphis.usda.gov/animal_health/emergency_management/downloads/sop/sop_rhd_e-e.pdf)
3. Viral Haemorrhagic Disease. In: Textbook of Rabbit Medicine. Frances Harcourt-Brown, ed. Butterworth-Heinemann, Oxford, UK. 2002; pp 380-382.
4. Virucidal efficacy of four new disinfectants. 2002. J Am Anim Hosp Assoc 38(3): 231-4.
5. Evaluation of the Antiviral Activity of Chlorine Dioxide and Sodium Hypochlorite against Feline Calicivirus, Human Influenza Virus, Measles Virus, Canine Distemper Virus, Human Herpesvirus, Human Adenovirus, Canine Adenovirus and Canine Parvovirus. 2010. Biocontrol Sci 15: 45-49. Available at: [https://www.jstage.jst.go.jp/article/bio/15/2/15\\_2\\_45/\\_pdf/-char/en](https://www.jstage.jst.go.jp/article/bio/15/2/15_2_45/_pdf/-char/en)
6. Clorox Bleach Master Labels - Clorox Bleach 6% 5813-114 [https://www3.epa.gov/pesticides/chem\\_search/ppls/005813-00114-20181030.pdf](https://www3.epa.gov/pesticides/chem_search/ppls/005813-00114-20181030.pdf) Clorox 8.25% sodium hypochlorite, EPA reg. no. 5813-100 [https://www3.epa.gov/pesticides/chem\\_search/ppls/005813-00100-20171208.pdf](https://www3.epa.gov/pesticides/chem_search/ppls/005813-00100-20171208.pdf)
7. Virkon S Master Label - Virkon S EPA reg. no. 39967-137 [https://www3.epa.gov/pesticides/chem\\_search/ppls/039967-00137-20191011.pdf](https://www3.epa.gov/pesticides/chem_search/ppls/039967-00137-20191011.pdf)

***The USDA is an equal opportunity employer, provider, and lender.***