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Management of manure and manure products

Minimising the risk of disease
spread

March 2023

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Foot and mouth disease virus in manure and manure products¹

The foot and mouth disease virus (FMDV) is excreted from infected animals in faeces and urine. Excreted virus can remain infectious in the faeces from anywhere between a few hours to 14 weeks depending on the ambient temperature, relative humidity and moisture content, temperature of the manure and species infected (1).

Foot and mouth disease (FMD) can be spread by the movement of manure and manure products that contain virus.

Survivability

Most of the research on FMDV survival in manure and its products has been conducted in temperate climates² - there is limited research on the survivability of FMDV in tropical climates.

Manure slurry is the mixture produced when manure, urine and water are combined following the cleaning of pens with limited bedding (e.g concrete pens). The proportions of solids in a slurry will vary between 5-15% (2). When the ambient temperature is around 20°C FMDV can remain infectious for up to three weeks in cattle manure slurry. At 35°C the virus will remain infectious for at least 24 hours (1).

There is limited research on the survivability of FMDV in composted manure. If the pH remains stable (6.5-8.5pH range), FMDV can remain infectious on food/vegetation for up to 75 days at 37°C and a relative humidity of 66-70% (3). So, it can be assumed that if manure piles remain moist and within the ideal pH and temperature range, the virus could remain infectious for up to 75 days.

Risk management for manure and products

The risk of spreading FMDV in manure and manure products is negligible when there are no active FMD cases.

When there are active cases of FMD, the risk of FMDV spreading in manure and manure products (either within the facility or to other facilities) can be managed by:

- Storing manure and manure products away from livestock.
- Processing³ manure and manure products to reduce the survivability of the virus (see Managing manure and products).
- Holding processed manure and manure products for a minimum of 75 days before it's distributed.

¹ Manure products refer to manure compost, manure effluent and manure slurry.

² Temperate climates are those with moderate average annual temperatures, usually with four distinct seasons where temperature varies between those seasons. Europe and northern America are classified as temperate climates.

³ Processing refers to activities conducted to turn manure and manure products it into a product that can be used either as fertiliser or fuel.

- Discontinuing the sale of raw manure and manure products until there are no active cases of FMD.

Managing manure and products

Management of manure refers to the capture, treatment and storage of manure. Wet or fresh manure that is sold within days of collection creates a risk of transmitting FMDV to new areas as the higher moisture content helps the virus to survive. If there is an active FMD outbreak on the feedlot or FMD affected animals have been processed at an abattoir manure should not be sold as fresh manure.

Particular processing methods can manage the risk of the FMDV remaining infectious in manure products, such as wet or dry manure being placed in impermeable bags which allow it to be safely stored for a period and composting.

Composting manure can reduce the risk of the FMD virus surviving providing the compost reaches the required temperature for the required length of time. The composting pile should reach a temperature 60°C. The length of time for composting to reduce survivability of FMD virus will depend on the composting system used, such as static aerated piles, windrows and vessels (4).

While studies regarding the survivability of the FMDV in compost are absent, the United States Environmental Protection Agency has issued recommendations for reducing the risk of pathogens in compost. Systems that involve turning the compost for aeration, such as windrows, require 15 days at a minimum temperature of 55°C, with a minimum of 5 turnings. Static piles and in-vessel systems require a minimum temperature of 55°C for 3 days (5).

Using manure as fuel for a biogas digester is another way to use manure products that avoids dissemination of fresh manure into situations where livestock may access it.

If water is to be recycled from effluent, it will need to be disinfected to ensure the FMDV is no longer infectious. There is more information on water treatment on the [MLA-IBS 22 website](#). The solids produced from effluent should be processed similar to compost, or heat treated to a minimum core temperature of 70 °C for a minimum of 30 minutes to ensure the FMDV becomes non-infectious.