

## FMDv SURVIVAL IN FRESH PORK MEAT INFORMATION SHEET

This information sheet contains material from the "Risk Assessment of Ready-to-Eat Pork Products from Premises Previous to the Establishment of a Control Area as a Source of Infection of Susceptible Livestock During a Foot-and-Mouth Disease Outbreak in the United States." More detailed information and references for the items listed on this information sheet may be obtained from this risk assessment found at the University of Minnesota Digital Conservancy persistent URL: <http://hdl.handle.net/11299/200854>.

**Question:** What is the overall risk of FMDv survival in fresh pork meat?

**Assumptions:**

- 1) Pigs entering the harvesting process will be viremic (shedding the virus) but pre-clinical (not showing signs of disease);
- 2) Infected pigs will pass the ante-mortem inspection; and
- 3) The data used for this evaluation came from research studies representing the 'worst-case scenario' (pigs inoculated with high virus titers and slaughtered with visible clinical signs) which may not represent a real situation.

**Findings:** Pre-clinical pigs are likely to have high titers of FMDv. The concentration of FMDv observed in fresh tissues of muscle, fat, blood, lymph nodes, and bone marrow in the literature varied among 8.8 to 10<sup>9.6</sup> TCID<sub>50</sub>/g<sup>1</sup>. Pig blood, bone marrow and lymph nodes had the highest concentration. Muscle and fat tissues had much lower concentrations ranging between non-detectable to 10-100 TCID<sub>50</sub>/g<sup>1</sup>.

<sup>1</sup>: Amount of virus required to infect 50% of cells per gram of tissue inoculated.

**FMDv survival and transmission:**

- 1) Contaminated carcasses can spread FMDv to other carcasses by blood splash;
- 2) Fresh pork meat is comprised principally of skeletal muscle, bone, and fat (lymph nodes and bone marrow tissues are not typically present due to trimming and deboning practices);
- 3) Ground pork products may represent a higher risk as lymph node, bone marrow, and clotted blood may be mixed with the muscle tissue during the grinding process. Given the higher viral titers of these tissues, it is moderately to highly likely that FMDv would be present in the tissues after the slaughter process.

**FMDv inactivation in meat:** The chilling process is considered a critical step for FMDv inactivation in meat carcass due to the pH drop (final pH value of 5.7 after 24-72 hours of storage at 2-5 °C). However, FMDv was able to survive for 24-72 hours in pork muscle and up to 10 days in other tissues (fat, bone marrow, lymph node, lungs, stomach, intestine, or tongue) when the carcass was held at refrigeration temperatures (4-7°C). Furthermore, in certain instances, e.g. when animals are stressed pre-slaughter or in meat that is frozen soon after death, the pH of tissues may not fall below 6.2.

**OIE recommendations for exporting meat:** The OIE Terrestrial Animal Health Code (2008) provides the sanitary measures for the safe importation of pork and pork products from FMD infected countries and zones (OIE, 2008). The sanitary measures are intended to inactivate FMD virus in meat products for international trade purposes and include heat treatment, canning, drying and salting. These measures imply that fresh pork meat cannot be traded.

**Overall risk estimations of FMDv survival in fresh pork meat:**

Possible Infection Pathway	Likelihood	Analysis Method
Likelihood that FMDv would remain in the carcass after completion of slaughter process	High	Literature evaluation
Likelihood that FMDv would remain in the carcass after refrigeration processes lasting less than 72 hours	High	Literature evaluation
Likelihood that FMDv would remain in other tissues (ie. bone, fat, lymph nodes and so on) of the carcass after chilling for at least 72 hours at 2-7 °C	Moderate to High	Literature evaluation
Likelihood that FMDv would remain in deboned pork <sup>^</sup> (e.g. meat free of lymph nodes and excessive connective tissue and generally just comprised of muscle and fat) after chilling for at least 72 hours at 2-7 °C	Moderate*	Literature evaluation
Likelihood that FMDv would remain in the boneless pork tenderloin <sup>^</sup> (e.g. pork with all skin, bones, cartilage, the tenderloin, and lean and fat overlying the psoas major, psoas minor and iliacus muscles removed) after chilling for at least 72 hours at 2-7 °C	Negligible	Literature evaluation

<sup>^</sup>Definitions of pork and pork loin from [www.fsis.usda.gov](http://www.fsis.usda.gov)

\*Regarding virus survival in fat tissue, there are discrepancies in FMDv survival times with some studies reporting FMDv survival after the chilling process for as little as 72 hours to as long as 10 days (Savi et al, 1962; McKercher et al., 1978; Panina et al., 1989).

