Abortion and mortality in farm mink (Neovison vison) associated with feed-born Clostridium limosum

Disease in mink clinically characterized by abortion and increased mortality among pregnant female mink on 28 Danish farms was observed during April and May 2015. Most of these farms suffered extensive disease problems, including a significant increase in the number of mated females without litters. Pathological, microbiological and molecular biological methods were applied to investigate the cause of disease. Necropsies of animals found dead revealed fragile and partially dissolved (liquefying) uterine tissue, with the presence of Gram positive rod-shaped bacteria. These slow growing bacteria were isolated by anaerobic culturing and identified as Clostridium limosum by both MALDI-TOF mass spectrometry analysis and 16S rRNA gene sequencing. All the performed tests for relevant differential diagnoses were negative. Foodborne disease was indicated because all the affected farms were served by the same feed factory. A specific PCR-based analysis was developed for positive identification of C. limosum and used to screen archived feed samples from the implicated feed factory. Both C. limosum 16S rRNA genes and C. limosum collagenase genes were identified in both mixed feed and more specifically in raw chicken carcass used as one of the components in the mixed feed, which was therefore identified as the most likely source of contamination. Based on the results of this investigation it is concluded that C. limosum can be associated with abortion and increased mortality in pregnant mink females and it is consequently recommended that raw materials contaminated with C. limosum should be avoided in mink feed, in particular during the whelping season.