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Dato for henvendelse	Dato for svarfrist	Dato for afsendelse	Versionsnummer
25-06-2020	29-06-2020		

Journalnummer/sagsnummer	FVST	KU	SSI
	2020-14-81-01808	061-0118/20-3680	20/06711

Besvarelse vedr.

- Risikovurdering af mulighed for smitte med SARS-CoV-2 via animalske biprodukter (ABP) eller foder, herunder smitte af mink via foder indeholdende rå animalske biprodukter (ABP)

Bestilling

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Fødevarestyrelsen ønsker en risikovurdering af, mulighed for smitte med SARS-CoV-2 via animalske biprodukter (ABP) eller foder, herunder smitte af mink via foder indeholdende rå animalske biprodukter (ABP).

Herunder svar på følgende spørgsmål:

- Er der risiko for, at animalske biprodukter (ABP) fra slagterier kan overføre SARS-CoV-2?
- Hvis ABP fra slagterier udgør en risiko, hvad vil så være grunden til dette? Er det f.eks. fordi ABP er blevet kontamineret af smittede slagterimedarbejdere eller fordi der har været SARS-CoV-2 i de slagtede dyr eller andet?
- Et stort slagteri i Tyskland, Tönnies, har mange tusinde smittede medarbejdere. Hvis dette slagteri har leveret ABP, som er blevet anvendt rå i minkfoder i Danmark, kan der så være risiko for at SARS-CoV-2 er blevet overført til mink via dette ABP?
- Hvis der anvendes store mængder blod fra tyske slagterier i foderet fra danske minkfodersamlecentraler, vil der så være risiko for at dette blod kan overføre SARS-CoV-2?
- Er der risiko for at andre typer ABP eller foder kan overføre SARS-CoV-2?
- Hvis der er risiko for at andre typer ABP eller foder kan overføre SARS-CoV-2, vil der så være risiko for at mink kan være blevet smittet via foder, herunder rå ABP i minkfoderet?
- For fødevarer er det blevet vurderet, at det ikke er sandsynligt, at de udgør en risiko for spredning af SARS-CoV-2. Forbrugerne varmebehandler almindeligvis kød, så derfor ønskes der en vurdering af, om anvendelsen af rå ABP i minkfoder kan udgøre en risiko for smitte af

mennesker eller dyr med SARS-CoV-2?

- Hvis det vurderes at der er risiko for at mink kan smittes via foder, herunder foder indeholdende rå ABP, vil det samme så gøre sig gældende ved fodring af andre dyr, herunder fodring med rå animalske biprodukter, f.eks. fodring af hunde med rå foder til selskabsdyr?
- Vil aflivede mink fra besætninger, der er testet positive for SARS-CoV-2 kunne udgøre en smitterisiko for de personer, der efterfølgende håndterer de aflivede mink?
- Hvor længe antages SARS-CoV-2 at kunne overleve i aflivede mink? F.eks. på forarbejdningsanlægget (Daka), hvor dyrene bl.a. hakkes og føres via rør inden de varmebehandles. Vil der ved reparation af disse dele af anlægget være risiko for at f.eks. en smed kan smittes med SARS-CoV-2? Er der viden fra Nederlandene om dette?

Fødevarestyrelsen ønsker at få belyst risikoen for, om rå ABP og foder kan overføre smitte med SARS-CoV-2.

Foder

De to besætninger, der er testet positive for SARS-CoV-2, har begge fået leveret foder fra samme minkfodersamlecentral.

Fødevarestyrelsen er i gang med at undersøge oprindelsen af de animalske biprodukter i minkfoderet, der er blevet leveret de seneste tre måneder fra den pågældende samlecentral, herunder om samlecentralen har modtaget ABP, der stammer fra tyske slagterier.

Fødevarestyrelsen, Dyresundhed er fra flere steder blevet spurgt, om der er mulighed for, at smitten med SARS-CoV-2 til mink kan være sket via rå animalske biprodukter (ABP) i minkfoder.

Fødevarestyrelsen, Dyresundhed har fået oplyst at et stort slagteri i Tyskland, Tönnies, har mange tusinde smittede medarbejdere. I relation til dette er Dyresundhed blevet spurgt om der kan være risiko for at SARS-CoV-2 er blevet overført til mink via ABP, hvis dette slagteri har leveret ABP, som er blevet anvendt rå i minkfoder i Danmark.

Endvidere har Fødevareministeren modtaget en henvendelse, hvor det oplyses, at der leveres store mængder blod (30.000 liter pr. sending) fra slagterier i Tyskland til en unavngiven minkfodersamlecentral i Nordjylland. I relation til dette bliver der spurgt, om der er risiko for, at minkene kan være smittet med SARS-CoV-2 via dette blod.

Lovgivning på området

Det kan oplyses, at det efter forordningerne om animalske biprodukter er tilladt at samhandle ABP. Der kommer sandsynligvis ABP til Danmark fra tyske slagterier, og det kan ikke udelukkes, at ABP fra det pågældende slagteri har fundet vej til minkfoder, der er anvendt i Danmark.

Det er ikke information som Fødevarestyrelsen ligger inde med eller har direkte adgang til.

Aflivede mink

Fødevarestyrelsen har modtaget en henvendelse fra forarbejdningsanlægget Daka, der bl.a. forarbejder de aflivede mink, fra besætningen, der er testet positiv for SARS-CoV-2.

Daka ønsker information, om hvor længe SARS-CoV-2 kan overleve i knust, men ikke varmebehandlet væske/kød masse, i den del af anlægget der ligger forud for varmebehandlingen. Dette er relevant for Daka i forbindelse med udførelse af vedligehold i råvaredelen af fabrikken, og om der er risiko for de personer, der udfører vedligehold.

Daka spørger også, om der er viden om, hvad man gør i Nederlandene, hvor der er allerede er slået mange flere mink ned?

› Fødevarestyrelsen har undersøgt om vi kunne finde svar på spørgsmålene andre steder. Det vi er nået frem til er at der ikke er specifikke oplysninger vedr. animalske biprodukter og foder. Der ikke er noget, der tyder på at corona overføres med fødevarer. I forhold til smitte med SARS-CoV-2 bør ABP fra de tyske slagterier, udgøre samme risiko som fødevarer/kød fra samme slagterier.

Jeg har indsat link til FAQ fra Kommissionen hvor spørgsmål 2.5 omhandler risiko ved foder til selskabsdyr:

https://ec.europa.eu/food/sites/food/files/animals/docs/ah_covid-19_gandas.pdf

Jeg har desuden indsat link til EFSA melding om fødevare:

<https://www.efsa.europa.eu/en/news/coronavirus-no-evidence-food-source-or-transmission-route>

Her er samme punkter fra WHO:

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/questions-relating-to-consumers>

Og fra FAO:

<http://www.fao.org/2019-ncov/q-and-a/food-safety/en/>

Jeg kan oplyse, at vi på baggrund af ovenstående ikke mistænker foder for at være den mest sandsynlige smittevej, men vi vil gerne have belyst spørgsmålet.

Svar

› The Danish Veterinary and Food Administration wants a risk assessment of the possibility of infection with SARS-CoV-2 via animal by-products (ABP) or feed, including infection of mink via feed containing raw animal by-products (ABP). The following questions were asked:

- Is there a risk that animal by-products (ABP) from slaughterhouses can transmit SARS-CoV-2?

Coronaviruses are generally host-species specific, thus, for example pig coronaviruses such as porcine epidemic diarrhea virus (PEDV), are only known to infect pigs. When coronaviruses acquire the ability to infect alternative hosts then there can be major consequences, as with the SARS coronavirus and SARS-CoV-2. When a change in host occurs, it may be that other new hosts become susceptible to the new virus but the initial studies with SARS-CoV-2 have shown only a limited range of susceptibilities in the animals tested. In some cases, like rats and mice, the host receptor (ACE-2) does not interact well with the virus. In the case of the pig, although the pig receptor appears to be functional for binding the virus other steps in the virus life-cycle are apparently incompatible. Direct inoculation of SARS-CoV-2 into a variety of animals, including pigs and chickens failed to show any evidence for virus replication.

Animal by-products (ABP) may be derived from a variety of animal species including pigs, cattle, sheep, poultry and fish. None of these species are known to be hosts for infection by SARS-CoV-2 thus it is not expected that the products from these animals should intrinsically contain the virus. However, it has become apparent that many staff in certain meat processing plants, around the world, have become infected with SARS-CoV-2, presumably from human-to-human transmission. Thus, there is the possibility that ABP could become contaminated by SARS-CoV-2-infected personnel preparing this material. However, the dose of virus that any one recipient of such contaminated ABP will ingest is very low. The level of virus required to initiate an infection by this route compared to infection via an aerosol is not known. Thus, the uncertainty around the risk of this source of infection is high.

- If ABP from slaughterhouses pose a risk, what will be the reason for this? Is it e.g. because ABP has been contaminated by infected slaughterhouse workers or because there has been SARS-CoV-2 in the slaughtered animals or other?

As indicated above, ABP could be contaminated by slaughterhouse workers who have COVID-19. The products from the slaughtered animals are not expected to be a source of the virus as there is no evidence that the meat production animals can be infected with SARS-CoV-2.

- A large slaughterhouse in Germany, Tönnies, has many thousands of infected employees. If this slaughterhouse has supplied ABP, which has been used raw in mink feed in Denmark, can there be a risk that SARS-CoV-2 has been transferred to mink via this ABP?

As indicated above, potentially ABP that are in close contact (<2m) with slaughterhouse workers that have COVID-19 could become contaminated with infectious SARS-CoV-2. If this material is used raw in mink feed then transmission to mink cannot be excluded. However, the risk of mink becoming infected via this route is assessed to be very low compared to the risk of being infected through close contact with infected humans/animals.

The survival of the virus in the ABP will depend on the temperature and duration of its storage and the nature of washing procedures (if any).

- If large amounts of blood from German slaughterhouses are used in the feed from Danish mink feed centers, will there be a risk that this blood can transmit SARS-CoV-2?

As above, blood from cattle, pigs, sheep and poultry would not be expected to contain SARS-CoV-2. However, contamination of the blood from slaughterhouse staff with COVID-19 may be a possibility but the “dose” of virus received from such material (since the virus will not replicate in it) by any one animal is likely to be very low.

- Is there a risk that other types of ABP or feed may transmit SARS-CoV-2?

Any feedstuff that is in close contact with workers infected with SARS-CoV-2 may potentially be contaminated by the virus and then transmission to recipients of the feed becomes a possibility. The extent of contamination, plus the duration and conditions of storage (temperature, humidity etc) will determine the residual level of infectivity in the feed. The level of virus required for infection through the ingestion of foodstuffs is not known. Fish and fish by-products are also not considered a risk as there is no evidence that SARS-CoV-2 can infect fish and it is considered very unlikely due to the restricted host range of the virus (see above).

- If there is a risk that other types of ABP or feed can transmit SARS-CoV-2, will there be a risk that mink may have been infected via feed, including raw ABP in the mink feed?

To date, it seems that the mink farms that have become infected with SARS-CoV-2 have also had personnel infected with the virus so the route of virus introduction to the mink farms is most likely to have been from contact with people with COVID-19 rather than from virus-contaminated feed. However, the timeline for virus transmission between people and mink (or potentially from mink to people) is not established because of asymptomatic infections in both humans and mink. However, if ABP or other feed includes products exposed to people with COVID-19 then there can be a low risk of virus transmission from this route but, as indicated above, the virus “dose” received by any one animal from such contamination is likely to be very low.

- For foods, it has been assessed that they are not likely to pose a risk of spread of SARS-CoV-2. Consumers generally heat treat meat, so therefore an assessment of whether the use of raw ABP in mink feed may pose a risk of infection to humans or animals with SARS-CoV-2 is wanted

The presence of SARS-CoV-2 in human food is only likely to have occurred from contamination from infected personnel. The SARS-CoV-2 can be readily inactivated by heating (e.g. to 70°C) and thus can be expected to be inactivated by standard cooking procedures. The use of raw meat products from cattle, pigs, sheep, poultry and fish does not seem to represent a significant risk, except from potential contamination that will often be mitigated by washing of the products. Following the known infection of mink by SARS-CoV-2, it is important to note that skinned mink bodies are not used for animal food production but the processed meat and bone meal are used as fertilizer after heat treatment (130°C, for 20 mins at 3 bar) while the fat is used for bio-diesel production. This heat treatment should inactivate any SARS-CoV-2 virus from infected mink and thus the products should not be a risk.

If it is considered that there is a risk that mink can be infected via feed, including feed containing raw ABP, will then the same apply to the feeding of other animals, including feeding of raw animal by-products, e.g. feeding dogs with raw pet food?

It has been shown that cats and dogs can be infected with SARS-CoV-2. This has been observed on multiple occasions where the owners have been infected with the virus first. Potentially raw ABP, contaminated with SARS-CoV-2 from infected personnel could constitute a source of infection for cats and dogs but the level of virus ingested by a single animal from such contamination is likely to be very low. Heat-treated ABP should be free from infectious SARS-CoV-2. Both cats and dogs have been found to have become infected with SARS-CoV-2 on farms with infected mink in both the Netherlands and in Denmark. The routes of their infection are not established but have probably occurred via aerosols produced by the infected staff and/or mink.

- Will killed mink from herds tested positive for SARS-CoV-2 pose a risk of infection to those who subsequently handle the killed mink?

SARS-CoV-2-infected mink probably pose the greatest risk of infecting those in close contact while they are alive and releasing virus in aerosols, e.g. in their breath. Once killed, the production of aerosols will be greatly reduced, but during handling of the killed mink this may occur and thus infectious virus could be introduced into the air during this process.

- How long is SARS-CoV-2 believed to survive in killed mink? For example. at the processing plant (Daka), where the animals, among others are chopped and piped before being heat treated. When repairing these

parts of the plant, will there be a risk that e.g. a worker can be infected with SARS-CoV-2? Is there any knowledge from the Netherlands about this?

We are unaware of any studies on the survival of SARS-CoV-2 in killed mink. There have been studies on the survival of various coronaviruses on a variety of surfaces. Warnes et al. (2015) showed that SARS coronavirus, MERS coronavirus and human coronavirus 229E remained infectious on plastic, ceramic tiles, glass and stainless steel for at least 5 days. However, the human coronavirus was rapidly inactivated (within a few minutes) on copper alloy surfaces.

The survival of transmissible gastroenteritis virus (TGEV), a pig coronavirus, has been studied in farm slurry, the virus survived for more than 8 weeks at 5°C, but was inactivated within 2 weeks at 20°C and after 30 min at 55°C (see attached appendix from Bøtner, 1990). As with other viruses (Bøtner & Belsham, 2012), the survival of the virus is clearly dependent on the temperature

The SARS coronavirus can be readily inactivated at low pH (<3) and high pH (>13) ((Darnell et al., 2004) and by detergents.

We are not aware of studies from the Netherlands on virus survival within meat processing plants.

References:

Bøtner, A., Belsham, G.J., 2012. Virus survival in slurry: Analysis of the stability of foot-and-mouth disease, classical swine fever, bovine viral diarrhoea and swine influenza viruses. *Vet. Microbiol.* 157, 41–49.

Darnell ME, Subbarao K, Feinstone SM, Taylor DR. Inactivation of the coronavirus that induces severe acute respiratory syndrome, SARS-CoV. *J Virol Methods.* 2004;121(1):85-91. doi:10.1016/j.jviromet.2004.06.006

Warnes SL, Little ZR, Keevil CW. Human Coronavirus 229E Remains Infectious on Common Touch Surface Materials. *mBio.* 2015 Nov 10;6(6):e01697-15. doi: 10.1128/mBio.01697-15.

Appendix: Bøtner, A., 1990. Modelstudier vedrørende overlevelse af virus i gylle under traditionel opbevaring og under udrådning i biogasanlæg, Delprojekt, VET-BIO-1 (see below)

Tabel 2. Oversigt over de ved infektivitets titreringerne fundne inaktiveringstider for de undersøgte virus ved forskellige opbevarings-/udrådningstemperaturer.

	SI-virus	PPV	BVD-virus	IBR virus	Auj.-virus	MKS-virus	SP-virus	TGE-virus	
Initial konc. af virus i gyllen TCID ₅₀ /50µl	10 ^{5,8}	10 ^{6,0}	10 ^{5,2}	10 ^{5,1}	10 ^{5,2}	10 ^{4,8}	10 ^{4,2}	10 ^{5,2}	
- gylle	svine	svine	kvæg	kvæg	svine	svine	kvæg	svine	
Forsøgstemperatur									
5°C	9 uger	* >40 uger	3 uger	* >4 uger	15 uger	* >14 uger	I.u.	* >6 uger	* >8 uger
20°C	2 uger	* >40 uger	3 dage	2 dage	2 uger	2 uger	5 uger	2 uger	2 uger
35°C	* >24 timer	21 uger	3 timer	24 timer	5 timer	24 timer	* >24 timer	4 timer	24 timer
40°C	* >24 timer	9 uger	50 min.	3 timer	2 timer	10 timer	I.u.	* >3 timer	* >5 timer
45°C	I.u.	* >19 dage	20 min.	# 1½ time	45 min.	5 timer	I.u.	* >3 timer	2½ time
50°C	* >2½ time	5 dage	5 min.	40 min.	20 min.	1 time	I.u.	momentant	1 time
55°C	1 time	3 dage	5 min.	10 min.	10 min.	1 time	* >60 min.	momentant	30 min.

* Tidspunktet for fuldstændig inaktivering (koncentration under detektionsgrænsen) ikke nået.

I.u. Ikke udført

Infektivt virus påvist ved podningsforsøg på kalve. Efter 2½ times udrådning ved 45°C kunne infektivt virus ikke påvises ved podning på kalve.