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African Swine Fever (ASF) – Assessing the risks of fresh meat and meat products from pigs kept in ASF restricted zones

Shared opinion from the BfR and the FLI

African Swine Fever (ASF) is a disease caused by a virus that affects domestic pigs and wild boars. Infections often lead to acute and severe illness in animals with a high mortality rate. Over the past few years, ASF has spread throughout Europe and other parts of the world.

The German Federal Institute for Risk Assessment (BfR) and the Friedrich-Loeffler-Institut (FLI) assessed the risks posed by fresh meat and meat products stemming from pigs kept in ASF restricted zones and intended for human consumption. The risk of ASF virus carryover was also assessed.

The ASF virus is not transmissible to humans. Therefore, contact with pigs stemming from ASF restricted zones as well as consumption of meat or meat products derived from these animals are not expected to cause adverse health effects. This is also true in cases where the ASF virus is contained within the products.

If all processes follow legal requirements (slaughter of healthy animals from monitored keeping conditions, no feeding of leftover food to pigs), the risk of ASF virus carryover via fresh meat or meat products from restricted zones is negligible to very low.

1 Subject of the assessment

The German Federal Institute for Risk Assessment (BfR) and the Friedrich-Loeffler-Institut (FLI) have formed an opinion regarding the risks posed by fresh meat and meat products stemming from pigs kept in restricted zones due to African Swine Fever (ASF) and intended for human consumption.

The background to the present opinion is the duty of the relevant government authorities to take certain courses of action upon the arrival of ASF in a given region or facility. One of the required measures is the designation of infected zones and restricted zones (Commission Delegated Regulation (EU) 2020/687, optionally in conjunction with Commission Implementing Regulation (EU) 2023/594). In the event of an ASF outbreak in wild boars, too, there are prescribed measures for facilities in the designated restricted zones: movement of kept pigs out of the designated zones is prohibited, though the competent authority can approve exemptions as long as certain conditions placed upon the facility as well as upon the kept pigs are met. Depending on the specifics of the case, the subsequently produced fresh meat may be subject to animal health-related marketing limitations, either due to a risk-minimising course of treatment or due to labelling as fit for human consumption.

The opinion is divided into two parts:

1. Assessing the safety of meat and meat products stemming from pigs kept in ASF restricted zones. This part comprises an assessment of the risk posed to human health.

2. Assessing a possible risk of ASF virus carryover via fresh meat or meat products derived from pigs kept in ASF restricted zones. This part comprises an assessment of the risk of infection of animals.

2 Results

1. Due to its high degree of host-specificity, the ASF virus is not transmissible to humans. Thus, no health risks for humans are to be expected. Contact with pigs stemming from ASF restricted zones and consumption of meat or meat products derived from these animals are also not expected to cause adverse health effects, even in cases where the ASF virus is contained therein.

2. Provided that only clinically healthy animals from unsuspicious populations subjected to a surveillance programme are sent to slaughter, the risk ASF virus carryover via fresh meat or meat products from restricted zones is negligible to very low.

3 Rationale

3.1 Risk assessment of the safety of meat and meat products stemming from pigs kept in ASF restricted zones in relation to human health

3.1.1 Hazard identification

The African Swine Fever virus (ASF virus) is classified as part of the *Asfarviridae* family (Alonso et al., 2018). It is an enveloped virus with a diameter of >200 nm and a genome consisting of double-stranded DNA with a length of 170-194 kbp (Li et al., 2022). To date, 24 different genotypes of the ASF virus are known, with the genotype II playing the most important role (Cho et al., 2024).

The ASF virus is a pathogen that causes a severe disease in pigs, African Swine Fever, which is associated with high case and mortality rates (Li et al., 2022). The ASF virus has been

detected in Germany since 2020. The virus is transmitted between animals via direct contact with infected animals or their cadavers, via intake of food leftovers or pork products, and via other transmission routes such as via contaminated vehicles, equipment or clothing. Additionally, the virus – especially in Africa – can also be transmitted between animals via infected ticks of the *Ornithodoros* genus (Li et al., 2022; Tulman und Rock, 2001).

Foods produced from infected animals play an important role in the spreading of the virus. The ASF virus has been identified in pork and pork products (Wang et al., 2019; Guinat et al., 2016). Infectious virus has also been identified in ham and salami produced from pigs experimentally infected with the virus (McKercher et al., 1978; Mebus et al, 1993).

The ASF virus is highly stable; at 4 °C, it remains infectious for up to 18 months in pigs' blood and pH values between 4 and 11 barely inactivate the virus (Plowright und Parker, 1968). Treatment with detergents or heat, however, may inactivate the virus (Franco-Martinez et al., 2022). In salami produced from experimentally infected animals, infectious virus was still found 9 days after production (McKercher et al., 1978). Moreover, infectious ASF virus was still detectable in Iberian and Serrano ham produced from experimentally infected pigs after 112 days (Mebus et al., 1993).

However, the host range of the ASF virus is very limited. Among vertebrates, only members of the *Suidae* family, which includes domestic pigs, wild boars, warthogs, and bushpigs, are susceptible to the virus (Tulman and Rock, 2001; Urbano and Ferreira, 2022). Other than these animals, only ticks of the *Ornithodoros* genus are vulnerable to the virus (Tulman and Rock, 2001; Urbano and Ferreira, 2022). Various genes have been identified as potentially responsible for the high host specificity (Tulman and Rock, 2001). There have been no known cases of humans being infected with the ASF virus or of human diseases caused by the virus and it has been estimated that the ASF virus does not have zoonotic potential (Urbano and Ferreira, 2022).

3.1.2 Hazard characterisation

Due to its high degree of host specificity, the ASF virus is not transmissible to humans. Thus, no health risks for humans are to be expected. The BfR has no information indicating ASF virus infections in humans or human diseases caused by the virus.

3.1.3 Exposure assessment

As the ASF virus is generally not transmissible to humans, potential routes and levels of exposure to the virus as well as predispositions of certain demographics do not play a role.

3.1.4 Risk characterisation

The ASF virus is a pathogen causing severe illness in pigs and has been detected in Germany since 2020. The virus can also be present in foods such as meat and meat products made from pigs. It has been shown to be highly stable against environmental influences. Therefore, humans can come into contact with the virus in a variety of ways. These include direct contact with infected pigs or consumption of contaminated foods. However the virus has a pronounced host specificity and can only infect pigs and certain ticks. The BfR has no information indicating ASF virus infections in humans or human diseases caused by the virus. Due to this high degree of host specificity, the ASF virus is not transmissible to humans. Thus, no health risks for humans are to be expected. Contact with pigs stemming from ASF restricted zones and consumption of meat or meat products derived from these animals are

also not expected to cause adverse health effects, even in cases where the ASF virus is contained therein. In this context, processing or treatment of the food does not play a role.

3.2 Risk assessment of potential ASF virus carryover via fresh meat

3.2.1 Background and hazard characterisation

As described above, the ASF virus is a large, complex DNA virus, the stability of which can be very high across a variety of matrices (see 3.1.1). In fresh meat and fresh meat products as well as raw sausage products made from ASF virus-infected animals, the virus can remain infectious for prolonged periods (up to several months, depending on various process parameters and the temperature) and therefore poses a carryover risk. The risk only appears when susceptible animals, i.e. pigs, come into contact with these matrices. This is in particular the case when food leftovers are fed to pigs, which has been forbidden within the EU for many years (see Regulation 1069/2009). Infection through oral intake of contaminated products is far less efficient than parental exposure and thus bears much uncertainty (McVicar 1984). However, very low doses may, under certain circumstances, still be enough to establish an infection (Pietschmann et al., 2015).

In Germany, outbreaks amongst domestic pigs have often occurred in regions in which ASF was present in wild boars. The identified virus strains were typically associated with the regional variants (Forth et al., 2023).

Independent of the fundamental hazard scenario outlined above, it may be assumed that only pigs which are clinically unremarkable and thus not suspected of having ASF are sent to slaughter. In restricted zones, a particularly high degree of awareness is assumed in regard to the inspections of the animals. Furthermore, animals in the restricted zones are subject to various monitoring audits, including official checks and additional checks before transport. Furthermore, additional monitoring measures beyond what is legally required are often called for before the animals may be transported out of the restricted zones.

A small amount of risk still remains, though, as it is still possible for animals in a very early stage of infection to appear clinically unremarkable during visual inspection. A test for viral genome, however, would already yield positive results and such a test can be carried out within a few hours. However, if these animals are slaughtered without a laboratory-diagnostic examination, it is possible for these animals to enter into the value chain. Because the viral load in a generally unremarkable pig is small, the hazard of carryover is low even in this scenario. Additionally, the current legal framework prescribes very strict rules including risk mitigation treatments for the processing of animals from restricted zones and offers little leniency for fresh meat and relevant meat products. There are no legal scenarios which allow for contact between fresh products and susceptible pigs.

It should be noted that far less surveillance is carried out before discovery of an outbreak, meaning that the risk of animals going to slaughter in the early phases of infection is likely greater. Furthermore, it is possible for the virus to be introduced through meat and meat products (legally and illegally) imported to Germany from other countries.

3.2.2 Exposure assessment

Meat products which have been subjected to risk mitigation treatment are not expected to pose risks. In terms of the limited possibilities granted by the current legal framework as it

pertains to transporting fresh meat and relevant meat products, the following considerations apply:

As a rule, only clinically healthy animals are sent to slaughter. This applies to both free areas and restricted zones. However, the infection hazard is greater in the restricted zones, particularly when the virus spreads rapidly and dynamically in the wild boar population. In these regions, there is an increased risk that a swine population will become infected, but there is also a heightened degree of monitoring measures, which are more frequent and intensive than in unaffected regions.

If a pig in the early stages of an infection is sent to slaughter, meat and meat products containing the ASF virus might be sold. Contact between domestic pigs and contaminated meat products is, however, not possible within a legal context, meaning that the risk is negligible.

Wild boars, too, only come into contact with the aforementioned products if they are improperly disposed of.

The risk which arises from indirect contact, meaning contamination of tools, shoes and other clothing, or human skin, may be considered negligible.

3.2.3 Consequence assessment

The probability of carryover cannot exactly be quantified, but it should not be discarded. Consequences of virus carryover via meat or meat products would be severe, as such a situation would require culling the affected population as well as an expansion of the restricted zones.

3.2.4 Summary

Provided that all processes are carried out in accordance with the legal requirements, meaning slaughter of healthy animals from monitored conditions, no feeding of food leftovers to pigs, the risk of carryover is negligible to very low.

Further information on the BfR website

Information on African Swine Fever

https://www.bfr.bund.de/en/a-z_index/african_swine_fever__asf_-203445.html

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About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. The BfR advises the Federal Government and the States ('Laender') on questions of food, chemicals and product safety.
The BfR conducts independent research on topics that are closely linked to its assessment tasks.

About the FLI

As the Federal Research Institute for Animal Health, the Friedrich-Loeffler-Institut (FLI) focuses on the health of livestock. They work to prevent, diagnose, and combat epizootic diseases as well as to improve animal husbandry conditions and feeding and conserve and use animal genetic resources.

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