AFRICAN SWINE FEVER – WEBINAR
QUESTIONS & ANSWERS

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Q: CAN ASFV BE CONTROLLED IN FEED BY USING FORMALDEHYDE?

ASFV is environmentally very stable across a wide pH range and ingredients which makes the in-feed mitigation more difficult compared to other viruses (e.g. PED). According to the OIE, formalin (3/1000 for 30 minutes) is an effective sanitizer of ASFV, showing that formaldehyde-based products may have potential as ASFV mitigants in feed.

Recently a commercially available feed additive composed of 37% aqueous formaldehyde and propionic acid (Sal CURB®, Kemin Industries, Inc.) was tested for efficacy against ASFV in a cell culture model and in complete feed and ingredients at mean 12.3°C temperature in a 30-day transoceanic shipment model. It was shown that formaldehyde-based product has a dose-dependent efficacy in vitro at inclusion rate of 0.35%. This concentration was able to reduce viral titres below the level of detection. Although, the formaldehyde was not able to eliminate ASFV DNA, the treatment resulted in consistent reductions of ASFV nucleic acid. (Megan C. Niederwerder et al., Transbound Emerg Dis. 2020).

Q: DOES ACIDIFYING A SLURRY WITH CONCENTRATED SULPHURIC ACID (2-3 LITRES/M^3) KILL THE ASFV?

Strong inorganic acids (e.g., hydrochloric acid, sulfuric acid) have been used to disinfect farm buildings but are typically too hazardous for use as a disinfectant and are rarely used for slurry sanitation.

The pH of slurry is usually between 7.0 and 8.4. To inactivate ASFV we need at least <pH 3,9. In manure probably at least pH 3,5 and below.

Strong acids, such as H_2SO_4, might be effective when acidifying to pH 3.5, as the amount of acid used should be low. However, as strong acids are rapidly buffered due to fast CO_2 release, large amounts of foam are generated and increase the handling risk as well as the volume required in storage tanks, which will be a management problem when high volumes of slurry need to be treated. Furthermore, the use of H_2SO_4 may lead to large emissions of hydrogen sulfide (H_2S), an important odorous component which at high levels - can cause death (Wang et al., 2014).

Cntd.

Q: DOES ACIDIFYING A SLURRY WITH CONCENTRATED SULPHURIC ACID (2-3 LITRES/M³) KILL THE ASFV? Cntd.

Slurry acification decreases NH_3 emissions efficiently and this treatment is frequently performed in some countries by addition of concentrated sulfuric acid (H_2SO_4) which is one of the cheaper acids available.

Important: the acid used must be throughout stirred to achieve the same pH in all slurry fractions and applied at least for several days (approx. 7 days). The environmental temperature and the composition of slurry will have influence. Treatment with concentrated sulphuric acid (2-3 litres/m^3) might be indeed effective if appropriately used (stirring) for several days and with following time of storage (30 – 60 days) and then drain to the field if possible, avoiding run-off or spill-over into the farms or land. But we do not have data!

Recommendation: if the farm is using H_2SO_4, take several samples of treated slurry and check the pH. Anything lower than 3,9 should already give a good sanitation. Combine with other treatments.

Q: CAN BITING LICE TRANSMIT ASFV? HUGE PROBLEM IN CHINA

II'm not sure what is addressed by this question: the hog louse (*Haematopinus suis*), or sucking and biting lice (order: *Phthiraptera*).

Haematopinus suis - a large (5–6 mm) sucking louse is common on domestic swine worldwide. Usually found in backyard farms, less frequently in large commercial operations.

Due to large blood amount consumed, *H. suis* can cause severe anemia, especially in piglets. The parasite cause a haevy pruritus and subsequent self-trauma.

H.suis is a vector of swine pox virus, and it has also been implicated as a vector of Eperythrozoon suis and E parvum, the causative agents of swine eperythrozoonosis.

Saegerman C. at el. (Transbound Emerg Dis. 2020) confirmed *H.suis* as a possible vector for ASFV in Europe.

Lice - the order ***Phthiraptera***, contains nearly 5,000 species of insects. Lice are obligate parasites, living externally on warm-blooded hosts which include every species of bird and mammal, except for monotremes, pangolins, and bats. Lice are vectors of some diseases such as typhus. There is no evidence that lice can be involved in transmission of ASFV,

Q: THERE ARE SOME RUMORS IN CHINA, THAT A URINE FROM PERSONS WHO ATE ASFV CONTAMINATED PORK CAN CONTAIN ASFV – IS IT POSSIBLE?

There is no evidence that ASFV can be present in human excrements (feces and urine).

There are some unpublished observation showing, that during the digestion process in gastro-intestinal tract of humans (also dogs, cats and probably other carnivora) the ASFV - consumed with infected pork - is fully inactivated.

As ASF is not pathogenic for humans, there is no possibility that ASFV will be present in urine.

Q: CAN OTHER SPECIES OF ORNITHODOROS SUSTAIN ASFV?

In Europe soft ticks presence is limited to South-West Europe (*O. erraticus* in Spain, Portugal), *O.verrucosus* has been confirmed in Ukraine. Potentially, any countries with warm climate (Mediterranean Area, South Balkan, Black Sea costs) can become populated by soft ticks.

The ecological requirements of the soft tick community, include five climate related factors: (i) a spring temperature exceeding 10 °C to induce the end of winter soft tick quiescent period, (ii) a three-months summer temperature above 20 °C to allow tick physiological activities, (iii) annual precipitation ranging from 60 mm to 750 mm and, in very arid areas, (iv) dry seasons interrupted by small rain showers to maintain minimum moisture inside their habitat along the year or (v) residual water provided by perennial rivers near habitats.

Cntd.

Q: CAN OTHER SPECIES OF ORNITHODOROS SUSTAIN ASFV?

In European soft ticks, the virus was first identified in the 1960s in *O. erraticus* from Spain. This species is suspected to have been the origin of the last Portuguese outbreak in 1999 five years after ASF was eradicated from the Iberian Peninsula. However, in more recent studies, ASF transmission by both *Ornithodoros erraticus* and *O.verrucosus* (a soft tick species present in South-Eastern Europe) to pigs could not be demonstrated while it was shown to be successful with *O. moubata* ticks as a positive control. Both tick species were however capable of maintaining viral infections for up to eight months after their infection (Pereira de Oliveira, R. et al 2019).

Taking into consideration the fact, that soft ticks in Europe can be present only in specific (warm) areas, that the infection is only possible by ingestion of large amount of infected soft ticks and that pigs farms are not ticks typical living habitat, the probability that European soft ticks will be a significant biological vector for ASFV is very low.

Q: IS THERE ANY DATA SHOWING THAT USING PRESERVATION ACIDS ON GRAINS CAN INCREASE THE SAFETY LEVEL? OR IS IT ONLY THE ADDITIONAL COST?

There is no explicit data for commonly used feed acidifiers. ASFV is very stable in broad range of pH. A pH value below 3,9 is needed to inactivate the virus, in field conditions even lower. Thus, the common acidifiers probably can not be effective (at least used alone without other compounds) in reducing the ASFV contamination in feed.

There is a recent data showing the efficacy of medium-chain fatty acids (MCFA) in mitigation of ASFV risk in feed (Jackman JA, et al., 2020). Another publication evaluated a blend of three commercially available MCFA at volume ratio (1:1:1) of hexanoic acid (C6), octanoic acid (C8) and decanoic acid (C10). The concentration of 0.7% were necessary to reduce viral titres below the level of detection, which was higher than for aldehyde-based products (Megan C. Niederwerder et al., Transbound Emerg Dis. 2020).

However, we are still missing data on dose and duration of exposure for MCFA in ASFV contaminated feed under practical conditions. And these data will have a significant impact on feed treatment expenses.

Q: IS SOUTH AMERICA ASF FREE?

South America is currently ASF free (all countries including Caribbean area and Central America). However, historically, there were some outbreaks in the past:

- Brazil 1978–1981: domestic pigs (Moura et al. 1978)
- Cuba 1971 and 1981: domestic pigs (Negrin 1980)
- Dominican Republic 1978–1980: domestic pigs (Rivera 1983)
- Haiti 1978–1984: domestic pigs (Alexander 1992)

Q: KNOWING REGULATORY DIFFICULTIES TO LICENSE DOMESTIC PIG VACCINES, WHY NOT FOCUSING ON ORAL VACCINE FOR WILD BOARS?

The role of wild boars as ASFV reservoir is well documented and taken very seriously. Without effective control of wild boar populations and ASFV circulation among them, it will be very difficult to eradicate ASF from domestic pigs.

There is already research ongoing, and the first experimental oral immunization of wild boar with a non-hemadsorbing, attenuated ASF virus of genotype II isolated in Latvia in 2017 was described and published by Jose A. Barasona et al. in Frontiers in Veterinary Science April 2019. The protection level was 92% against heterologous strain (Arm07). However, there are still many questions regarding safety of repeated administration in free-ranging wild boars, long-term shedding and the genetic stability of the vaccine virus. A huge challenge will be the differentiability from the field virus based on DIVA serological testing and development of vaccine formulation which will be easily accepted and taken by wild boars.

Thank you for your questions !

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ASF COMBAT