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White Paper — Safety of Spray-Dried Blood Products with Respect to Lumpy Skin Disease (LSDV)

1. Background

Lumpy skin disease virus (LSDV) is a double-stranded DNA virus belonging to the genus *Capripoxvirus* that affects cattle and water buffalo. It is not a zoonotic virus and has a host range limited to ruminants, meaning that non-ruminant animals including pets, pigs, poultry, fish and humans are not susceptible. Transmission occurs mainly through biting insects and, less frequently, through direct contact or contaminated equipment.
Because LSDV can circulate in the blood during the viremic phase of infection, raw blood collected from infected cattle could potentially contain the virus. However, strict sourcing controls and validated manufacturing steps effectively eliminate this risk in spray-dried blood products used for feed or industrial applications. Since LSDV only affects ruminant animals, the risk of transmission by feeding LSDV contaminated blood products to non-ruminant animals is negligible.

2. Environmental Stability

LSDV is relatively stable in dried scabs, skin lesions, and some organic materials, and it can persist for weeks under cool, protected conditions, especially when dried. However, the virus is thermally sensitive and is completely inactivated at much lower temperatures than those used in spray-drying. Studies show complete inactivation at **56 °C for 30 minutes** or **60 °C for 10 minutes**, even in protein-rich media. Therefore, industrial spray-drying conditions reaching **80 °C throughout its substance** ensure complete inactivation.

3. Relevant Safety Steps in Spray-Dried Blood Product Manufacturing

3.1 Sourcing and Collection

- Blood is collected only from **healthy animals** that have passed **veterinary inspection** and are declared fit for slaughter for human consumption.

- Material from suspected or diseased animals is excluded from the supply chain.

3.2 Thermal Inactivation During Spray-Drying

- During spray-drying, the blood reaches **80 °C throughout the substance**, even if the exposure time is only a few seconds to one minute.
- This temperature exceeds the known inactivation threshold for LSDV, suggesting complete virus destruction.
- S**pray-drying at 80ºC throughout its substance** has been demonstrated to **inactivate** more than 4 logs of other viruses of importance in food animal production like **African swine, fever virus (ASFV), classical swine fever virus (CSFV), porcine epidemic diarrhea virus (PEDV), swine influenza virus (SIV), swine vesicular disease virus (SVDV), pseudorabies virus (PRV) and porcine reproductive and respiratory virus (PRRSV)** (Blázquez et al., 2020; 2023). Some of these viruses have similar or higher resistance to temperatures than LSDV.
- This heat treatment is a **critical control point (CCP)** in the manufacturing process.

3.3 Low Water Activity and Post-Processing Storage

- After drying, the final product has **very low water activity**, which prevents viral survival and replication.
- **Storage of dried blood product at room temperature for two weeks inactivates more than 4 logs of other enveloped viruses like ASFV, PEDV and PRRSV** (Blázquez et al., 2020).

4. Conclusion

Spray-dried blood products are produced under scientifically robust and internationally aligned hazard control steps that together make the risk of LSDV transmission negligible:

- Blood is sourced exclusively from **healthy animals inspected by veterinarians**.
- The **spray-drying process reaches 80 °C throughout its substance**, a condition that should be enough for virus's inactivation.

- The **low water activity** of the final product and **two-week storage** act as additional barriers against enveloped viruses.

5. References

English:

1. WOAH. *Terrestrial Animal Health Code*, Chapter on Lumpy Skin Disease.
2. WOAH. *Lumpy Skin Disease (LSDV) Technical Disease Card*.
3. EFSA & ECDC. *Lumpy Skin Disease Reports and Risk Assessments*.
4. UK DEFRA. Import Requirements for Animal By-Products During LSDV Outbreaks.
5. Blázquez et al., 2020. Biosafety steps in the manufacturing process of spray-dried plasma: a review with emphasis on the use of ultraviolet irradiation as a redundant biosafety procedure. Porcine Health Manag. 2020; 1: 1–9.
6. Blázquez et al., (2023). Inactivation of African swine fever virus inoculated in liquid plasma by spray drying and storage for 14 days at 4˚C or 20˚C. PLoS ONE 18(8): e0290395