Aerial Spread of Pathogens in Swine Production

It is well known that some pig pathogens are spread by air. The distance that they can travel varies by a huge amount. The maximum distance documented was the spread of Foot and Mouth Disease Virus from Northern France to the Isle of Wight, England, a distance of approximately 240kms in 1987. A distance of 1.5 kms was recorded for Mycoplasma hyopneumoniae virus. Aerial spread and infection of PRRS virus has been demonstrated over few hundred metres and it is now believed that aerial spread has a significant role, in pig disease areas.

Pathogens, such as Swine Influenza and Mycoplasma hyopneumoniae virus readily spread both within an air space and between buildings. Others spread more locally by coughing and sneezing (e.g. Actinobacillus pleuropneumoniae and Streptococcus suis) and move from pig to pig in a building.

ViralFx™ shows that aerial disinfection can reduce the spread of pathogens such as PRRS virus and Aujeszky’s Disease Virus which can improve food conversion, mortality and medication costs. Air quality is greatly affected by the presence of dust and bacterial endotoxins which have a negative impact on the health of pigs and stockmen alike. The air that pigs breathe can have a significant impact on their health and performance. Not only can it carry pathogens but also its quality can affect the pigs health.
Studies demonstrate the benefits of improving air quality through improved hygiene and Biosecurity practices:

**FOGMASTER - TRIJET**

**AIR QUALITY:**

Workers in the UK demonstrated that pigs exposed to dust, ammonia and endotoxins in a commercial pig unit had lower feed intakes and lower growth rates than unexposed pigs. The depression of both was dependent on the concentration of dust.

According to Paul Baekbo lecture at IPVS, 1998 on dust and endotoxins in the air contributed to the development of respiratory disease in pigs. Apart from pathogens, the air within pig housing also contains other harmful contaminants.

Finally we must be aware of the impact of air quality on operative health. There is evidence that a substantial number of pig stockmen suffer from occupational respiratory disease believed to result from chronic exposure to aerial pollutants over several years.

**HYGIENE & BIOSECURITY:**

There are many ways in which a full Biosecurity programme can improve the quality of air in a pig building and help reduce the aerial spread of pathogens.

In Australia a survey of 160 piggeries monitored the concentrations of total bacteria, respirable endotoxins, ammonia and inhalable particles. Concentrations of airborne bacteria and respirable particles increased as pen hygiene decreased. It was concluded that improving pen cleaning was likely to improve the health and welfare of both pigs and staff.
AERIAL DISINFECTION:
Demonstration of aerial disinfection using ViralFx™ in a large animal veterinary hospital resulted in a significant reduction in bacterial levels on the surfaces of the facility. Aerial disinfection is the process of suspending disinfectant particles in the air for a period of time. It can have profound effects on both the spread of pathogens and air quality.

DIFFERENT SPRAYING SYSTEM:

Spraying with a knapsack sprayer or pressure washer. This produces large droplets which stay in the air for less time.

Misting or cold fogging. This produces smaller particles which have increased duration, penetration and uniformity.

Thermal fogging which is similar to cold fogging but heats the disinfectant to produce smaller particles with better penetration and suspension.

Lastly, Fumigation which is the combination of two or more chemicals producing a vaporised form of disinfectant. This is usually done with Formaldehyde and related products, and so has negative health and safety impacts.

In the pig industry the normal preferred method is by cold fogging using either hand held misters or computer controlled systems. Various disinfectants products like Formaldehyde and Glutaraldehyde products can cause irritation, sensitisation and other problems in operatives and have been subject to health and safety claims. Neither can be used safely in the presence of pigs or operatives and their prolonged release from treated surfaces is a hazard. ViralFx™ has high levels of actives against a wide range of pig pathogens and can be misted in the presence of pigs and livestock at a dilution rate of 1:200 (0.5%).

BENEFITS - ROUTINE AERIAL DISINFECTION

- Reduces the spread of pathogens in a building.
- Reduces the risk of aerial spread of pathogens from adjacent buildings or farms.
- Reduces dust particles in the air by adhering to them and causing them to fall to the floor more quickly and stay there longer.
- Decreases Endotoxin levels in the air through the sedimentation of dust.
CONCLUSION:

Air quality and aerial spread of pathogens can lead to respiratory disease and reduce production performance. A complete Biosecurity programme including aerial disinfection can reduce this impact on pig health.

The most flexible and useful product is ViralFx™ for aerial terminal disinfection programmes, while pigs are in the building.