

The importance of a complete biosecurity programme in the control of viral respiratory infections in swine production

*Vittorio Sala, Claudia Gusmara - University of Milan - Faculty of Veterinary Medicine,
Department of Animal Pathology, Hygiene and Public Veterinary Health*

*Fabio Ostanello – University of Bologna – Faculty of Veterinary Medicine, Department of
Veterinary Public Health and Animal Disease Control*

Mark Alistair Beghian - Antec International

Fabiano Effretti – Prochemi srl

Umberto Rubello – Dimensione Controllo

Introduction

An appropriate management of the environment which includes disinfection regularly applied according to a pre-set programme, has been used for a year in a farrow to finish swine farm of Po valley.

This programme is a further and innovative mean of controlling and preventing viral door-opener infections of pigs.

The control of the airborne spread of infections in swine production is possible mainly by hygienic management of facilities and by spraying disinfectants in the units in which animals are already present.

The aim of this trial is to show that the regular application of a complete biosecurity programme based on the application of a heavy duty detergent and formulated disinfectants either in the surface and in the air in all the critical steps of the production cycle (eg. gestation, farrowing, weaning and growing), can improve the quality of the farm output and offer an actual economic benefit.

Materials and Methods

Livestock. The trial was performed in a farm featuring average health status, located in the Lombardia region (Italy) and targeted for the production of the characteristic Italian heavy swine (eg. 160 kg liveweight at slaughter).

The farm accounted for 350 sows in a farrow to finish farm cycle. The production concerns pigs weighing 160 kg at slaughter time. The weaning starts at 25 days of age, the growing at 40 kg and the fattening at 80 kg.

Sows are vaccinated with inactivated vaccines against PrV, PPV, atrophic rhinitis and leptospirosis.

Slaughtering pigs are vaccinated against PrV (live vaccine) and Mycoplasma hyopneumoniae.

Disinfection Programme. Washing, cleansing (Antec HD3) and disinfection of facilities (Antec Farm Fluid S) before the repopulation. Environmental air disinfection (Antec Virkon S) through a computerized air-liquid nebulization plant (AIR JET SYSTEM PROCHEMI). 1 litre per 100 m³ of Virkon S (1:200) was used 3 times a day.

Serological tests. Four groups of pigs of 60, 90 –1 00 and 170 - 180 days of age were blood-sampled and submitted for serological test against PrV and PRRSV by ELISA technique. The number of animals to be tested has been established on statistical basis, considering the total number of pigs in each productive phase. The animals have been sampled each four months.

Productive parameters. Number of born piglets per sow, average weaning mortality and slaughter weight were registered and compared with those obtained before the introduction of the biosecurity programme. The veterinary per kg of pork meat was also appraised.

Results

Serological data: The results of the serological examinations are listed in table 1. The results for glycoprotein E of PrV and PRRS are expressed in percentage form of positive and negative samples.

As a consequence of nebulization treatment, the sero-prevalence for PRRSV decreased progressively in weaners, but not in growers and fatteners: as a matter of facts, the disinfection of air was not carried out until this stage and the production occurs in continuous flow.

The sero-prevalence for glycoprotein E of confirmed the efficacy of the nebulization of Virkon S against Aujeszky virus. The disinfection proved effective at all stages of the production cycle.

Table 1. Serological results (ELISA Test)

AGE (days)	T	% PRRS +	% PRRS -	% PRV +	% PRV-
60	T ₀	71,1	28,9	24,4	75,6
(46 pigs)	T ₁	70,2	29,8	22,2	77,6
	T ₂	85,8	14,2	1,1	98,9
90-100	T ₀	80,4	19,6	6,5	93,5
(67 pigs)	T ₁	98,5	1,5	7,5	92,5

	T ₂	96,7	3,3	0	100
170 -180	T ₀	37	63	4,3	95,7
(92 pigs)	T ₁	97	3	0	100
	T ₂	100	0	0	100

Productive parameters. After the introduction of a complete biosecurity programme the number of born piglets per sow increased from 22.20 to 22.57 per year, while the number of piglets weaned per sow increased by 1.19 animals on annual basis (23.67 after the introduction of a complete biosecurity programme vs. 22.48). The weaning mortality reduced by 50 % in comparison to previous year and was equal to 1.07 %. The average slaughter weight increased, by 700 grams per swine. The veterinary bill per kg of produced meat decreased by nearly 50 % and was equal to 57 Italian Lire per kg.

The cost/benefit ratio, calculated on annual basis was around 10.000 Italian Lire per fatterer or a 1:24 cost/benefit ratio

Table 2. Productive Parameters (comparison between two years)

Productive Parameter	Year 1999 (Traditional Management – air disinfection with QACs+ glutaraldehyde)	Year 2000 (Antec Biosecurity Programme)
Number of piglets born per sow p.a.	22.20	22.57
Weaning mortality (%)	2.15	1.07
Number of piglets weaned per sow p.a.	22.48	23.67
Average weight at slaughter (kg)	156.3	157.0
Veterinary bill per kg of pork meat (Italian Lire)	107	57

Closing Remarks

Environment is the main factor determining the severity of clinical manifestations of infectious diseases in the intensive pig production.

Nevertheless we can turn it into a profitable positive conditioning factor to prevent the development of diseases and to increase the effects of other preventive measures, such as vaccination.

From this viewpoint, an appropriate level of hygiene can improve the environmental conditions, giving an essential contribution to the prevention of main pig diseases.

As far as disinfection is concerned, it should be stressed that its practical efficacy is limited to the time of application and that it decreases rapidly once interrupted: however, if the application is implemented continuously, it may limit their localisation of many pathogens in the animals thus contributing to a remarkable reduction of health problems.

According to our opinion, experimental data produced in this paper have showed that it's possible to minimize the effects of the environment on animals and that viral respiratory infections can be controlled by a biosecurity programme regularly applied in all the different steps of intensive pig production.

The achieved profit and the cost/benefit ratio are therefore the key factors reasons for planning and accomplishing livestock production under tight biosecurity control.

References

- Backstrom L. & Jolie R. (1997). The role of airborne contaminants in respiratory diseases of swine. Their caretakers. Proceedings of the 28th Annual Meeting of the American Association of Swine Practitioners. Quebec City, March 1-4, 1997.
- Bodman G.R. (1997). Diagnosing the ills of sick buildings. The macro environment. Proceedings of the 28th Annual Meeting of the American Association of Swine Practitioners. Quebec City, March 1-4, 1997.
- Lunney J.K. (1997). Immune factors influencing the disease resistance. Proceedings of the 28th Annual Meeting of the American Association of Swine Practitioners. Quebec City, March 1-4, 1997.
- Meunier-Salaun M.C. (1997). Animal welfare in pig production. Research programs and issue for husbandry practice. Proceedings of the 28th Annual Meeting of the American Association of Swine Practitioners. Quebec City, March 1-4, 1997.