

EFFECTIVENESS OF A NEW BIOCIDES AGENT IN ANIMAL PRODUCTION

Pintarič, Š.¹, Gobec, I.¹, Mirt, D.² and Dobeic, M.¹

¹ *University of Ljubljana, Veterinary faculty, Institute for animal and environmental hygiene with ethology, Gerbičeva 60, 1000 Ljubljana, Slovenia; stefan.pintaric@vf.uni-lj.si; ivan.gobec@vf.uni-lj.si; martin.dobeic@vf.uni-lj.si;* ² *Novartis Animal Health d.o.o., Verovškova 57, 1000 Ljubljana, darja.mirt@novartis.si*

SUMMARY

The oxygen emitting agents are used frequently in general disinfection owing to insignificant corrosion effect. In contribution are present results of disinfection of pig stables with a new biocide agent Virucidal Extra in practical conditions. Study was performed on the typical large pig farm in Slovenia in piglet and fattening pig stables and six smaller common pig farms in real field conditions following typical sanitation routine by farm staff. Reduction in number of CFU on tested surfaces was by disinfection in average range between 74 and 94%.

Keywords: disinfection, biocide, peroximonosulfate, prevention, pig houses, Virucidal Extra

INTRODUCTION

Effectiveness of sanitation process is influenced by several factors as disinfectant agents, temperature, exposition time and presence of organic matter. The oxygen emitting agents are used frequently in general disinfection owing to insignificant corrosion effect. In contribution are present results of disinfection of pig stables with a new biocide agent Virucidal Extra in practical conditions.

Virucidal Extra[®] is a well-balanced, stable mixture of inorganic peroxide compound, inorganic salts, halogen group donor, anionic surface-active substance, colouring agent and lemon flavour. It rapidly and effectively kills all known viruses, Gram-positive and Gram-negative bacteria, and fungi. It acts also when highly diluted. Due to its broad biocide action, it is also suitable for:

- stables of all types
- transportation vehicles
- veterinary facilities (stations, laboratories, surgeries etc.)
- areas for housing of animals (livestock buildings, dog kennels, cages...)
- areas for preparation, processing and storage of food and feed/feedstuffs
- hatcheries
- fish stables
- disinfection barriers for vehicles and footwear

MATERIAL AND METHODS

Study was performed on the typical large pig farm in Slovenia in piglet and fattening pig stables and six smaller common pig farms in real field conditions following typical sanitation routine by farm staff. The efficiency of biocide agent (BA) was estimated by reduction of the number of colony forming units (CFU) on different surfaces in stables. For final disinfection 1% working solution was used in amount of 300 ml/m². The total surface expense for disinfection in each stable was defined by multiplying the floor surface by 2.5.

The number of CFU was detected by smears following parts of surfaces: corridor (feed passage, walking corridor and pier), feeder, cubicle floor (slatted, solid floor), wall, cubicle fence, and fan and water nipple. Smears were prepared in a standard laboratory condition for CFU on 30°C for 72 hours.

CFU on surfaces were assessed before cleaning, after cleaning and drying and after disinfection. On each pig stable 41 smears in 3 repetitions were taken. In total 1.599 smears were taken. Simultaneously measurements of the microclimate parameters (air temperature, relative humidity, air speed), surface temperature, surface pH, hardness of water, estimated water spots remaining, dust and annotation of implemented sanitation routine (cleaning, disinfection) in tested stables were performed.

Results of measurements were tabled and statistically evaluated.

RESULTS

Results are present in a table 1 and figure 1. After disinfection reduction in number of CFU on tested surfaces varied in average range between 74 and 94%. Reduction in number of CFU on tested surfaces: corridor (feed passage, walking corridor and pier) 81.0–94.7%, feeder 83.1–98.4%, cubicle floor 86.4–95.3% (slatted, solid floor), wall 59.1 and 93.2%, cubicle fence 75.0, fan 79.6–86.5% and water nipple 72.6–96.0%.

Table 1. Average reduction (%) of CFU number in pig stables on different tasted surfaces

Stable	Piglet stables	Fattening pig stables	Common pig farms
Corridor (feed passage, walking corridor, pier)	94,7	89,3	81,1
Feeder	98,4	83,1	92,2
Cubicle floor (slatted, solid floor)	86,4	95,3	93,0
Wall	59,1	84,8	93,2
Cubicle fence	75	86,8	78,9
Fan	79,6	82,7	86,5
Water nipple	72,6	96,0	94,8

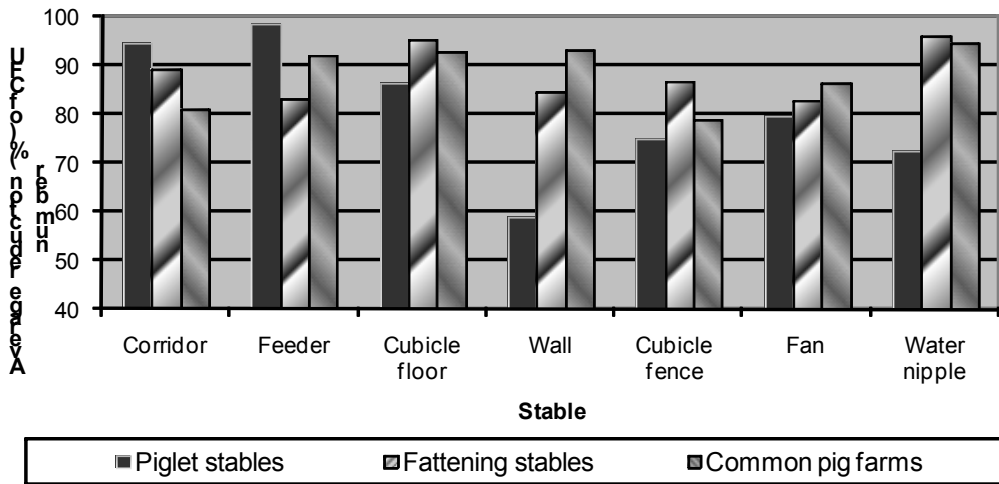


Figure 1. Average reduction (%) of CFU number in pig stables on different tasted surfaces

CONCLUSIONS

Biocidal agent Virucidal Extra is an effective agent in general disinfection of stables in animal production. Effectiveness was found out also in pure cleaning routine.

Virucidal in this clinical trial represent very quality and in some cases an exceptional disinfectant action. Virucidal was especially successful in dirtiness aggravated environment. All findings are average results of sample smearing results from different types of breeding and animal categories in pig stabling referring especially to the most aggravated and exposed places.

Many deficiencies in sanitary technologies of pig stables were found; especially in the sense of none continually process of animal emptying, cleaning and disinfection. Few days delay among animal emptying and stable cleaning have the consequence in a high increase of micro-organism in dirty medium, what aggravate also Virucidal efficiency, but never the less the Virucidal was successful on those conditions as well. Furthermore it was established that cleaning and disinfection process in fattening pig stables done by high-pressure machines, because bacteria aggravated aerosol, which can be potentially dangerous for additional surface contamination also after finished disinfection. Workers, who perform cleaning and disinfection of stable and equipment, do not handle all surfaces equally, so we establish remains of unclean and un-disinfected places especially on equipment with heavier access or on surfaces which were not directly exposed. Exactly on those places Virucidal had successful disinfection effects on the number of CFU, what have very practical meaning. In common pig stables the same phenomenon appeared. Cleaning and disinfection in large farm was more successful as in common pig stables, while breeders were not splashing surfaces enough after cleaning what can cause microbiological recontamination of surfaces that can be in some cases higher after cleaning as before it. Mechanical cleaning and use of high-pressure machines, regarding to this clinical trial, were the reason for microbiological contaminated aerosol what can recontaminate surfaces after sedimentation.

If we compare results of CFU reduction in piglet and fattening stables after cleaning process we can establish that in fattening pig stables CFU reduction was worse or even negative (more CFU after cleaning). Moreover it is astonishing that Virucidal action was better in fattening pig stables despite worse conditions for disinfectant activity. Virucidal reduction of CFU varies between 74 and 94%, and between 79 and 97% in fattening pig stables. In analysis due to criteria only, the reduction of tested surfaces was between 72 and 98%, and between 83 and 96% in fattening pig stables, except in one case with higher CFU after disinfection as before it (fan activity). In common pig stables we established poor Virucidal activity as in previous stables, encountered because of poor cleaning. It should be emphasized that Virucidal efficiency is still 81 to 93% despite very poor cleaning results. Obviously very heterogeneous CFU pattern was represented due to unequally cleaned surfaces and equipment in common pig stables had important influence on Virucidal activity.

Virucidal tests have been done in summer weather by temperatures between 19 and 32°C. Temperatures of disinfected surfaces were between 18 and 23°C. Temperature differences from surfaces of sample smearing were too small for influencing results. Hardness of water was very similar in all stables – between 8.2 and 8.7 dH, as well as surface pH, which were in alkaline line between 8.2 and 8.7. Humidity and air speed were also in allowed areas of normative.

From all it can be concluded that disinfectant Virucidal extra demonstrated qualitative disinfection effect in practical criteria. Excellent preparation activity represented also in dirty environment, where most of other disinfections lost their efficiency. For that reason Virucidal extra is by our opinion an appropriate choice for disinfection in pig stables. Along that we appeal on improving cleaning and disinfection technologies which can be of crucial for Virucidal efficiency.

For further assessing of disinfecting effectiveness of agent are recommended studies of specific effects on separate pathogenically micro-organisms.