

Effect of disinfectants on viability of *Ascaris suum* and *Ascaridia galli* eggs

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Introduction

- Ascarid (round worm) eggs can persist in the environment due to their resistant thick shells.
- Few commercial disinfectants (e.g. FL-des Allround) claim to have an effect on parasite eggs.
- Ascaris suum* eggs (pigs) have thicker uterine layer than *Ascaridia galli* eggs (poultry).

Objectives

- To study and compare the effect of three commercial disinfectants (Virkon S[®], FL-des Allround[®] and FL-des GA[®]) at different concentrations and exposure times on the survival of *A. suum* and *A. galli* eggs.



Fig. 1 Unembryonated ascarid eggs: A. *Ascaris suum*, B. *Ascaridia galli*

Fig. 2. Schematic diagram of ascarid egg shells

Materials and methods

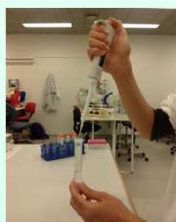
Disinfectant	Chemical composition	Solution
FL-des Allround [®]	Hydroxybiphenyl 1-2 fatty acid, peracetic acid, hydrogen peroxide and acetic acid	0.3%, 3%
Virkon S [®]	Potassium peroxymonosulfate, sodium dodecylbenzenesulphonate, sulfamic acid	1%, 10%
FL-des GA [®]	Glutaraldehyde, benzyl-C12-16-alkyldimethylammoniumchloride, didecylmethylammoniumchloride	1%, 10%

- Distilled water was used in controls
- Solutions were made by diluting chemicals with distilled water
- Time of exposure: 3 hours, 5 hours and 3 days



SET UP

An average number of 5755 eggs were added to each 5ml disinfectants in plastic tubes.



EXPOSURE



Eggs were exposed to chemicals at ambient temperature (22-25 ° C).

WASHING



Eggs were washed by following process: Centrifuged at 250 × g for 7 minutes, supernatant removed, distilled water added, centrifuged and the process repeated for 4 times

INCUBATION



Eggs were allowed to develop at ambient temperature (22-25 ° C) until day 6.

EXAMINATION



- At day 40-200 eggs were categorized into viable and non-viable by examining microscopically at 400 times magnification.
- Viable eggs were either fully or partially embryonated, while nonviable eggs were unembryonated or dead, the contents were degenerated.

Results

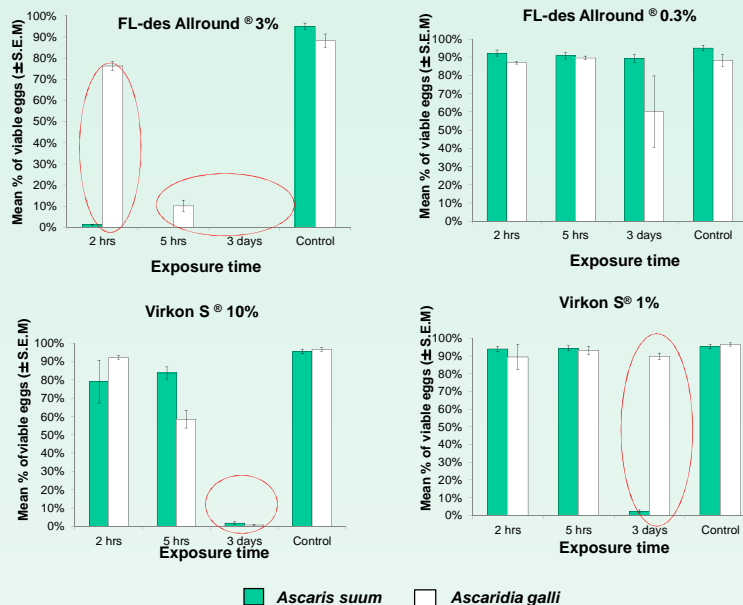


Fig. 3. Mean percentages (n=3, ± S.E.M) of embryonating *A. suum* and *A. galli* eggs after treatment and control with varying concentration and exposure times.

❖ No effect was seen on eggs exposed with FL-des GA[®].

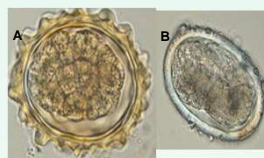


Fig. 4. Viable eggs: A. *A. suum*, B. *A. galli*

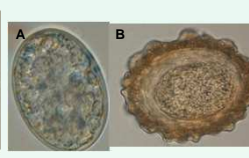


Fig. 5. Non-viable *A. suum* eggs: A. FL-des Allround[®] 3% for 2 hours, B. Virkon S[®] 10% for 3 days.

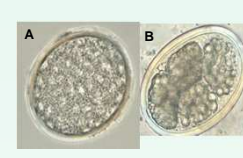


Fig. 6. Non-viable *A. galli* eggs: A. FL-des Allround[®] 3% for 2 hours, B. Virkon S[®] 10% for 3 days

Conclusion

- FL-Des Allround[®] effectively killed *A. suum* eggs at 3% for 2 hours → can be potentially used in conventional pig farms to control *A. suum* infection.
- Virkon S[®] had negative impact on *A. suum* eggs only at high concentration (10%) and long exposure time (3 days).
- A. galli* eggs survived well compared to *A. suum* eggs → may be more resistant than *A. suum* despite having thinner uterine layer

Perspectives

- Identify appropriate methods for on-farm application
- Test the disinfectant against other thick-shelled nematode eggs (e.g. *Trichuris* spp., *Toxocara* spp., etc).
- Biochemical studies on egg shells of various species of ascarids.

References

- Wharton, D. 1979. *Ascaris* sp.: Water loss during desiccation of embryonating eggs. *Experimental Parasitology* 48, 398-406.
- Wharton, D. 1980. Nematode egg-shells. *Parasitology* 81, 447-463.