The importance of using hygienic bedding in poultry farms

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The hygienic quality of bedding material is essential in order to optimise a farm's production indexes. Not only is it important to use bedding material of high hygienic quality from the start, but in addition it is also necessary to carry out maintenance treatments during breeding with the objective of controlling microbial flora produced during the productive cycle.

Treatments applied to bedding should have the control of dampness and microbial load as their main objectives. The majority of products and work protocols applied to date have been mainly directed towards the reduction of dampness in bedding and as a result, a certain control of microbial proliferation is achieved. However, if the treatments applied do not present a degree of antimicrobial action per se it is difficult to control microbial development through to the end of the productive cycle.

Material and methods

This article highlights results obtained by using a work protocol specifically designed for use in poultry farms and incorporating products of known biocidal capacity.

The tests were carried out in a poultry company that breeds broilers, one of renowned prestige within Portugal.

Their buildings measure 14 x 80m and boast controlled internal environments. Each building is equipped with five lines of poultry drinkers and four lines of poultry feeders. Drinking water is sanitised on a continuous basis and food for a whole building originates from the same silo.

The tests were carried out in half of one of the buildings, with the remaining half used as the control area.

The products used in the tests were:

- S2-OX: Sanitiser, drier and protector in powder. This product presents a combination of mineral substances with vegetal extracts, creating a mixture with high absorption capacity and strong deodorant power.
- OX-S4: Disinfectant, sanitiser and protector in powder. Mixture of hydrogen peroxide and peracetic acid solids, combining inert support components with high absorption capacity and carriers of hygiene and deodorising substances.

The work protocol carried out in the part of the building designated as the test area was as follows:

- After carrying out a thorough cleaning and disinfection of the facilities and before putting the bedding in place, S2-OX was sprinkled about at a ratio of 50g/m^2.
- Subsequently, the surface of the building was covered with new bedding material, which in turn was sprinkled with OX-S4 at a ratio of 50g/m^2.
- The area was sprinkled with OX-S4 on day 14 of the production cycle at a ratio of 50g/m^2 with the animals inside the building.
- In addition, during the whole of the production cycle, the following recommendation was followed; if a damp area appeared, any bedding showing signs of deterioration was removed and OX-S4 was applied at a ratio of 150g/m^2. New bedding material was then put in place and OX-S4 (once again at a ratio of 150g/m^2) was sprinkled on top of it.

In the half of the building being used as control, new bedding material was also introduced but without any kind of sanitiser.

Six pre-established zones

In both the test area and the control area, samples of bedding were taken on days 0, 21 and 28 and always from the same points of the six pre-established zones:

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Fig. 1. Quantitative evaluation of dampness.

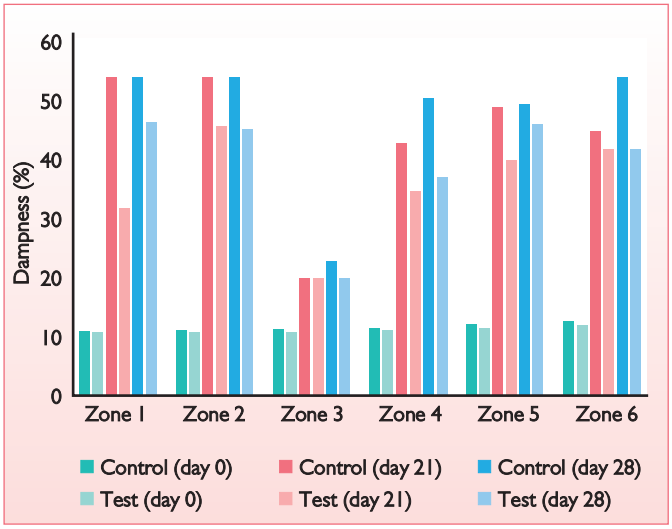
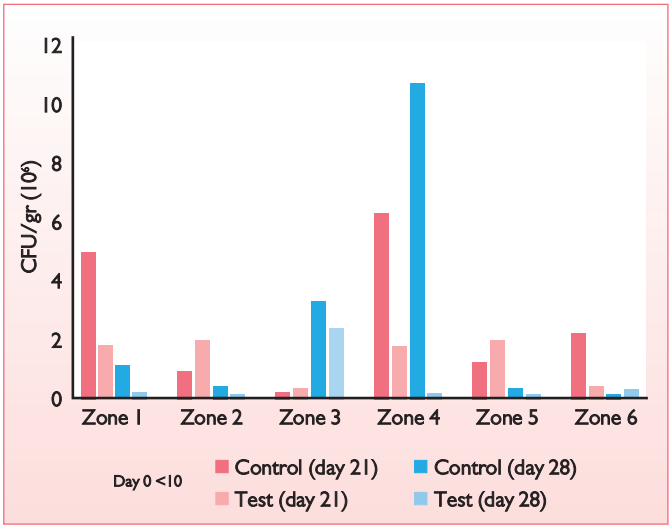


Fig. 2. Coliform bacteria count (CFU/g).



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- Zone 1: upper part of the building.
- Zone 2: pipettes.
- Zone 3: poultry feeders.
- Zone 4: halfway point of the building.
- Zone 5: next to the wall-ventilators.
- Zone 6: next to the wall-air entry point.

The collection of samples was carried out in duplicate; one sample underwent chemical analysis and the other was subjected to a microbiological analysis. Each sample had to contain at least 250g.

Evaluation of the dampness of the bedding material was carried out through quantitative and qualitative tests (Method: NP 875:1994) on days 0, 21 and 28.

Microbial growth was also measured on days 0, 21 and 28 using the following methods at laboratory level:

- Coliform bacteria – Method: NP 3788:1990.
- E. coli – Method: NFV 08-053:2002.
- Salmonella – Method: ISSO 6579:2002/A1:2007.
- Campylobacter – Method: MED 09:01.
- Eimeria oocysts – Method: MED-14:01.

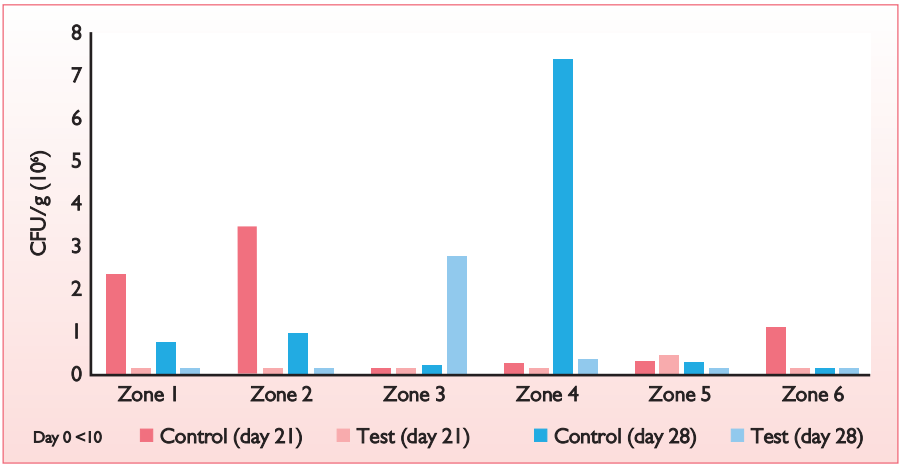

Fig. 3. E. coli count (CFU/g).

Dampness and microbial quality

With regards to the evaluation of dampness from a qualitative point of view it should be highlighted that, overall, no significant difference was noted between the samples taken from the test area and those from the control area. However, what was observed is that from day 21 onwards the smell of ammonia was much more persistent in the control area than in the test area. In addition, it was noticed that the bedding in the control area was, in general, much damper by day 28.

In comparison with other buildings within the same farm, the test area was seen to have better quality bedding in general. The evaluation of the samples at a quantitative level did demonstrate statistically significant differences between the two areas. It should be pointed out that, overall, the degree of dampness in the test area was lower than in the control zone.

This fact clearly demonstrates that, despite that fact that there was no visible difference to the naked eye (i.e. the qualitative evaluation), the quantitative analysis of the samples shows that the absorption capacity of the products used permits efficient dampness control.

As can be seen in Fig. 1 the degree of dampness in the bedding on day 28 of the production cycle was significantly less in the test area than in the control area in all of the zones tested. The lower degree of dampness in the bedding of the treated area had a positive impact on the control of microbial development in the same bedding.

Data relating to the microbial count taken after the analysis of collected samples is set

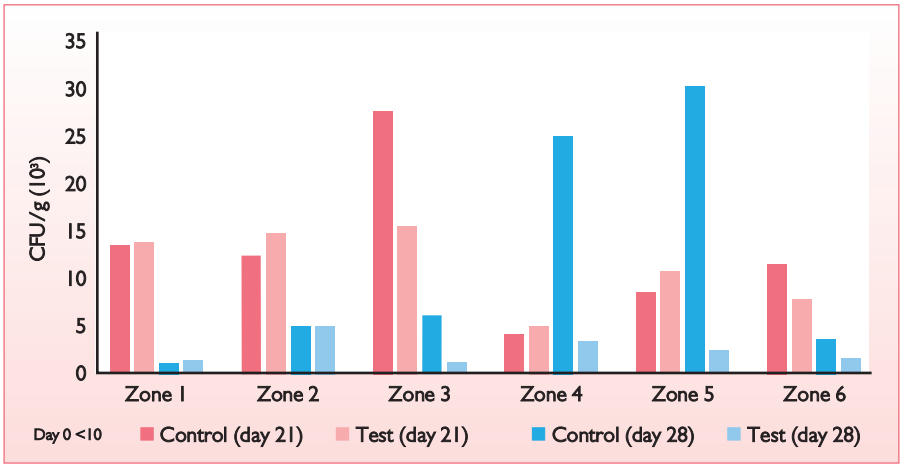

Fig. 4. Eimeria oocysts count (number/g of faeces).

out in Fig. 2. Despite the fact that on day 21 no defined tendency was observed, by day 28 it can be seen that the coliform bacteria count in the test area was lower overall than in the control area.

The differences are extraordinarily high in areas of high dampness, such as zones 1, 2 and 4. Overall, it can be seen that on days 21 and 28 the E. coli counts were much lower in the zones of the test area than those within the control area (Fig. 3).

In relation to the Eimeria oocysts count, it should be highlighted that count values at 21 days are higher in general than at 28 days, as can be seen in Fig. 4. This could be due to the fact that at 21 days the birds are in a critical phase of intestinal development and this coincides with a change of feed.

The results after 21 days do not show a defined tendency. However, results after 28 days show similar values in the two area (zones 1, 2 and 6) or higher values in the control area with respect to the test area (zones 3, 4 and 5).

With respect to the evaluation of the presence of salmonella, the results of the sample analysis were negative in all cases, in both the test and control areas. In the case of the campylobacter count, the samples taken presented <100 CFU/g across the board.

Conclusions

As has been shown above, the work protocol applied to the testing process did in fact result in a significant reduction of dampness in bedding.

With regards to the counts of coliform bacteria, E. coli and Eimeria oocysts, it should be emphasised that overall the counts in the test area were equal or less than in the control area. Therefore it can be concluded that the products used in accordance with the established protocol made a significant contribution to the control of microbial proliferation in bedding material.

This may be due to the fact that the product OX-S4 contains hydrogen peroxide and peracetic acid in a solid state. These 100% biodegradable biocides present a wide spectrum of action, being effective against bacteria, fungi, virus and even coccidia oocysts as has been shown in this study.

In addition, and thanks to its action mechanism, these biocidal substances prevent microbial resistance and therefore guarantee a wide spectrum of action at low doses.

Thanks to the fact that OX-S4 is a non-toxic product, is gentle on animal skin and has high absorption and deodorant capacity, its use, using the work protocol indicated in this test, helps to improve the well being of the animals. These facts, without doubt, favour the productive parameters of the farm, which in turn contribute to the optimisation of its profitability. ■