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Air Quality in Three Types of Laying Hen Houses

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SUMMARY

The housing system plays a critical role in welfare of laying hens, and various systems have been implemented throughout the world. Benefits vary for different housing schemes. Important considerations for welfare also include environmental conditions (air quality), but these parameters are not well documented for different laying hen housing systems. Regarding the consequences of poor air quality, it includes diminished production performance and impaired bird health. Therefore, the objective of this research was to assess the air quality in three housing system types for laying hens. One farm from each type (conventional cages, furnished cages and alternative system) was selected, based on farm access and availability. The evaluated environmental variables included: ammonia concentration, carbon dioxide concentration, air temperature, relative humidity, air flow velocity, bacteria and fungi. All parameters were determined using hygiene specific methods, in three different points, in three consecutive days in the summer. The temperature was adequate in all the hen houses, while the relative humidity was below the hygienic norms in the system with furnished cages. The air currents' velocity was lower than is recommended by welfare standards, in all the assessed farms. The concentration of carbon dioxide was below the threshold limit in all three housing types, higher values being recorded in the alternative system (900 ppm). The ammonia concentration varied (5-25 ppm), being significantly ($p<0.05$) higher in the alternative system comparing with the conventional and furnished cage housing. The numbers of bacteria (4.49×10^6 CFU/m^3) and fungi (1.49×10^5 CFU/m^3) were significantly ($p<0.05$) higher in the alternative system, comparing with the other two systems. Significant differences ($p<0.05$) were also found between the conventional cages and the furnished ones for the total number of mesophilic bacteria (5.07×10^5 CFU/m^3 and 8.47×10^4 CFU/m^3, respectively). The obtained values are conformable with the results of other studies (Matkovic et al., 2007; Nimmermark et al., 2009). The air quality problems are more frequently encountered in the systems where the birds are kept on the floors than in cage systems, especially in those hen houses where the ventilation rates are low, but these can also be significant in cage housing due to the hens' manure. The results of the study indicate better air quality in the system with furnished cages comparing with the other two housing systems.

Keywords: conventional cages, furnished cage, airborne bacteria, airborne fungi

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