

ABSTRACT

The overall objective of the study was to investigate the most suitable lighting program for broiler chicken reared under tropical environment in terms of production and welfare. First experiment consisted of two sub experiments that were focused on four different artificial light colours (red [RL], blue [BL], green [GN] and white [control]). One was to test the performance, behaviour and welfare aspects under respective light colours and the other was to test the birds' preference for these light colours. The significantly ($p < 0.05$) highest weight gain (WG) was recorded by RL apparently until 14 day while showing the highest preference for RL. It was also noticed that exposure to artificial light is more influence on bird's behaviour than growth. Results of the first experiment concluded that the RL is the best light colour in terms of production performance and welfare compared to other primary light colours. The second experiment was conducted to investigate the most suitable intensity of RL for the same parameters tested in experiment 1. Second experiment was also consisted of two sub experiments; one was to find out the most suitable RL intensity (high [320 lux], medium [20 lux] and dim [5 lux]) in relation to performance and welfare and the other was to test the preference of the birds for these intensities. Birds exposed to dim light gained a higher weight, potentially indicating compromised welfare. Younger birds preferred high intensity (320 lux) and older birds preferred dim light intensity (5 lux). Irrespective of the age, all the birds prefer high intensity RL during night time and low intensity RL during day time. Based on the results of the second experiment it was identified that setting of an optimum light intensity was difficult since dim light intensities that favour growth reduce welfare and thus the third experiment aimed at finding a suitable lighting regimen including high and dim light intensities of RL. Therefore the

third experiment was focused to investigate the most appropriate lighting regimen that is favourable for both better production performance and welfare. It was found that early exposure to dim light intensity (DI) RL (up to 28 days) followed by high intensity (HI) RL is the most favourable lighting regimen for greater production and welfare status of broilers. Furthermore, an added advantage of this lighting regimen is significantly ($p < 0.05$) the lowest fat percentage deposited in the carcass which may indirectly benefit human health. On the other hand this regimen could save energy due to prolonged exposure to DI. It is concluded that brooding (up to 14 days) under RL (60 lux) followed by DI (5 lux) upto 28 days and thereafter exposure to HI (320 lux) is the most suitable lighting program to obtain increased production performance and better welfare in tropics.