Light Choices of Pullets and Laying Hens between a Commercial LED Light and a Typical CFL Light

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Introduction

Light plays an important role in development, behaviors, production performance, health, and well-being of poultry. Extensive research on poultry lighting has contributed to the improved energy efficiency in lighting and management practices of modern egg production.

More energy-efficient, readily-dimmable and long-lasting LED lights are increasingly finding applications in poultry production facilities today. With the emergence of the new lights and control strategies comes the need for research to assess the animal’s responses.

The objective of the study was to evaluate the light preference of W-36 pullets and laying hens between a commercial LED light (Dim-to-Red) and a typical CFL light.

Materials and Methods

Three types of birds, 12 group each, three birds per group.
- IP: pullets with only incandescent light rearing experience
- LL: layers with only LED light rearing experience
- CL: layers with only CFL light rearing experience

Results

Figure 1. Spectral characteristics of the incandescent, CFL, and LED lights used in this study.

Figure 2. Schematic of light preference testing system.

Figure 3. Distributions of birds in light preference testing compartments.

Figure 4. Image processing procedure. (a) RGB image, (b) binary image without enhancement, (c) binary image with morphological opening, (d) binary image with morphological closing, (e) binary image with small objects removed, and (f) detected blobs in the binary image.

Figure 5. Flowchart for determining the distributions of birds in light preference testing compartments.

Figure 6. (a) Overall daily feed intake and (b) light-period moving frequency of birds. IP = pullets reared under incandescent light; LL = layers reared under LED light; CL = layers reared under CFL light; ODFI = overall daily feed intake of birds; LMPF = light-period moving frequency of birds. Values with different superscripts differ significantly at P<0.05.

Figure 7. Proportions of daily feed intake (a, c), proportion of light-period time spent (b, e), and proportion of dark-period number of birds (c, f). P-value displayed in each figure is the significance of the comparisons among bird types. Values are significantly different at P<0.05. Bars with lowercase superscripts are significantly lower than 50%. Bars with uppercase superscripts are significantly higher than 50%. Bars without superscript are not significantly different from 50%.

Summary and Conclusions

1) During the light period, when given free choice, all the three types of birds (incandescent-reared pullets, LED-reared layers, and CFL-reared layers) showed significantly higher use of the CFL light than the LED light.

2) During the dark period, when given free choice, only CFL-reared layers showed significantly higher use of the CFL light than the LED light, whereas the other two did not.

3) No difference was detected in feed intake of the W-36 pullets and laying hens under LED vs. CFL light.

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