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УДК 636.03

### **THE EFFECT OF USING DIFFERENT COLORS OF LED LIGHTS ON SOME BEHAVIORAL INDICATORS OF BROILERS**

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**Abstract:** From the field of agriculture and broiler production point of view, in view of absence studies concerned with the using of the different colors of LED lights on some behavioral indicators of broilers in the Syrian Arab Republic. Tis study was conducted for the first time in this study.

This article describe the effect of using lamps LED with different colors (Green G24 Lux, Blue B24 Lux, Mix G+B 28 Lux, White W65 Lux, Yellow Y90 Lux), of broiler farms. And the recommendations to use lamps LED instead of traditional lighting lamps (fluorescent and tungsten).

**Keywords:** LED lights, fluorescent, tungsten, broilers, welfare.

**Introduction:** Light plays an important vital role in influencing the behavior and activity of broilers [1], and the improvement of growth and performance of different broiler crosses is associated with the progress of nutrition science and management. including modern lighting programs duration of light, the blue light played a good role in calming the birds[2,3]. While the red light caused an increase in anxiety and aggression among the birds, while the combination of light (blue and green) stimulated the growth of the birds [4], also the emergence of aggressive behavior in birds exposed to white light, compared to birds exposed to blue light [5].

Therefore, the importance of the research is work on the introduction of modern colored lighting in the care of broiler chickens. By replacing the old lighting methods with modern methods that are characterized by saving in the consumption of electrical energy, reduce aggressive behavior and stress of birds, and improve the behavioral state by increasing the comfort and calmness of the birds [6,7].

Data on the number of treatments and chicks and the intensity of light used (Table 1).

Table 1

| Treatments  | Lights color | Number of chicks | Number of replication | Number of chicks in each replication | Illumination intensity/lux |
|-------------|--------------|------------------|-----------------------|--------------------------------------|----------------------------|
| TG          | Green        | 5                | 3                     | 25                                   | 24                         |
| TB          | Blue         | 5                | 3                     | 25                                   | 24                         |
| TMix        | (Mix) G+B    | 5                | 3                     | 25                                   | 28                         |
| TY          | Yellow       | 5                | 3                     | 25                                   | 90                         |
| TW(control) | White        | 5                | 3                     | 25                                   | 65                         |

## Results:

### 1- Mortality rate:

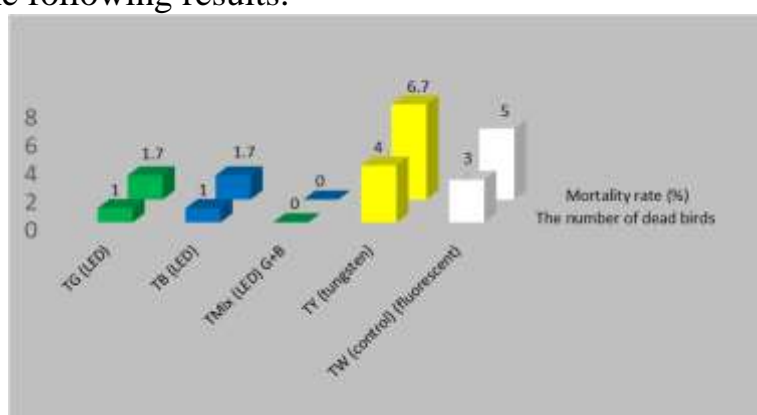
Data on the number and percentage of mortality for birds of different transactions (Table 2).

Table 2

| Transactions                   | TG (LED)         | TB (LED)         | TMix (LED) G+B   | TY (tungsten)                  | TW(control) (fluorescent) |
|--------------------------------|------------------|------------------|------------------|--------------------------------|---------------------------|
| The number of dead birds       | 1 <sup>b</sup>   | 1 <sup>b</sup>   | 0 <sup>a</sup>   | 4 <sup>d</sup>                 | 3 <sup>c</sup>            |
| Mortality rate (%)             | 1.7 <sup>b</sup> | 1.7 <sup>b</sup> | 0.0 <sup>a</sup> | 6.7 <sup>d</sup>               | 5 <sup>c</sup>            |
| The life of the dead bird/ day | 29 <sup>b</sup>  | 32 <sup>b</sup>  | - <sup>a</sup>   | 15 -12- 34<br>-27 <sup>d</sup> | 21- 28 - 42 <sup>c</sup>  |

<sup>a,b,c,d</sup> Means in the same row with significant differences among averages ( $p \leq 0.05$ )

We obtained data on the number and percentage of mortality for birds of different transactions, from private commercial broiler farm in the Lattakia Governorate, Syria. During the period of 2022. The commercial unsexed hybrid (Habbard Flex) chickens were used with a total number of (375) and the chicks were randomly distributed among five treatments, presented them graphically and obtained the following results.



**Figure 1. The number and percentage of mortality for birds of different transactions.**

Figure 1 shows the number and percentage of mortality for birds of different transactions.

The number and the percentage of the mortality for different studied treatments, as no death case was recorded for treatment  $T_{Mix}$ . And there was a significant ( $p \leq 0.05$ ) decrease in the mortality rate at the two treatments  $T_G$  and  $T_B$ , compared with the two treatments  $T_Y$  and  $T_W$ , and the green light has a role in reducing the number of dead birds.

This decrease in mortality may be attributed to a higher level of immunity and a more stable health status at  $T_{Mix}$  treatment and  $T_G$  treatment. And  $T_B$  treatment compared to conventional lighting treatments  $T_Y$  and  $T_W$ .

Also, the aggressive behavior and excessive activity of some birds in traditional lighting treatments may be an important reason for the decline in the health and immunity of some other birds, and thus their death, unlike treatment birds. treatment  $T_{Mix}$ , treatment  $T_G$  and treatment  $T_B$  who were calmer and less aggressive and.

## 2- Observing the behavior of birds:

Data on the some observations during the different age stages of the birds recorded in each treatment number and percentage of mortality for birds of different transactions (Table 3).

Table 3

| Bird age/week | Observations recorded on the movement and activity of birds and feed consumption in each transaction separately  |
|---------------|--|
| 1             | Treatment chicks (T <sub>Y</sub> ) was the most active in terms of movement and vitality, followed by (T <sub>W</sub> ) chicks, as they enjoyed active movement, followed by (T <sub>G</sub> ) and (T <sub>MIX</sub> ) chicks, and (T <sub>B</sub> ) chicks were the least active and lively, and feed consumption was almost equal for all transactions. .                                  |
| 2             | An improvement began in the movement and activity of the treatment chicks.(T <sub>B</sub> ) and (T <sub>G</sub> ) chicks, which seemed more lively with higher feed consumption compared to the chicks of the two treatments (T <sub>W</sub> and T <sub>Y</sub> ), while the (T <sub>Mix</sub> ) chicks were described as good in terms of movement and feed consumption from the first day. |
| 2             | The movement and feed consumption of birds began to improve.T <sub>B</sub> ) compared to the treatment (T <sub>G</sub> ) and the treatment birds (T <sub>mix</sub> ) continued to improve compared to the birds of the two treatments (T <sub>W</sub> and T <sub>Y</sub> )   |
| 4             | Treated birds (T <sub>mix</sub> ) with more feed consumption followed by an improvement in movement and feed consumption among treatment birds (T <sub>B</sub> ) compared to treatment birds (T <sub>G</sub> ), followed by treatment birds (T <sub>W</sub> ) and treatment birds (T <sub>Y</sub> ) with less feed consumption   |
| 5             | It appeared clear stress and anxiety with a decrease in the consumption of feed among the birds of the two transactions (T <sub>W</sub> and T <sub>Y</sub> ) compared to the rest of the transactional birds, as they showed a quick movement to move away and flee as soon as they were approached.   |
| 6             | Treatment birds outperformed (T <sub>mix</sub> ) in terms of movement and the amount of feed intake, and the transaction birds were arranged according to vitality and the amount of feed intake according to the following (T <sub>B</sub> ), then treatment birds (T <sub>G</sub> ), then (T <sub>W</sub> ), and finally treatment birds (T <sub>Y</sub> ).                                |

It appears from the observations recorded in the table (3) that birds exposed to incandescent light from yellow tungsten lamps (TY) was suffering from stress and anxiety, and this was reflected in her behavior, feed intake, and ultimately affected the weight of the birds at the end of the experiment.

This activity, which leads to improved feed intake and thus productive efficiency in birds, the decrease in fear and stress in birds exposed to colored lighting leads to a decrease in the level of the hormone cortisol and an increase in the concentration of the hormone melatonin. While the incandescent light emanating from white fluorescent lamps (TW), a similar effect to yellow tungsten lamps, but it was somewhat less stressful for birds. And this may be attributed to this was being less intense than tungsten lamps, in addition to the fact that yellow is one of the primary colors that does not result from a mixture of colors. And is considered one of the colors that attract attention and keep the birds in a state of constant alertness, which increases their stress. And the white color is not counted Luna According to the sensory concept of perceiving colors, but in fact it is a color without tincture, It is the sum of all the colors invisible spectrum it is less stressful for birds.

As for the lighting from the LED lamps, it is of low intensity and is comfortable for the bird's eye, and reduces its stress state. This confirms that the intensity of the wavelength and the source of light affect the physiological and behavioral responses of the birds in addition to the comfortable colors emanating from them. It was expected that the different wavelengths of light have a diverse ability to stimulate the retina. It is a mixture of yellow and blue colors, and it gave good results during the experiment, specifically in the first period of the birds' life until the fourth week. On the other hand, the blue color had a significant ( $p \leq 0.05$ ) positive effect on the behavior of the birds in the second period of the birds' life, from the fourth week until the marketing age.

The blue color is one of the basic colors that are calm and comfortable for birds eyes, and this color simulate the colors of the nature such as sea and sky colors. Birds whene exposed to white or yellow light were more active, and this was observed through (fast walking, head movement, scratching and clicking the brush, vigorous wing flapping, feather clicking and aggressiveness). Also, found that abnormal behavior (aggressiveness and feather pecking) was significantly higher in birds exposed to yellow and white light compared to light of other colors, as a result of increased activity and movement of birds.

Recent studies showed that broiler birds exposed to blue-green lighting had improved calm behavior and increased well-being and welfare compared to white.

The combination of blue and green lighting ( $T_{MIX\ G+B}$ ) gave the turquoise color that combined the characteristics of the two colors, and excelled through the results of the experiment, as a significant ( $p \leq 0.05$ ) improvement appeared in the birds exposed to these two colors. In terms of behavior, movement, the amount of feed ingested, weight, and stress relief from the birds, and showed comfort appeared clear on the birds, which this indicates that this color is one of the distinctive colors, and is preferred for the sight and vision of birds..

**Conclusions:** Replacing traditional lamps with lamps the colored LED lights in the broiler poultry house significantly reduced the mortality rate, and improved the behavioral and well-being of those treatments.

So it is recommended to use lamps LED in broiler care pens instead of traditional lighting lamps (fluorescent and tungsten), and conducting in-depth studies on the effect of this type of lighting on the health and immunological indicators of broiler chickens.

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УДК 31:63(470+571)

## **ENHANCING THE ADDED VALUE OF STRAWBERRY FRUITS IN TARTOUS/SYRIA**

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**Abstract.** The research was conducted in Tartous Governorate for the agricultural season 2020-2021 with the aim of estimating the added value of the fresh and processed strawberry crop, and comparing them, to show the effect of the processing process on enhancing the added value of strawberry fruits .The results showed that the process of processing strawberry fruits, whether at the domestic or commercial level, contributed to enhancing the added value of strawberry fruits, including increasing the financial return, and the manufacturing process also contributed to absorbing the surplus from production. And reduce as much as possible the rate of loss.