SUMMARY AND CONCLUSION
CHAPTER-VI

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Experiment was conducted on hundred birds of about 5 months age to study the "Effect of stresroak on nutrient utilization, egg production and certain blood metabolites in White plymouth rock birds". The birds were randomly divided into 4 groups, 25 birds in each group. The trial was carried out at poultry unit of Instructional Livestock Farm of Narendra Deva University of Agriculture and Technology, Narendra Nagar, Kumarganj, Faizabad (U.P.).

A measured quantity of feed was provided to the birds every day upto 20\textsuperscript{th} week of age. The birds of groups I, II, III and IV received 0.0, 8.0, 10.0 and 12.0 ml/100 birds of stresroak in drinking water, respectively.

Samples of feed offered and residue left were collected daily during experimental period to estimate the dry matter intake and digestibility of nutrients.

Feed consumption

Feed consumptions in hundred days/bird were 13.60 \pm 6.35, 13.67 \pm 6.01, 13.70 \pm 5.49 and 13.67 \pm 3.92 kg in group I, II, III and IV, respectively. Significantly higher feed consumption was observed under treatment groups.
Average egg production

The egg productions during hundred days were 37.00 ± 0.40, 39.00 ± 0.36, 40.00 ± 0.34 and 39.00 ± 0.32 in groups I, II, III and IV, respectively. Significant differences were observed among various groups of birds.

Feed conversion efficiency

The feed conversion efficiency in group I, II, III and IV was 369.84 ± 4.78, 349.87 ± 3.74, 344.07 ± 3.19 and 355.37 ± 3.30 grams, respectively. Significantly higher feed conversion efficiency was observed in control group as compared to treatment groups.

Age at laying the first egg

The age at laying the first egg had been observed as 207.72 ± 1.77, 209.44 ± 1.47, 208.28 ± 1.43 and 207.84 ± 1.34 day in group I, II, III and IV, respectively. There was no significant difference in various groups of birds.

Body weight at the first egg laid

The body weights at first egg laid were 2172 ± 56.42, 2104 ± 43.38, 2064 ± 43.54 and 2116 ± 54.36 g in group I, II, III and IV, respectively. No-significant difference in various groups of birds had been noticed.

Nutrient digestibility

The dry matter digestibilities were 67.00 ± 0.15, 67.89 ± 0.11, 68.31 ± 0.10 and 67.78 ± 0.13 per cent in group I, II, III and IV, respectively. The digestibility of dry matter were significantly higher
The digestibility coefficient of organic matter in four groups viz., I, II, III and IV were 68.63 ± 0.08, 69.37 ± 0.11, 69.73 ± 0.10 and 69.21 ± 0.12 per cent, respectively. Significantly higher digestibility of organic matter was observed under treatment groups than control group.

The digestibility of total carbohydrate were 71.34 ± 0.07, 71.99 ± 0.10, 72.35 ± 0.09 and 71.86 ± 0.10 per cent in group I, II, III and IV, respectively. The differences were found to be significant among the various groups of birds.

The digestibility coefficient of crude protein were 60.88 ± 0.10, 61.78 ± 0.13, 62.29 ± 0.12 and 61.65 ± 0.15 per cent in group I, II, III and IV, respectively. Significantly higher digestibility of crude protein was observed under stressroak fed groups.

The digestibility of crude fat in four groups viz., I, II, III and IV were 56.28 ± 0.11, 57.26 ± 0.17, 57.83 ± 0.14 and 57.03 ± 0.17 per cent, respectively. Significantly higher digestibility of crude fat was observed under treatment groups as compared to control group.

Nutrient balance

Nitrogen balance were 1.42 ± 0.08, 1.48 ± 0.07, 1.51 ± 0.07 and 1.47 ± 0.05 g/d in group I, II, III and IV, respectively. There was significant difference in the nitrogen balance among the groups of birds.

Calcium balance were 2.77 ± 0.09, 2.81 ± 0.09, 2.85 ± 0.08 and 2.81 ± 0.07 g/d in group I, II, III and IV, respectively. Highly significant differences in calcium balance were observed among the groups of birds.
The phosphorus balance in groups I, II, III and IV were 0.11 ± 0.01, 0.13 ± 0.01, 0.14 ± 0.01 and 0.12 ± 0.01 g/d, respectively. Significant difference in phosphorus balance was observed in all groups of birds.

External egg quality

Egg weight of 45.00 ± 0.43, 45.00 ± 0.63, 44.00 ± 0.63 and 44.00 ± 0.50 g have been recorded in group I, II, III and IV, respectively. There was no significant difference in the egg weights in various groups of birds fed on stresroak in the drinking water of broilers.

Egg length were 55.93 ± 0.36, 55.70 ± 0.42, 53.46 ± 0.67 and 55.59 ± 0.34 (mm) in group I, II, III and IV, respectively. The significant difference in egg length was observed in all groups of birds.

Egg width were 41.54 ± 0.25, 41.80 ± 0.26, 40.72 ± 0.24 and 41.09 ± 0.24 mm in group I, II, III and IV, respectively. The differences were significant among various groups of birds.

Shell thickness of 0.23 ± 0.01, 0.25 ± 0.02, 0.25 ± 0.01 and 0.25 ± 0.01 mm had been recorded in group I, II, III and IV, respectively. The effect of stresroak on shell thickness was found to be significant.

Shell membrane thickness were 0.02 ± 0.00, 0.02 ± 0.00, 0.02 ± 0.00 and 0.02 ± 0.00 in group I, II, III and IV, respectively. No significant influence of treatment had been noticed.

Shell weight of 5.39 ± 0.23, 5.37 ± 0.13, 5.93 ± 0.10 and 5.76 ± 0.14 g had been observed in group I, II, III and IV, respectively. The shell weight was not free from the effect of stresroak.

Shape indices were 74.32 ± 0.56, 75.08 ± 0.46, 76.36 ± 0.84 and
differences in shape indices among the groups of bird had been recorded.

Internal egg quality

Yolk weight was maximum in treatment group III (15.56 ± 0.39 g) and minimum in group I (13.36 ± 0.33 g). The differences were significant among various groups of birds.

Yolk indices were 44.84 ± 0.51, 46.75 ± 0.80, 46.91 ± 0.55 and 45.64 ± 0.50 in group I, II, III and IV, respectively. The birds of different groups did not show any significant differences in their yolk indices.

Albumen weights of 28.78 ± 1.07, 29.73 ± 0.87, 30.39 ± 0.61 and 29.27 ± 0.52 g had been noticed in group I, II, III and IV, respectively. Non significant difference was observed among the various groups of birds.

Albumen indices were 11.59 ± 0.21, 11.76 ± 0.21, 11.30 ± 0.23 and 11.11 ± 0.24 in group I, II, III and IV, respectively. It was free from the effect of stressroak in the drinking water.

Haugh unit scores were 88.66 ± 0.65, 89.26 ± 0.64, 87.79 ± 0.82 and 86.87 ± 0.79 in group I, II, III and IV, respectively. The haugh unit score was found to be significant in various groups of birds.

Certain blood metabolites

Haemoglobin levels of 10.52 ± 0.17, 16.00 ± 0.07, 12.82 ± 0.12 and 12.12 ± 0.09 g/100 ml were recorded in group I, II, III and IV, respectively. The differences were significant among various groups of birds.
Haematocrit values were $28.62 \pm 0.17$, $30.40 \pm 0.23$, $30.66 \pm 0.14$ and $30.16 \pm 0.20$ per cent in group I, II, III and IV, respectively. The results revealed significantly higher haematocrit value in group III, followed by group II, IV and I.

Packed cell volume were $29.90 \pm 0.10$, $45.56 \pm 1.44$, $38.28 \pm 0.13$ and $37.12 \pm 0.11$ per cent in group I, II, III and IV, respectively. The differences were significant among various groups of birds.

Total leucocyte count of $28.15 \pm 0.17$, $27.76 \pm 0.12$, $28.19 \pm 0.12$ and $28.15 \pm 0.13$ per cent were noticed in group I, II, III and IV, respectively. The treatment did not affect significantly the total leucocyte counts.

Lymphocyte levels were $63.60 \pm 0.50$, $58.40 \pm 0.50$, $58.80 \pm 0.48$ and $58.60 \pm 0.50$ per cent in group I, II, III and IV, respectively. The differences were significant among various groups of birds.

Neutrophils were $34.40 \pm 0.50$, $38.40 \pm 0.50$, $36.60 \pm 0.50$ and $40.00 \pm 0.44$ per cent in group I, II, III and IV, respectively. Highly significant differences were observed among the various groups of birds.

Eosinophils had been observed as $2.01 \pm 0.02$, $2.02 \pm 0.02$, $1.91 \pm 0.02$ and $1.96 \pm 0.02$ per cent in group I, II, III and IV, respectively. The eosinophil levels was found to be affected significantly by the feeding of stresroak in the drinking water.

Basophils were $1.72 \pm 0.02$, $1.79 \pm 0.01$, $1.85 \pm 0.02$ and $1.81 \pm 0.02$ per cent in group I, II, III and IV, respectively. The differences were found to be significant among the various groups of birds.
Monocyte levels was found to be 4.66 ± 0.05, 5.04 ± 0.05, 5.28 ± 0.08 and 5.20 ± 0.07 per cent in group I, II, III and IV, respectively. Highly significant differences were observed among the various groups of birds.

The value of RBC was maximum in treatment group II (4.08 ± 0.12) and minimum in control group (3.30 ± 0.07). Differences were observed to be significant among various groups of birds.

The maximum value of WBC (27.20 ± 0.37) was observed in treatment group III and minimum in control group (24.20 ± 0.37). The differences were significant among the different groups of white plymouth rock birds.

Total serum protein had been noticed as 4.21 ± 0.05, 3.98 ± 0.04, 4.52 ± 0.01 and 4.24 ± 0.02 g/100 ml in group I, II, III and IV, respectively. The differences were significant among the various groups of birds.

Glucose levels were 260.18 ± 0.73, 182.08 ± 0.43, 203.18 ± 0.94 and 139.52 ± 0.40 mg/100 ml in group I, II, III and IV, respectively. The different groups differed significantly in their glucose levels.

The levels of Cholestrol were 152.5 ± 0.79, 166.26 ± 0.46, 181.64 ± 0.84 and 170.3 ± 0.62 mg/100 ml in group I, II, III and IV, respectively. The differences were significant among the various groups of birds.

The value of serum calcium was highest in treatment group III (23.80 ± 0.08) and lowest in group I (22.26 ± 0.09 mg/100 ml). Significant difference was observed among the various groups of birds.
Serum phosphorus levels of $8.68 \pm 0.05$, $9.25 \pm 0.14$, $10.08 \pm 0.10$ and $9.95 \pm 0.01$ mg/100 ml were observed in group I, II, III and IV, respectively. The different groups differed significantly in their levels of serum phosphorus.

Certain blood enzyme activity

SGPT activities were $22.62 \pm 0.41$, $24.84 \pm 0.34$, $24.26 \pm 0.31$ and $27.26 \pm 1.00$ U/ml in group I, II, III and IV, respectively. The differences were significant among the various groups of birds.

SGOT levels of $21.96 \pm 0.26$, $20.12 \pm 0.78$, $25.94 \pm 0.80$ and $23.72 \pm 0.61$ U/ml were observed in group I, II, III and IV, respectively. Significant difference was observed among the various groups of birds.

Alkaline phosphatase were maximum in group III ($8.06 \pm 0.23$) and minimum in group II ($6.15 \pm 0.06$) I.U.L. The differences were significant among the various groups of birds.

Acid phosphatase levels were $1.37 \pm 0.02$, $1.25 \pm 0.01$, $1.59 \pm 0.05$ and $1.76 \pm 0.03$ (K.A.) in group I, II, III and IV, respectively. The different groups showed significant differences in their levels of acid phosphatase.

Per cent hatchability

Chicks hatched were $33.00 \pm 1.15$, $34.00 \pm 0.94$, $36.00 \pm 0.57$ and $34.00 \pm 0.57$ in group I, II, III and IV, respectively. Higher chicks hatched was observed in treated groups than control group.

Hatchability percentages were $66.00 \pm 2.30$, $68.00 \pm 2.30$, $72.00 \pm 1.15$ and $68.00 \pm 1.15$ in group I, II, III and IV, respectively. There was
no-significant differences among the groups of birds in their hatchability percentages.

Vital organ weight

Body weights of 2366 ± 13.75, 2514 ± 14.90, 2620 ± 18.20 and 2434 ± 12.00 g had been noticed group I, II, III and IV, respectively. Significant differences were observed among the various groups of birds.

Heart weights were 10.0 ± 0.41, 10.5 ± 0.54, 1.42 ± 0.24 and 10.2 ± 0.25 g in group I, II, III and IV, respectively. Significant differences were observed among the various groups of birds.

Liver weight was found to be 45.74 ± 1.15, 36.32 ± 0.67, 47.22 ± 0.96 and 41.28 ± 0.42 g in group I, II, III and IV, respectively. The liver weights showed significant differences among the various groups of birds.

Lung weight of 10.01 ± 0.07, 10.08 ± 0.09, 10.21 ± 0.11 and 10.07 ± 0.08 g had been recorded in group I, II, III and IV, respectively. The differences were non-significant in different groups of birds.

The weights of kidney were 8.84 ± 0.29, 8.14 ± 0.25, 9.84 ± 0.26 and 8.32 ± 0.19 g in group I, II, III and IV, respectively. The effect of stressroak significant on kidney weights in various groups of white plymouth rock birds.

Number of mature ova in ovary

The number of mature ova in group I, II, III and IV were 3.0 ± 0.45, 4.0 ± 0.32, 5.0 ± 0.32 and 4.0 ± 0.32, respectively The differences
was significant among the various groups of white plymouth rock birds.

Mortality rate

The mortality rates of 16, 12, 8 and 12 per cent had been noticed in group I, II, III and IV, respectively indicating lower mortality rate in stresroak fed groups as compared to control group.

From the above study, it can be concluded that incorporation of stresroak upto 8.0 per cent in the drinking water of broilers, improved feed consumption, nutrient utilization, egg production, hatchability percentage, vital organs weight and lower mortality rate. Therefore, it may be suggested, for over all production efficiency, 8.0 per cent of stresroak can be provided in the drinking water of broiler birds without any detrimental effect.