Efficacy of Selenium (Se) and Zinc (Zn) supplementation in combating summer-induced-heat stress in ducks

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High ambient temperature along with high humidity constitute major problems for poultry and duck production in tropics by inducing huge economic losses, e.g. coastal Indian state: Odisha. The present study was conducted to assess role of microminerals: Se, Zn and their combination in alleviating summer-induced heat-stress in ducks. Ninety six White Pekin ducks (pullets) were randomly assigned into 4 dietary groups containing 8ducks each, in triplicate and study was conducted during May - June 2017, for 46 days. Group I received basal diet (control) and group II received Se @0.30 mg/Kg feed, group III received Zn @40 mg/kg feed and group IV was supplemented with Se @0.30 mg/kg feed plus Zn @40 mg/kg feed along with basal diet. The temperature and humidity were recorded daily and blood samples were collected on days: 0, 23 and 46 to assess the effects on haematological (PCV, Hb and Heterophil/lymphocyte ratio); biochemical (serum cortisol, ALP, LDH, blood glucose, triglyceride, cholesterol and blood-urea nitrogen) and oxidative stress indices [i.e. lipid peroxidation in terms of malondialdehyde production (MDA), NBT-assay, reduced glutathione (GSH), anti-oxidant enzyme Super oxide dismutase (SOD), Catalase, Glutathione Peroxidase (GPx)]. The mean maximum and minimum temperature were 39.16o C and 26.57o C and for relative humidity were 82.98 % & 46.13% respectively. Heat stress severely perturbed the haematological, biochemical and oxidative stress indices which stood significantly ameliorated by combination of Zn and Se supplementation. It is concluded that combination of Zn and Se provides a reliable-relief measure for ameliorating Summer-induced heat-stress in ducks.

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| --- | --- | --- | --- | --- | --- |
| **Temperature** | | | **Humidity** | | |
| **Date** | **Max (⁰C)** | **Min (⁰C)** | **Date** | **7hr (%)** | **14hr(%)** |
| 09-04-2017 | 36.2 | 27.0 | 09-04-2017 | 82 | 53 |
| 10-04-2017 | 36.6 | 27.0 | 10-04-2017 | 86 | 42 |
| 11-04-2017 | 37.4 | 26.6 | 11-04-2017 | 88 | 40 |
| 12-04-2017 | 40.4 | 24.6 | 12-04-2017 | 93 | 45 |
| 13-04-2017 | 40.2 | 25.6 | 13-04-2017 | 89 | 42 |
| 14-04-2017 | 37.0 | 25.8 | 14-04-2017 | 85 | 46 |
| 15-04-2017 | 37.2 | 25.4 | 15-04-2017 | 82 | 43 |
| 16-04-2017 | 38.4 | 25.6 | 16-04-2017 | 82 | 45 |
| 17-04-2017 | 35.1 | 20.0 | 17-04-2017 | 83 | 71 |
| 18-04-2017 | 35.2 | 26.2 | 18-04-2017 | 97 | 51 |
| 19-04-2017 | 35.6 | 27.8 | 19-04-2017 | 94 | 54 |
| 20-04-2017 | 35.4 | 26.4 | 20-04-2017 | 90 | 58 |
| 21-04-2017 | 35.8 | 24.2 | 21-04-2017 | 85 | 55 |
| 22-04-2017 | 36.4 | 27.4 | 22-04-2017 | 87 | 58 |
| 23-04-2017 | 36.6 | 27.8 | 23-04-2017 | 87 | 59 |
| 24-04-2017 | 36.2 | 27.4 | 24-04-2017 | 92 | 60 |
| 25-04-2017 | 37.6 | 27.0 | 25-04-2017 | 89 | 52 |
| 26-04-2017 | 40.0 | 26.4 | 26-04-2017 | 86 | 44 |
| 27-04-2017 | 40.6 | 27.2 | 27-04-2017 | 92 | 43 |
| 28-04-2017 | 37.8 | 27.4 | 28-04-2017 | 81 | 54 |
| 29-04-2017 | 39.1 | 26.8 | 29-04-2017 | 87 | 45 |
| 30-04-2017 | 37.8 | 27.4 | 30-04-2017 | 88 | 46 |
| 01-05-2017 | 36.8 | 27.0 | 01-05-2017 | 85 | 48 |
| 02-05-2017 | 37.0 | 26.4 | 02-05-2017 | 82 | 48 |
| 03-05-2017 | 38.2 | 26.4 | 03-05-2017 | 78 | 45 |
| 04-05-2017 | 38.4 | 27.0 | 04-05-2017 | 82 | 48 |
| 05-05-2017 | 39.4 | 27.0 | 05-05-2017 | 84 | 45 |
| 06-05-2017 | 38.4 | 26.8 | 06-05-2017 | 82 | 46 |
| 07-05-2017 | 36.0 | 24.4 | 07-05-2017 | 81 | 46 |
| 08-05-2017 | 40.4 | 27.4 | 08-05-2017 | 83 | 44 |
| 09-05-2017 | 38.5 | 26.8 | 09-05-2017 | 84 | 47 |
| 10-05-2017 | 38.0 | 24.0 | 10-05-2017 | 86 | 51 |
| 11-05-2017 | 35.4 | 26.0 | 11-05-2017 | 89 | 43 |
| 12-05-2017 | 37.2 | 27.2 | 12-05-2017 | 85 | 45 |
| 13-05-2017 | 38.8 | 27.4 | 13-05-2017 | 85 | 45 |
| 14-05-2017 | 39.0 | 27.0 | 14-05-2017 | 83 | 42 |
| 15-05-2017 | 40.2 | 28.4 | 15-05-2017 | 81 | 45 |
| 16-05-2017 | 40.1 | 28.6 | 16-05-2017 | 83 | 46 |
| 17-05-2017 | 38.8 | 28.0 | 17-05-2017 | 83 | 54 |
| 18-05-2017 | 39.6 | 29.0 | 18-05-2017 | 85 | 47 |
| 19-05-2017 | 39.0 | 28.0 | 19-05-2017 | 87 | 46 |
| 20-04-2017 | 39.4 | 27.6 | 20-04-2017 | 80 | 45 |
| 21-04-2017 | 40.1 | 27.0 | 21-04-2017 | 76 | 41 |
| 22-04-2017 | 40.0 | 28.8 | 22-04-2017 | 81 | 42 |
| 23-04-2017 | 39.6 | 28.4 | 23-04-2017 | 75 | 46 |
| 24-04-2017 | 39.0 | 28.0 | 24-04-2017 | 79 | 45 |