The impact of brief temporary heat stress on some physiological parameters in young birds

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When measuring the body temperature of the turkeys before beginning the study determined that the average temperature for the experimental group was 41,0^{0}C. After 2 hours the effects of heat stress there was a statistically significant increase of body temperature of the bird by 0.5^{0}C. In the study of the body temperature of the turkey after 6 hours of exposure to heat stress, body temperature turkeys returned to normal, and after 26 hours was decreased by 0.5^{0}C ($P< 0.01$) and was maintained at this level until the end of the research. The heat loss from the body poultry occurred mainly by evaporation.

Poultry do not have sweat glands, but the evaporation of a small amount of water is from the surface of the skin, resulting in negligible heat loss. However, turkeys evaporation occurs primarily during breathing from the surface of the membranes covering the airway. According to our research the acceleration of the respiration of turkeys came through 60 minutes after their stay at temperature 25^{0}C. With increasing ambient temperature up to 30^{0}C, the number of respiratory movements increased to 94 per minute. Raising the external temperature to 32^{0}C, 38^{0}C, 49^{0}C, increased the number of respiratory movements respectively 177, 269, 315. Intense breathing leads to significant water loss in the body, to replenish which the bird drinks the more times the amount of water. About our research in the first days of stay of turkeys at a temperature of 38^{0}C with the consumption of water increased significantly, while feed consumption was decreased by 1/3 from the general rule. Reducing the amount of feed consumption resulted in decreased production of heat, which in turn contributed to the decrease in the temperature of the body turkeys, and cooling of the body through heavy breathing. The use of

significant amounts of water could lead to the quick return of body temperature to normal and further fall for 26 and 50 hours.

On the impact of heat stress chickens in comparison with the turkeys reacted differently. At a temperature of 35^0C external environment after an hour came the increase in body temperature by 1.5^0C, and subsequently after 6 and 24 hours of exposure to heat stress, a reduction in body temperature by 0.5^0C, which by the end of the study within seven days did not come back to normal.

When calculating the number of respiratory movements in chickens an hour after their stay at temperature 35^0C installed increases from 40 to 120 per minute, while the turkeys after 30 minutes of being in the room at a temperature of 32^0C found an increase in the number of respiratory movements with 20 to 177 per minute. More intensive breathing in turkeys leads to rapid heat loss through the evaporation of water through the mucous membranes of the respiratory tract, as evidenced by slow growth of body temperature and faster return to normal in turkeys compared to chickens at the same ambient temperature.

The important issue is the influence of humidity of the external environment on body temperature turkey poults and chicks up to four weeks of age. The turkeys that were subjected to long-term operation temperature (35^0C), humidity had no effect on their body temperature. Unlike chickens, which was at a temperature of 35^0C, relative humidity of 60 – 65 % led to decrease the temperature of their body. When analyzing the results of the study suggest that turkeys compared to chickens, due to improved thermoregulation mechanisms, exhibit a higher tolerance to the high temperatures of the external environment also equally and humidity.

In the study of acid – base balance in turkeys 12 weeks of age average blood pH was 7,31+0,04 in the beginning of the experiment. After two hours of heat stress blood pH increased to 7.34+0,01. The high temperature for six hours resulted in a slight rise of pH of 7.35+0,05. On 26 and 50 hours of heat stress pH decreased almost to baseline and was 7,31+0.04 and 7,30+0,06 according to the provided time.

It must be emphasized that a significant difference in pH of blood from individual animals. In our experiments, the rate ranged from 7,18 to 7,43, but after 2 and 6 hours of heat stress occurred also a slight decrease in pCO_2. Given the parameters of acid – base balance suggest that after 2 and 6 hours operation temperature stress in turkeys is the tendency to acceleration of the respiratory movements. However, quick response regulatory mechanisms have not led to the deepening of breathing through 26 and 50 hours of action of the stress and allowed us to keep the blood pH at a constant level.

In the study of acid – base balance in turkeys 12 weeks of age the average blood pH was 7,31, whereas in 30 weeks, named figure was increased to a value of 7, 37 and 40 weeks was equal to the 7.43. These data suggest that the turkeys blood pH depends on the age. The parameters of acid – base balance in turkeys 12 weeks of age has had some impact, the temperature of the external environment. Thus, when ambient temperature 35^0C was observed fever turkeys for $2,4^0$C with a simultaneous increase in the number of respiratory movements from 20 to 269 per minute and raising blood pH with 7,31 ± 0.04 to 7,35 ± 0,05.

Other indicators identified in males under the influence of temperature on acid – base balance. Males after 90 minutes exposure to a temperature of 350 with blood pH increased to of 7.48 – 7,54.

The bird during respiration increases the number of respiratory movements, but decreases tidal volume. Acceptable tidal volume limit hyperventilation only to the surface of the act of respiration, which does not participate in the exchange of gases between blood and air, in consequence of which changes the ability to extract excess CO_2 from the blood that was observed in turkey poults. In chickens reduction of pCO_2 to 11 mm Hg was associated with increased blood pH of 7.48 to – 7,54. The low pH of turkeys at lowering CO_2 indicate that in comparison with chickens turkeys have the best recovery mechanism of constancy of pH of blood. One such mechanism is a buffer hemoglobina system, can be more effective in turkeys compared to chickens. More intensive work of the respiratory muscles in turkeys, possibly linked to the formation of large amounts of lactic acid.