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The immunological effect of heat stress in laying hens with use of apple cider vinegar, betaine and their combination in drinking water

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Egg production and some blood parameters were investigated during high temperature in laying hens. Tetra-SL hens were kept in four groups (15 animals in each) for 47 days in a hot summer period. For the prevention of the possible heat stress additives were added to the water. The Group A was treated with apple cider vinegar (1 L 5% vinegar/100 L drinking water). The Group B with betaine (10 g/10 L drinking water) and both additives were mixed into the water of third the Group AB. The fourth group received only tap water and served as control (Group K). The environmental and pen temperature was registered. Before, during and after the heat stress period (the temperature was 15-20 °C higher than the technological adequate for a week) the number of egg laid, and some blood value (packed cell volume, PCV and titre of immunoglobulin IgY) were determined.

PCV (L / L) values decreased in all treatment groups compared to blood samples before the heat stress period. After statistical analysis, only the control group (before HS 28.4% after 25.7% HS) and apple cider vinegar-betain in the case of treatment (before HS 28.8%, 24.4% after HS) had significantly decreasing value. The hens responded to increased water consumption in the warm environment for thermoregulation. This is caused moderate hemodilution.

The 10 days of extreme heat causes decreased in all groups of IgY titers. Differences in samples taken before and after heat stress titers in betaine group had the smallest. However, significance was detected only in group AB (0.147 OD before HS after HS OD 0.127). The vinegar and betaine have no synergism in our case. The Tetra-SL hybrid can tolerate the heat stress conditions which characterised 15-20 °C higher values than the technological adequate.

Key words: heat stress, laying hen, IgY, immune status, apple cider vinegar, betain, PCV, ELISA

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