WELFARE & NUTRITION

AWN-042

SUPPLEMENTATION OF A CLAY-MINERAL BASED PRODUCT MODULATES THE EFFECTS OF HEAT STRESS ON BODY TEMPERATURE, RESPIRATORY RATE, AND ILEAL ENDOTOXIN PERMEABILITY IN GROWING PIGS

N. Reisinger [1], S. Schaumberger [2], G.R. Murugesan [3], N. Gabler [4].

[1] BIOMIN Research Center, Tulln, Austria; [2] BIOMIN Holding GmbH, Getzersdorf, Austria; [3] BIOMIN America Inc., San Antonio, TX, United States; [4] Department of Animal Science, Iowa State University, Ames, IA, United States.

Pigs are quite sensitive to high temperatures and heat stress which can attenuate performance and wellbeing. The gastrointestinal tract is one of the major organs affected by heat stress. The objective of this study was to evaluate effects of a short-term heat stress on health parameters and ileal endotoxin permeability, and to assess the ability of a dietary clay-mineral based product to reduce the severity of heat stress challenge.

Thirty-two piglets (~21 kg) were either kept under thermoneutral conditions (24 hours at 28°C for 3 days), or under heat stress conditions (6 hours at 38°C; 18 hours at 32°C /day for 3 days). In addition, animals received either a diet without any supplement (control) or a diet with a clay-mineral based product (CM). Respiratory rate and body temperature were measured daily at 0, 2, 4 and 6 hours. Ileum endotoxin permeability was assessed via Ussing chamber assay using FITC-labeled lipopolysaccharides.

Average rectal temperature and respiratory rate significantly increased during heat stress ($P < 0.01$) compared to animals kept under thermoneutral conditions. Addition of CM significantly reduced respiratory rate (140.2 vs 134 bpm; $P < 0.001$) as well as rectal temperature (41.2°C vs 41°C; $P < 0.05$) during heat stress. In heat stressed animals, endotoxin permeability was significantly increased in the ileum (7.6 vs 31.9 AU; $P < 0.01$) compared to animals kept under thermoneutral conditions. CM showed a trend to decrease ileum endotoxin permeability in heat stressed animals (14.1 vs 31.9 AU; $P = 0.087$).

As expected, heat stress did have a negative effect on general health parameters as well as endotoxin permeability. In addition, the results indicate that supplementation of CM could counteract the negative effects of heat stress on selected parameters. However, mode of action of CM should also be assessed during long-term heat stress.