A Living Lab to address heat stress in dairy goats: impact of a nutritional intervention on milk yield and quality

Romero-Huelva, M[1]., Gómez, A[1]., Rivelli, I[1]., Romera, E[1]., Ortega A[2]., Baños, M[2]., & Yáñez-Ruiz, D.R[1*].

[1]CSIC, EEZ, Profesor Albareda, 1, 18008 Granada, Spain. [2]Grupo Omega, Pico del Mulhacén, 44, 28500 Madrid, Spain.

The frequency and intensity of extreme weather events are increasing, with a severe impact on livestock husbandry. Thermal stress impacts on animal welfare and is responsible for significant productive and economic losses. In the H2020 PATHWAYS project we established a Living Lab in south Spain to co-develop with farmers and livestock industry potential solutions to better deal with heat stress in dairy goats farms. The aim of this particular study was to evaluate the impact of a specific dietary supplement on primiparous dairy goats under heat stress conditions. Thirty Murciano-Granadina dairy goats from a commercial farm were used. They were randomly assigned to two treatments (n=15): control concentrate + alfalfa (**CTL**), and control concentrate with a methionine hydroxy analogue (HMBi) and a high-solubility magnesium oxide buffer (**HS**). The diet offered had a forage-to-concentrate ratio of 30:70. The trial started on July 1st and ended on October 30th, 2023. Individual daily milk yield was monitored, and temperature and relative humidity at the barn and milking parlor were recorded hourly using sensors. A total of eight samplings for milk composition were performed every fortnight. Moreover, 50 activity collars validated for dairy goats were used during the trial to monitor behavioral pattern (resting, eating, walking). The results were statistically analyzed using repeated measures GLM. Milk yield, protein, and the fat + protein contents were significantly higher ($P < 0.001$) in the HS diet compared to the CTL diet, with values of 2.71 vs. 2.20 kg/day for milk yield; 94.5 vs. 74.9 grams/day for protein production, and 215.4 vs. 176.6 grams/day for fat + protein, respectively. Similarly, fat production was higher ($P = 0.006$) in the supplemented animals (119.1 vs. 101.1 grams/day). THI values were higher ($P < 0.001$) during July and August compared to September and October, 75.4 and 68.6, respectively. A significant correlation was found between activity behaviors and the THI, but there was no effect of the treatment. Supplementing the diet of primiparous lactating goats with a HMBi and a high-solubility magnesium oxide buffer positively impacts milk production and quality under stress conditions.

Acknowledgements: H2020-PATHWAYS project (101000395)