Metabolic risk factors for impaired growth performance in intensively-fed light lambs

J. Pelegrin-Valls[1], B. Serrano-Pérez[1], D. Villalba[1], E. Molina[1], J.R. Bertolín[2], M. Joy[2] and J. Alvarez-Rodriguez[1]
[1]University of Lleida, Animal Science, Av Rovira Roure 191, 25198, Spain, [2]CITA-IA2 de Aragón, Producción y Sanidad Animal, Av Montañana 930, 50059, Spain; javier.alvarez@udl.cat

The light lambs' growth may be predicted on the basis of their earlier metabolic status. Forty-six composite Spanish local lambs, half by sex (females and males) and season (winter and summer seasons), were weaned at 41 ± 5.4 days of age (14.6 ± 1.3 kg of body-weight) and fed with concentrate and straw *ad libitum* until slaughter at 85 days of age (24.6 ± 3.7 kg of body-weight). The average daily gain (ADG) was calculated by regression of body-weights against time on finishing. Blood samples were collected at day 50 of age to analyse protein catabolite markers (urea, creatinine), energy markers (triglycerides, cholesterol, glucose) and oxidative status markers (free, protein-bonded and total malonaldehyde-MDA, and total antioxidant capacity through ABTS method). Partition tree data predictive modelling through JMP software was used as data mining to predict ADG on the basis of early-status plasma metabolites. The overall ADG was affected by season (248 g in winter vs 185 ± 17 g in summer, $P<0.05$) but not by sex (210 g in females vs 222 ± 17 g in males, $P>0.05$). At the start of the finishing period in winter, the worst performant lambs (ADG 164 ± 61 g, n=8) had glucose level below 88 mg/dl and concomitant total MDA above 6.78 μM ($R2=0.62$). In summer, the worst performance (ADG 137 ± 66 g, n=10) was observed in lambs that had early plasma creatinine above 0.83 mg/dl ($R2=0.56$). The performance was optimum in winter when plasma glucose was above 88 mg/dl (ADG 308 ± 48 g, n=10) and in summer when creatinine was below 0.83 mg/dl concomitantly with protein-bonded MDA above 6.93 μM (ADG 280 ± 40 g, n=5). These target thresholds may be used at the start of the intensive finishing as metabolic markers to trace a successful subsequent growth response.