Book of Abstracts

of the 75th Annual Meeting of the European Federation of Animal Science

Book of Abstracts No. 34 (2024)
Florence, Italy
1-5 September, 2024

Effect of early life nutrition on the growth, metabolic and carcass characteristics of beef cattle

A. Kelly[2], D. Kenny[1]
[1] Teagasc, Animal and Bioscience Research Department, Grange, C15PW93 Trim, Ireland, [2] University College Dublin, Animal Science, Belfield, Dublin 4 Dublin, Ireland

Early adaptation to a perinatal nutritional stimulus permanently alters cattle physiology and metabolism, significantly impacting key productivity and longevity traits such as reproductive development, pubertal advancement, and lifetime milk production. In beef production systems, maximizing carcass gain, achieving high meat yield, and meeting industry specifications for desirable quality attributes are crucial economic traits. Our research shows that up to 40% of the variation in final carcass weight is attributable to calf performance during the first three months of life. Failure to meet early growth targets by weaning and housing (under 7-8 months of age) often results in lighter carcasses and/or delayed age at slaughter, adversely affecting production efficiency, farm economics, and environmental impact. Enhanced early-life nutrition in beef calves has been shown to positively influence lifetime growth potential and carcass composition, but data on this are limited. Key developmental programming windows in early calf life are proposed to influence carcass composition and development. Strategic nutritional manipulation during these windows can enhance tissue hyperplasia and hypertrophy, particularly through targeting myogenesis—via the post-natal division of skeletal muscle satellite cells—and adipocyte development, characterized by hyperplastic growth. This approach may alter carcass gain, adiposity, composition, and meat quality later in life. This presentation will explore the effects of early-life growth and targeted nutritional strategies on tissue development at physiological and molecular levels, and will address the immediate and latent impacts on animal performance, carcass gain, composition, and production and environmental efficiency within sustainable pasture-based dairy beef systems.

Effects of undernutrition and hydroxytyrosol supplementation during the last third of gestation on growth and physiological profiles of male beef offspring

O. Akesolo-Atutxa[1], L. López De Armentia[1], A. Noya[1], G. Ripoll[1], N. Escalera-Moreno[2], J. Álvarez-Rodríguez[2], B. Serrano[2], A. Sanz[1]
[1] CITA de Aragón - IA2 (UNIZAR), Animal Science, Avda Montanana 930, 50059 Zaragoza, Spain, [2] University of Lleida, Animal Science, Avda Rovira Roure 191, 25198 Lleida, Spain

Effects of maternal subnutrition and hydroxytyrosol (HT, antioxidant from olive leaves) inclusion during late pregnancy on live weight (LW), average daily gain (ADG) and physiological profiles were studied in male beef offspring during the fattening period (4 to 12 months of age). From gestation week 28 to calving (w40), 109 cows were divided into four groups: feeding level (100 vs 60% requirement) x HT (Control vs HT, for 0 and 178 mg HT/kg unifeed). Parda de Montaña (n=25) and Pirenaica (n=21) concentrate-fed bulls were weighed monthly, and blood samples were collected bi-monthly to determine plasma levels of glucose, fructosamine, urea, creatinine and IGF-1. Data were analysed with a mixed linear model with feeding, HT, time and breed as fixed effects, and bull as random effect. Live weight at the end of the fattening and ADG during the fattening period were not affected by maternal feeding level (496 vs 498 kg LW; 1.18 vs 1.40 kg ADG; for 100 and 60%), HT inclusion (493 vs 501 kg LW; 1.22 vs 1.36 kg ADG; for Control and HT) or breed (501 vs 493 kg LW; 1.23 vs 1.35 kg ADG; for Parda and Pirenaica). Concerning physiological profiles, urea was the only one affected by the interaction feeding x HT (at 10 and 12 months of age). Interestingly, fructosamine and glucose levels did not follow a similar evolution over time. To sum up, maternal subnutrition and HT during the last third of gestation had no major effect on male offspring growth and physiology during the fattening phase. More studies are needed to assess their potential effects on male meat quality. Funded by PID2020-113617RR-C21 FETALNUT. Research group A25-23R.