Diet density during the first week of life: Effects on energy and nitrogen balance characteristics of broiler chickens. David Lamot, *Cargill Animal Nutrition Innovation Center Velddriel, Netherlands*.

This study aimed to determine effects of diet density on growth performance, energy balance, and nitrogen (N) balance characteristics of broiler chickens during the first week of life. Effects of diet density were studied using a dose-response design consisting of 5 dietary fat levels (3.5, 7.0, 10.5, 14.0, and 17.5%). The relative difference in dietary energy level was used to increase amino acid levels, mineral levels, and the premix inclusion level at the same ratio. Chickens were housed in open-circuit climate respiration chambers from d 0 to 7 after hatch. Body weight was measured on d 0 and 7, whereas feed intake was determined daily. For calculation of energy balances, O2 and CO2 exchange were measured continuously and all excreta from d 0 to 7 was collected and analyzed at d 7. Average daily gain (ADG) and average daily feed intake (ADFI) decreased linearly (P = 0.047 and P < 0.001, respectively), whereas gain to feed ratio increased (P < 0.001) with increasing diet density. Gross energy (GE) intake and metabolizable energy (ME) intake were not affected by diet density, but the ratio between ME and GE intake decreased linearly with increasing diet density (P = 0.006). Fat, N, and GE efficiencies (expressed as gain per unit of nutrient intake), heat production, and respiratory exchange ratio (CO2 to O2 ratio) decreased linearly (P < 0.001) as diet density increased. Energy retention, N intake and N retention were not affected by diet density. We conclude that a higher diet density in the first week of life of broiler chickens did not affect protein and fat retention, whereas the ME to GE ratio decreased linearly with increased diet density. This suggests that diet density appears to affect digestibility rather than utilization of nutrients.

Key Words: diet density, digestibility, first week, broiler