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Abstract title: **In vivo estimation of body composition: comparison of eight methods in dairy goats**

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Preferred presentation: Theatre

Preferred session: 05: Fitting PLF to species and animal size, possibilities for sheep, goats, poultry, horses, pigs and

Abstract text:

The objective was to test 8 methods for estimation of empty body lipid (EBL) and protein (EBP) mass in dairy goats. The methods tested on 20 Alpine goats (3 ± 0.6 years old; 226 ± 9 DIM; 47 to 72 kg of BW) were: adipose cell size; deuterium oxide dilution space (D2OS); 3-dimension (3D) imaging : whole body 3D-scan and automatic 3D assessment of body condition score (3D-BCS); manual sternal and lumbar BCS and ultrasound imagery; computer tomography and bioelectrical impedance spectroscopy (BIS). Simple and multiple regressions (Proc GLM, SAS) were tested between different variables and EBL and EBP mass measured by chemical analyses after slaughter. Perirenal adipose tissue mass and cell diameter combined with BW provided the most accurate predictive equations for EBL (R^2 = 0.95, residual coefficient of variation, rCV = 12%). Nonetheless, such predictors can only be measured *post-mortem*. The best equations for EBL derived from in vivo variables included BW combined with 1/ the volume of fatty tissues measured by computer tomography (R^2 = 0.92, rCV = 17%), 2/ the D2OS (R^2 = 0.91, rCV = 19%), and 3/ the BIS (R^2 = 0.87, rCV = 23%). D2OS combined with BW provided the best equation for EBP (R^2 = 0.97, rCV = 3%), whereas BW alone provided a fair EBP estimate (R^2 = 0.92, rCV = 4%). Manual BCS combined with BW provided good EBL and EBP estimations (R^2 = 0.80 and 0.94, rCV = 28 and 4%, respectively). BCS is a non-invasive technique and does not require particular equipment, but it is subjective and prone to operator bias. Compared to manual BCS, 3D-BCS combined with BW slightly decreased the accuracy of the predictive equation for EBL (R^2 = 0.74, rCV = 32%), and did not improve the estimation of EBP compared with BW alone. Ultrasound and whole body 3D imaging techniques were not satisfactory estimators of EBL and EBP (R^2 ≤ 0.40).