Assessment of Lamb Carcass Composition from Live Animal Measurement of Bioelectrical Impedance or Ultrasonic Tissue Depths

E.P. Berg, Department of Animal Science, Purdue University, West Lafayette, IN 47907
M.K. Neary, Department of Animal Science, Purdue University, West Lafayette, IN 47907
J.C. Forrest, Department of Animal Science, Purdue University, West Lafayette, IN 47907
D.L. Thomas, Department of Meat and Animal Sciences, University of Wisconsin, Madison 53706
R.G. Kauffman, Department of Meat and Animal Sciences, University of Wisconsin, Madison 53706

ABSTRACT

Market weight lambs, average weight 52.5 kg (±6.1), were used to evaluate nontraditional live animal measurements as predictors of carcass composition. The sample population (n = 106) represented U.S. market lambs and transcended geographic location, breed, carcass weight, yield grade, and production system. Realtime ultrasonic (RU) measurements and bioelectrical impedance analysis (BIA) were used for development and evaluation of prediction equations for % boneless, closely trimmed primal cuts (BCTPC), weight or % of dissected lean tissue (TDL), and chemically derived weight or % fat-free lean (FFL). Longitudinal ultrasonic images were obtained parallel to the longissimus thoracis et lumborum (LTL), positioning the last costae in the center of the transducer head. Images were saved and fat and LTL depths were derived from printed images of the ultrasonic scans. Bioelectrical impedance analysis was administered via a four-terminal impedance plethysmograph operating at 800 m A at 50 kHz. Impedance measurements of whole-body resistance and reactance were recorded. Prediction equations including common linear measurements of live weight, heart girth, hindsaddle length, and shoulder height were also evaluated. All measurements were taken just before slaughter. Bioelectrical impedance measurements (as compared to RU and linear measurements) provided equations for %BCTPC, TDL, %TDL, FFL and %FFL with the highest R2 and lowest root mean square error. Even though BIA provided the best equations of the three methodologies tested, prediction of proportional yield (%BCTPC, %TDL, and %FFL) was marginal (R2 = .296, .551, and .551, respectively). Equations combining BIA, RU, and linear measurements greatly improved equations for prediction of proportional lean yield.

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