

# The Use of Electrical Impedance to Predict Saleable Yield of Hog Carcass

Alan K.W. Tong, Andr  Fortin, Wayne M. Robertson,  
Sophie M. Zawadski, Tong Liu and Brady P. Chabot

Agriculture and Agri-Food Canada, Lacombe Research Centre, 6000 C & E Trail, Lacombe, AB T4L 1W1; *Email*: tonga@em.agr.ca

Electrical impedance has shown promise as a non-destructive method to assess carcass tissue composition of hogs. Data on 205 market weight hog carcasses, mean hot carcass weight  $86\pm 6$  kg, of varying fatness level, were used in this study. A laptop computer equipped with a National Instrument NI-488.2 PCMCIA interface adapter was used to control a 4-electrode Hewlett Packard 4284A Precision LCR meter to measure electrical impedance of carcasses at deep muscle temperatures of 39, 20, 12 and 3° C respectively, at various combinations of alternate current, voltage and frequency. Percent saleable yield was defined as the sum of yields from ham, loin, butt, picnic and belly, expressed as a percentage of cold carcass weight.

Electrical impedance did not change significantly from 5 alternating current and 5 voltage levels. However, increased frequency from 8 kHz to 200 kHz and decreased carcass temperature significantly ( $P<0.1$ ) and increased electrical impedance. The accuracy ( $R^2$ ) of predicting percentage saleable yield from using a basic reference model including fat and muscle depths from Destron probe was 0.67. Inclusion of impedance measurements obtained at the best 5 frequencies and the distance between the detector electrodes, in addition to the predictors from the basic reference model resulted in an accuracy ranging from 0.74 to 0.83, depending on temperature. This is equivalent to a 10 to 24% improvement of accuracy.

## Implications

Electrical impedance could provide a low cost and accurate instrument for online hog carcass grading.