Determination of IMF by MRI: a validation with the NIT and NMR techniques.

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The intramuscular fat content in fresh pork and its distribution through the muscle are important factors in sensory acceptability to the consumer. The determination of intramuscular fat is based on the meticulous and time-consuming standard chemical extraction methods. Although near infrared transmittance (NIT) is a secondary method linked to a chemical reference method by sophisticated calibration, it is now an approved method for the commercial chemical analysis of meat. In this study we validated a self-calibrated NMR relaxometry technique using a single oil reference tube to determine IMF content in dried pig longissimus thoracis muscle. The NMR technique gave identical IMF content values as the NIT technique, previously calibrated by the Soxhlet reference method, with a RMSE of 0.13% between the two physical methods. We therefore propose a reliable and accurate magnetic resonance imaging (MRI) method using very simple sample preparation and image analysis to determine IMF content and distribution in intact pig muscle samples. IMF values obtained through MRI matched well with those obtained by NMR relaxometry and NIT techniques, with standard errors of calibration of 0.20% and 0.23%, respectively.