A pan-European computed tomography procedure for measuring the new EU lean meat content of pigs

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A new EU regulation on carcass classification applies from July 2018. The new reference to calibrate the pig classification methods is a lean meat percentage based on total dissection (LMPtd). Manual dissection can be replaced by an unbiased computed tomography (CT) procedure. If the national pig population to be sampled has the same characteristics as the population for which a CT procedure has been previously corrected, no additional dissection is required. In most of the national applications for authorisation of classification methods the population characteristics are managed via a stratification on a fat depth, mimicking the LMP variation.

The aim of this paper is to propose a pan-European CT procedure to calibrate the pig classification methods without any additional manual dissection.

A sample of 29 half-carcasses was CT scanned with 3 mm slice thickness and then fully dissected according to the EU regulation.

The CT muscle volume was calculated by thresholding in the Hounsfield range 0-120. It was converted into muscle weight by applying a density of 1.04. The weight was divided by the carcass weight to obtain the lean meat percentage from CT (LMPct), in the same way as done for the LMPtd.

LMPtd was regressed on LMPct. Only the slope was significant and was estimated at 0.965 (s.e.=0.002). The RMSE was 0.81. The plot of residuals against fitted values showed no pattern and no heterogeneity of variances.

The main source of measurement error is the thresholding of the rind. As the thickness of the rind is very thin (2-3 mm), most of the voxels including rind are mixed voxels, either with air or with fat. Their Hounsfield values are therefore less than 0 and these voxels are classified in non-muscle. Only a few rind voxels have a Hounsfield value in the range [0-120 HU] and are thus misclassified in muscle. This is taken into account by the slope value which is slightly less than 1.

The LMPtd range in the sample (53-68) covers the S+E classes (>= 55) which represent more than 90% of the EU pigs. It covers too more than 80% of all the national populations, excepted Italy.

This robust CT procedure can therefore be applied in 27 Member States, by using a pan-European multiplicative factor of 0.965, without any additional national dissection.