Prediction of pork quality parameters by applying fractals and data mining on MRI

This work firstly investigates the use of MRI, fractal algorithms and data mining techniques to determine pork quality parameters non-destructively. The main objective was to evaluate the capability of fractal algorithms (Classical Fractal algorithm, CFA; Fractal Texture Algorithm, FTA and One Point Fractal Texture Algorithm, OPFTA) to analyse MRI in order to predict quality parameters of loin. In addition, the effect of the sequence acquisition of MRI (Gradient echo, GE; Spin echo, SE and Turbo 3D, T3D) and the predictive technique of data mining (Isotonic regression, IR and Multiple linear regression, MLR) were analysed. Both fractal algorithm, FTA and OPFTA are appropriate to analyse MRI of loins. The sequence acquisition, the fractal algorithm and the data mining technique seems to influence on the prediction results. For most physico-chemical parameters, prediction equations with moderate to excellent correlation coefficients were achieved by using the following combinations of acquisition sequences of MRI, fractal algorithms and data mining techniques: SE-FTA-MLR, SE-OPFTA-IR, GE-OPFTA-MLR, SE-OPFTA-MLR, with the last one offering the best prediction results. Thus, SE-OPFTA-MLR could be proposed as an alternative technique to determine physico-chemical traits of fresh and dry-cured loins in a non-destructive way with high accuracy.