

NIRS for the determination of composition and quality of pig muscle

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The determination of pig muscle composition and quality by traditional laboratory/chemical methods is very time consuming and very costly. Near infrared spectroscopy (NIRS) may allow prediction of both quality and compositional traits simultaneously on the same muscle sample quite rapidly with a considerable cost saving. NIRS, in the reflectance mode, uses principles similar to those used by meters for measuring meat color, except that infrared wavelengths are detected in addition to those in the visible part of the spectrum. This study was conducted to evaluate the potential of NIRS for estimating quality and compositional traits.

At 24 h post-slaughter, sections of longissimus muscle (between the 4th and 9th ribs) were collected from more than 500 pigs of varying genetic background. A number of quality and compositional traits were measured. Samples were analyzed, both wet (stored frozen, then thawed and blended) and dry (dried, pulverized, stored and then re-dried) on a Foss Perstorp 6500 NIR spectrophotometer (reflectance mode, wavelength = 400 - 2500 nm).

The accuracy of prediction was good for protein and fat contents of the dry samples (99%) and protein, fat and moisture contents of wet samples (96-99%). Certain traits, including protein and pigment (wet samples) and ultimate pH (dry samples), could be predicted moderately well (80-90% accuracy). NIRS seemed less promising (< 75% accuracy) for the prediction of some of the other quality traits (drip loss, colour, protein solubility, fat hardness, shear value).

Implications:

NIRS is very accurate for simultaneous determination of moisture, fat and protein composition of muscle, and is much more time-efficient than techniques now in general use. This technique does not seem well suited to the prediction of many other quality traits, but this conclusion should await further evaluation.