Validation of a method for measuring the colour and determining the proportions of myoglobin redox forms on beef

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The aim of this study was to validate the use of the spectrophotometer Minolta CM-600d for measuring the colour and the proportions of different myoglobin redox forms (oxymyoglobin, deoxymyoglobin, and metmyoglobin) on the surface of meat. One vacuum-packaged (VP) striploin was supplied by a Belgian food wholesaler. It was cut in 3 cm thick steaks, repacked under vacuum and stored at −0.5 °C until analyses. The measurement of colour in the C.I.E. L*a*b* space and the determination of oxymyoglobin, deoxymyoglobin, and metmyoglobin were performed on VP and modified atmosphere-packed (70 % O₂/30 % CO₂ for 24 h) samples (n = 10). Results obtained were compared to two reference methods (colour measurement using a chromameter Minolta CR-400 and spectrophotometric determination of different myoglobin redox forms in aqueous meat extracts) by F-test for precision and t-test for accuracy. Statistic significance level was established at 5 %. The two colour measurement methods presented the same precision, when considering VP samples only, and different accuracies, probably because of the different detectors and observation angles used by both devices. The two methods for determining the different myoglobin forms presented also the same precision but different accuracies, probably due to the fact that oxygenation is favoured during some steps of the reference method (e.g. extraction, filtration). In conclusion, the results for colour measurement obtained by both devices cannot be compared. It is necessary to compare both methods for determining oxymyoglobin, deoxymyoglobin, and metmyoglobin in complete anaerobic conditions in order to eliminate the oxygenation bias.