Non-destructive salt content prediction in brined pork meat using ultrasound technology

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Abstract

This works aims to show the feasibility of using low-intensity ultrasound (US) to predict the salt content in brined Biceps femoris (BF) and Longissimus dorsi (LD) pork muscles. For this purpose, meat samples were salted in brine solution (20% w/w at 2 ºC) for different times (24, 48, 96 and 168 h) and the US velocity measured before and after salting. In addition, model samples with preset water and salt contents were formulated and the US velocity was measured. In the model samples, the salt content (X_S) had a more marked effect on the US velocity (13.0 m/s per $\Delta X_S = 1\%$ wet basis) than the water content (5.0 m/s per $\Delta X_W = 1\%$ wet basis). The salt gain and the water loss during brining caused the US velocity to increase (61.5 and 49.3 m/s for 168 h in LD and BF, respectively). Significant linear relationships between the US velocity and both factors (X_S and X_W) were established ($R^2 >$ 0.771). A predictive model of the salt content based on the US velocity was proposed; this was successfully validated (average estimation error 0.48%), which shows the feasibility of using US for industrial quality control purposes.