Acoustic Signatures: A Novel Tool to Detect Muscle Myopathy

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A novel muscle myopathy in chickens, termed woody breast (WB), is causing meat quality issues leading to consumer complaints and economic losses to the global poultry industry. Detection and removal of WB from processing lines will reduce consumer complaints but the current method of hand-palpation to detect WB is inefficient. Advanced methods such as magnetic resonance imaging (MRI), elastography (EL) and ultrasound (US) are being studied to detect WB, however challenges in analyzing the images and scans limits these methods to lab scale. One way to simplify the image analysis to make instant decisions is to convert them to acoustic signatures. Pilot experiments indicated that compared to MRI and EL, US scans of broiler breast fillets were most efficiently converted to acoustic signatures, hence only US method was used for further experiments. US scans of freshly deboned broiler breast fillets (n =32) with varying degree of WB severities were converted to frequency profiles and sound using 'Photosounder' software. Frequency profiles were analyzed using 'ImageJ' software by plotting the peaks and valleys, and calculating the average the heights of adjacent peaks. Sound patterns generated for each fillet were heard to detect differences. Normal and woody breast US scans created distinct frequency profiles and sounds and had higher peak height averages (28 +/- 5) than woody (13 +/- 3). Acoustic signatures can be used as a simple diagnostic tool to detect woody breasts by field personnel without significant training. This novel technique can also be used in medical applications.

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