

# A Proposed Mechanism for Texture Property of Woody Breast in Broilers

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## Introduction

- Woody breast is a myopathy observed in chicken breast meat (*Pectoralis major*) characterized by its tough and rubbery texture, however the exact causation of woody breast texture is still unknown.

## Objective

- The objective of this preliminary study was to investigate if the abnormal texture observed in woody breast meat is due to sarcoplasmic reticulum dysfunctionality resulting in rapid leakage of intracellular calcium.

## Experimental Procedures

- Seven woody breast samples exhibited moderate to severe white striping, and 7 normal samples did not exhibit any signs of white striping or woody breast were collected from a commercial processing facility.



- All samples were trimmed, weighed, vacuum packaged and frozen at approximately 8 hours postmortem.
- One 1.9 centimeter strip across the cranial end of each fillet was fabricated and pulverized with liquid nitrogen.
- Purge was collected from each sample and evaluated for protein with a bicinchoninic acid assay and free calcium concentration through atomic absorption.
- Sarcomere length was measured using a Laser Scan Confocal Microscope with a 100x/NA 1.4 objective.
- Calpain activity was determined with immunoblotting for  $\mu$ -calpain autolysis.
- Proteolysis was also determined with immunoblotting for troponin-T degradation.
- Collagen content was determined by measuring hydroxyproline.

## Results

Table 1. Weight, free calcium concentration, sarcomere length, proteolysis and collagen content from woody breast and normal chicken breast samples.

	Weight (g)	Free calcium concentration (nmol calcium/mg protein)	Sarcomere length ( $\mu$ m)	Proteolysis (% relative intact troponin-T band density)	Collagen (mg collagen/g muscle tissue)
Woody Breast	522.9	6.2	1.70	49.88	3.89
Normal	446.9	4.2	2.02	56.97	2.08
P-Value	<0.05	<0.05	0.0543	0.0515	<0.05

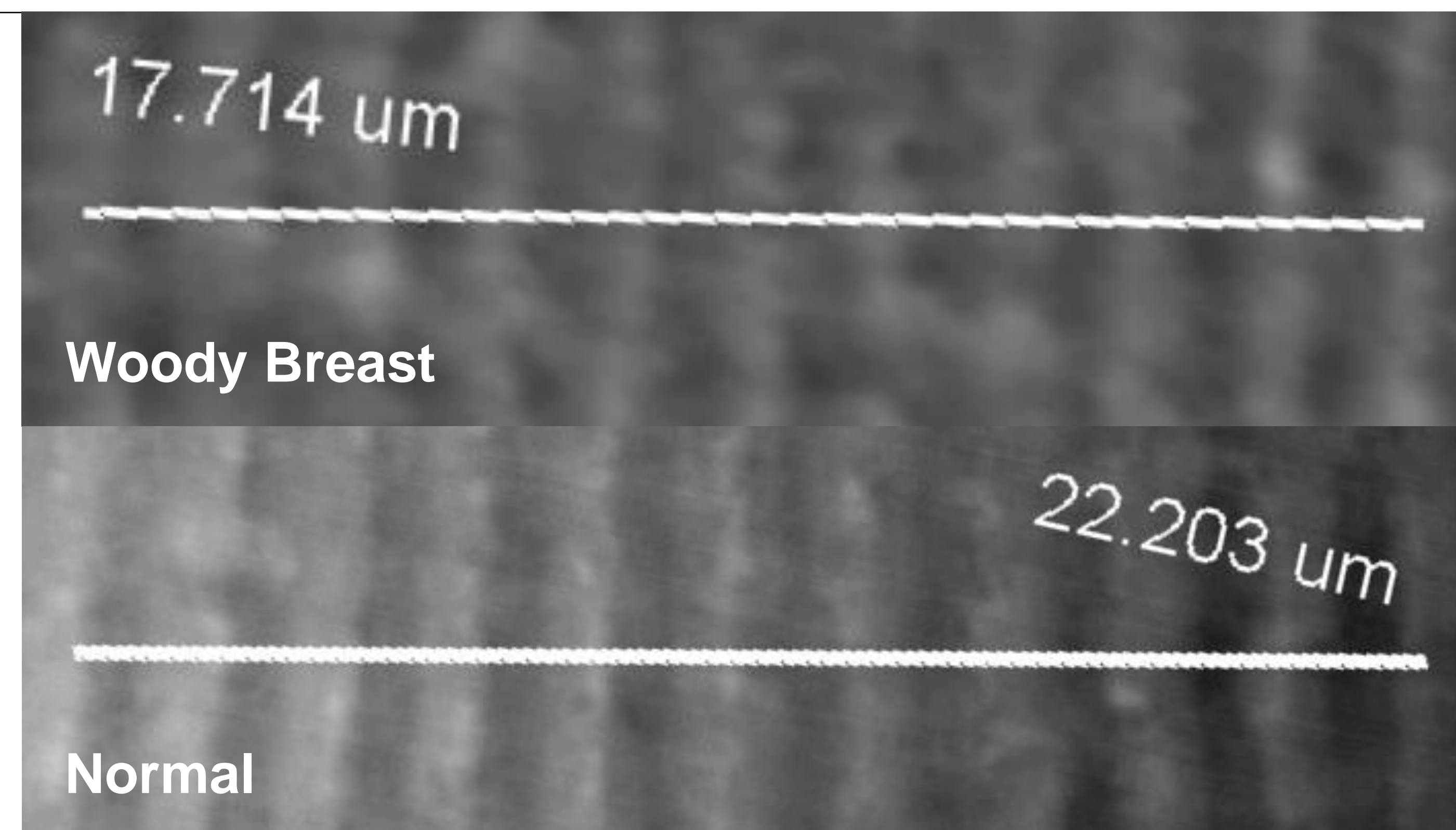


Figure 1. Representative woody breast and normal samples used to quantify sarcomere length

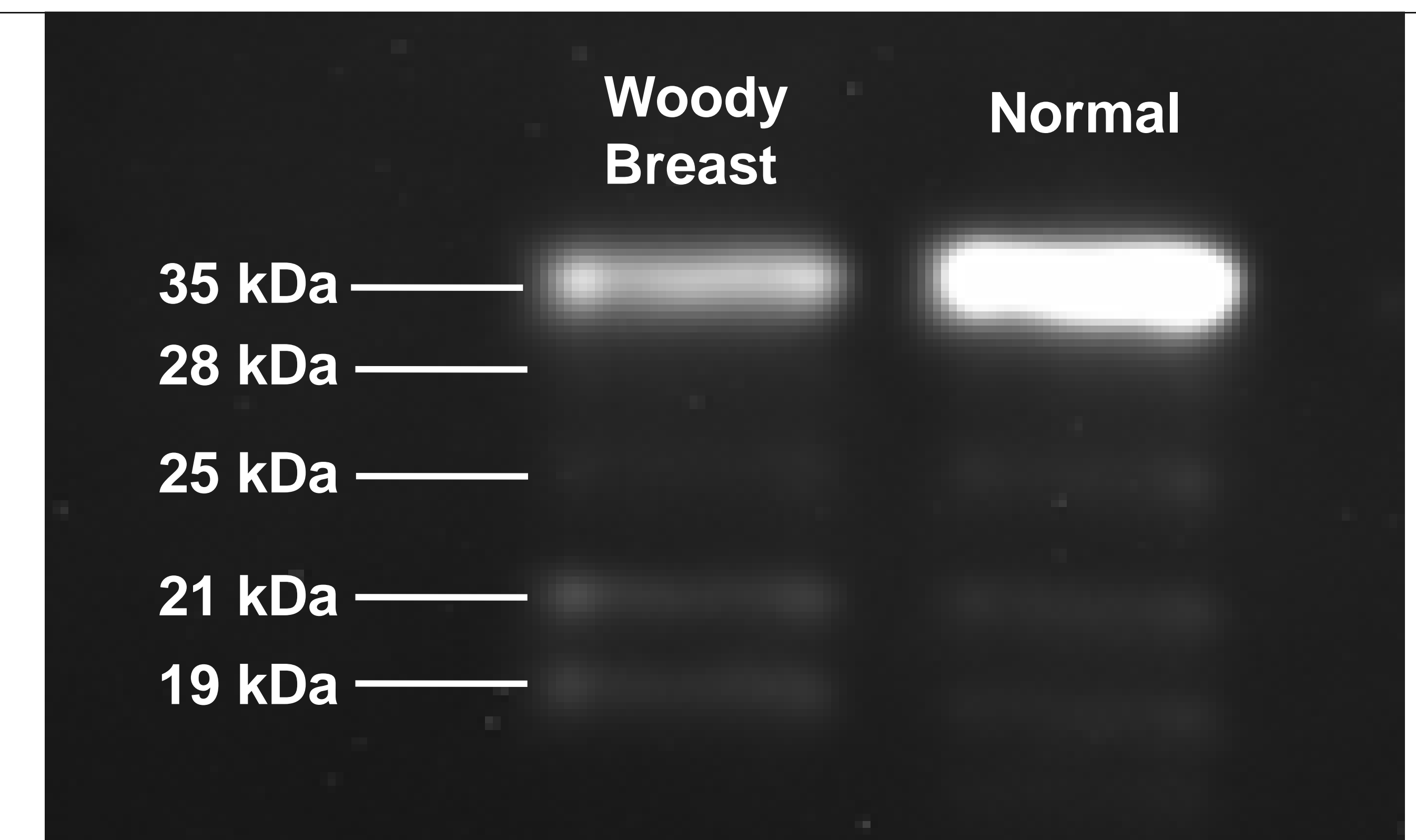
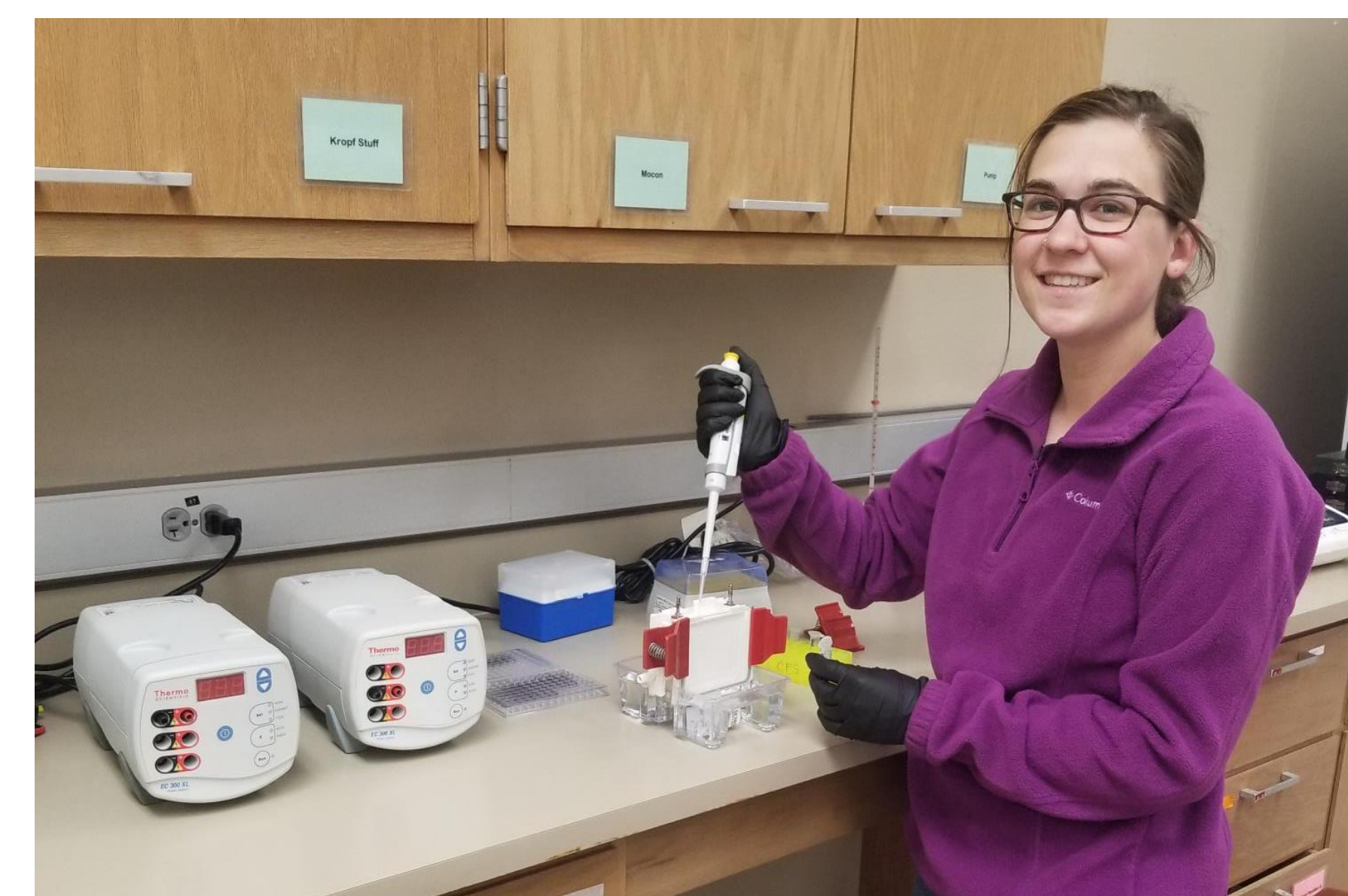


Figure 2. Representative woody breast and normal samples used to quantify proteolysis



- Calpain activity was inconclusive because the  $\mu$ -calpain for both the woody breast and normal samples were completely autolyzed at 8 hours postmortem.

## Conclusions

- The cause of texture abnormality of woody breast may be the combined effects of shorter sarcomere length and more collagen being deposited in the chicken breast meat.