



# Technological quality of spent hen *Pectoralis major* as influenced by ultrasonication

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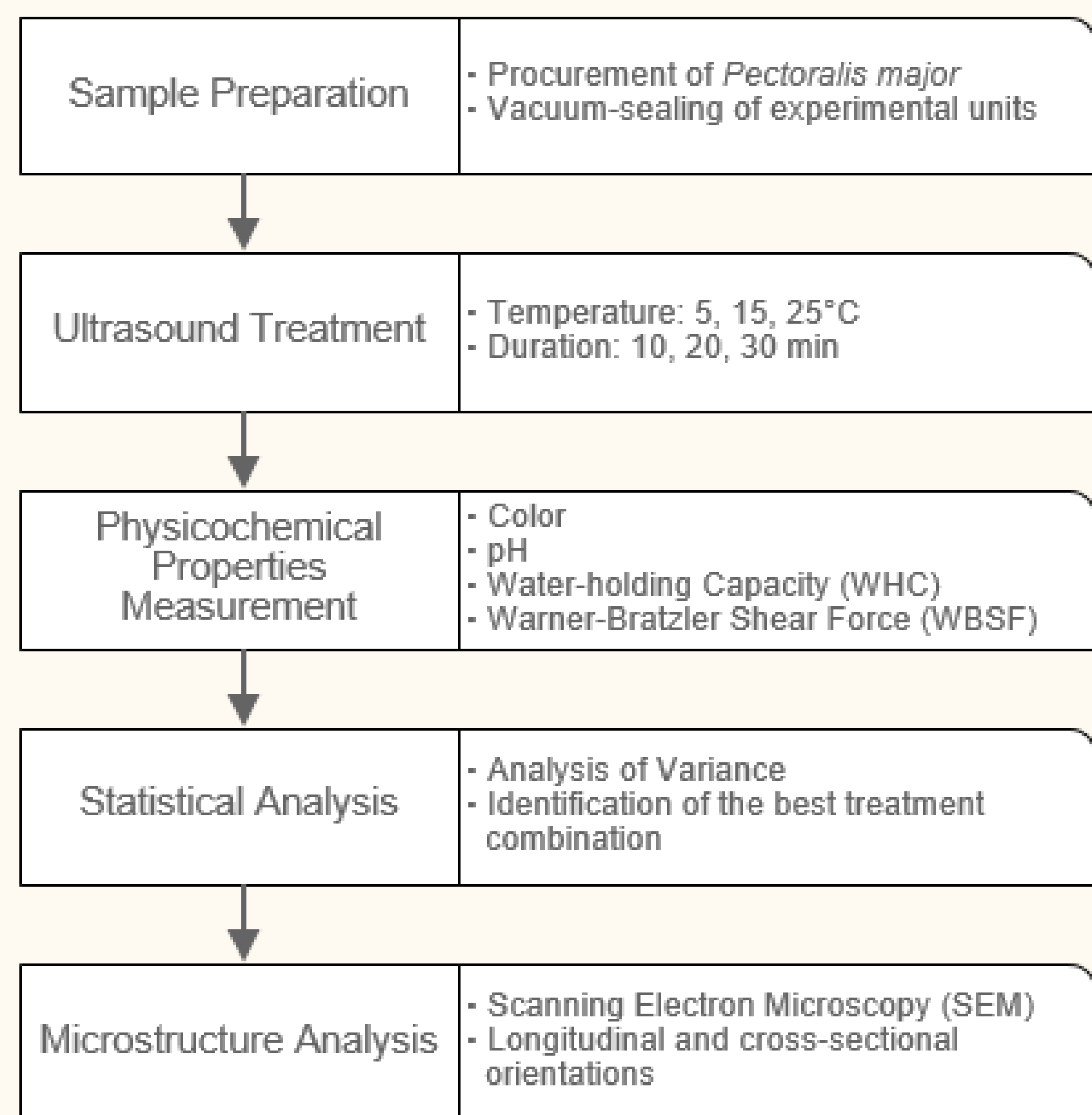
## 1 INTRODUCTION

The efficient utilization of meat from spent hens has been a major issue for the egg industry.<sup>1</sup> The toughness of spent hen meat is undesirable for processors and consumers, making it a low-value and underutilized protein source.<sup>2</sup>

Ultrasound, with its mechanical waves at frequencies exceeding the threshold of human hearing, is a rapid, economical, and energy-efficient technology that has been used to tenderize beef, pork, and poultry meat.<sup>3-5</sup>

In this study, the effect of different combinations of ultrasonication temperature and duration on the technological properties of spent hen *Pectoralis major* was investigated.

## 2 METHODOLOGY



## 3 RESULTS

### Physicochemical Properties

L\* values and pH values were not significantly affected by sonication but remained within the 'normal' range for chicken meat.<sup>6-9</sup> On the other hand, a\* and b\* values and WHC significantly changed ( $p < 0.05$ ) due to ultrasound parameters.

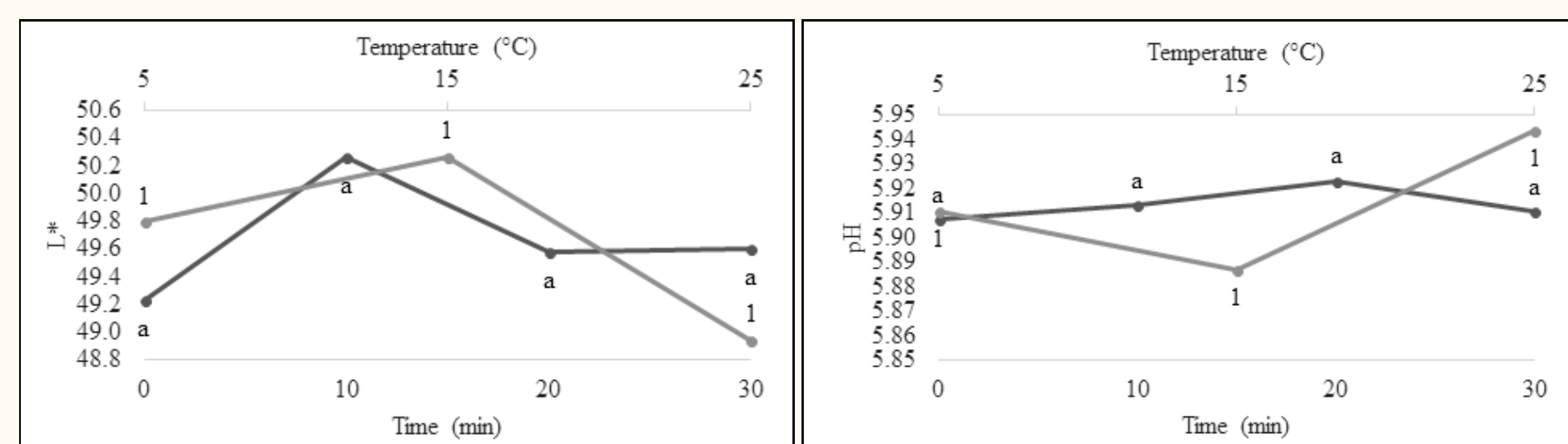


Figure 1. L\* values and pH of spent hen *Pectoralis major* after ultrasonication at different combinations of treatment temperatures and durations. Data points with similar labels are not significantly different ( $p < 0.05$ ).

A significant relationship between WHC and WBSF was detected ( $r = -0.443$ ;  $p < 0.01$ ). WBSF values had no significant changes after sonication, but the overall mean values indicated a trend. The signal-to-noise ratios of WBSF mean values suggested 10 min and 5°C as the optimal levels for treatment duration and temperature, respectively.

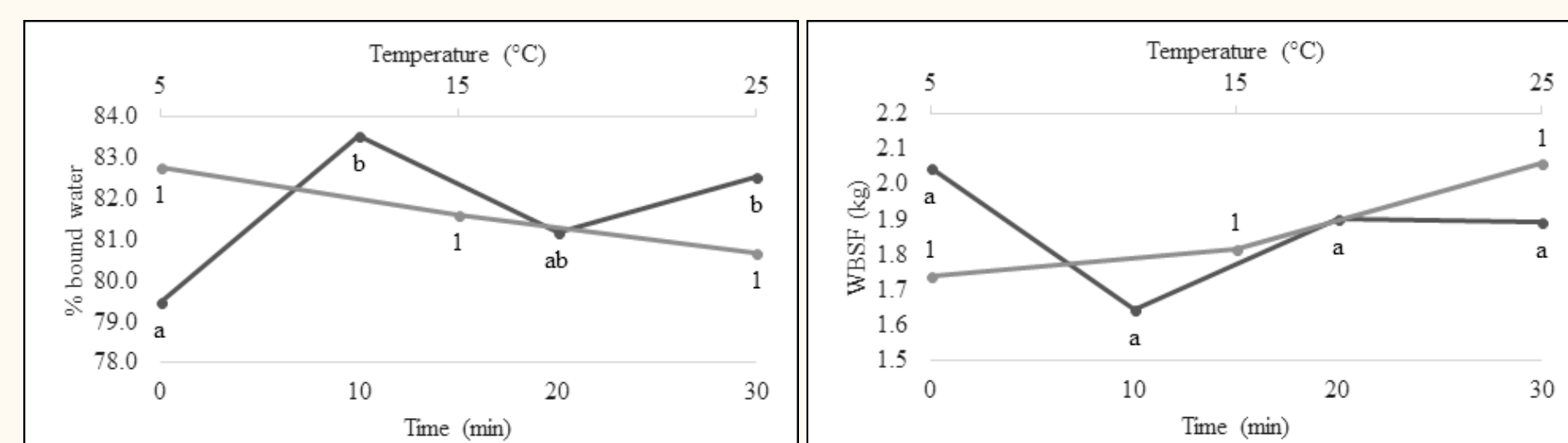


Figure 2. Water-holding capacity and Warner-Bratzler shear force of spent hen *Pectoralis major* after ultrasonication at different combinations of treatment temperatures and durations. Data points with similar labels are not significantly different ( $p < 0.05$ ).

### Muscle Microstructure

Using the optimal settings, the effect of ultrasound on the microstructure of spent hen meat was evaluated. SEM images revealed that sonication led to fragmented muscle fibers, deformed and separated fiber bundles, and disrupted connective tissues—evidence of its effects on muscle microstructure.<sup>10</sup>

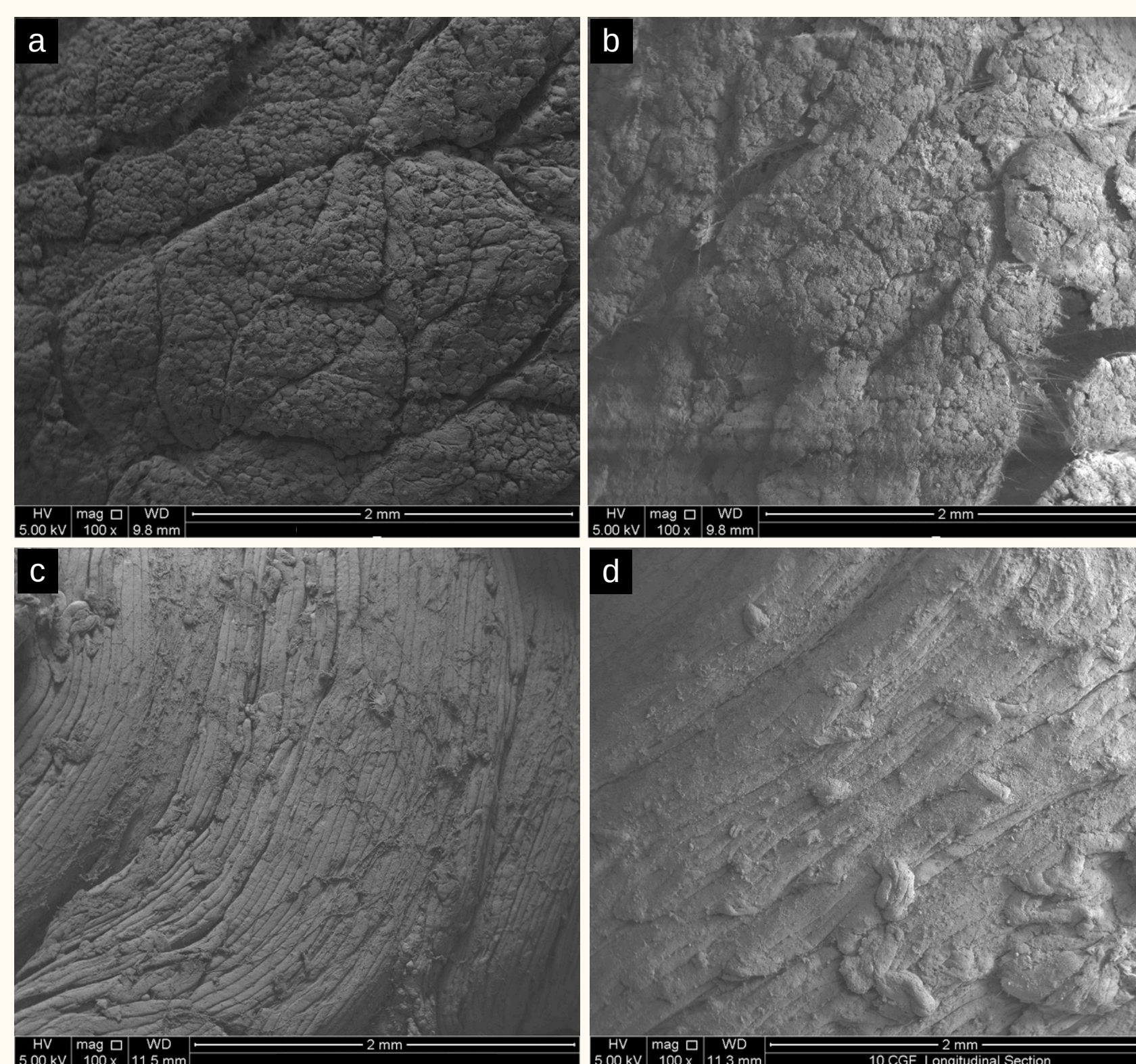


Figure 3. Cross-sectional (a & b) and longitudinal (c & d) SEM images of spent hen *Pectoralis major* after ultrasound at 5°C and at different durations: 0 mins (a & c; control) and 10 min (b & d).

## 4 CONCLUSION

Ultrasound applied at the settings used did not negatively affect the technological quality of the spent hen *Pectoralis major* samples. While ultrasound insignificantly influenced the texture of spent hen meat, overall WBSF means and SEM images suggest that there was an impact to some degree—possibly more substantially at higher ultrasound intensities.

