Effects of Citrus Fiber on Texture Properties of Chicken Nugget Batter made with Wooden Breast

Muhammad J. Nawaz[1*], Brain C. Bowker[2], Jonathan McDonald[1], Harshvardhan Thippareddi[3], and Alexander M. Stelzleni[1]

University of Georgia, [1]Animal and Dairy Science, [3]Poultry Science, [2]USDA, Agricultural Research Service, U.S. National Poultry Research Center, United States of America

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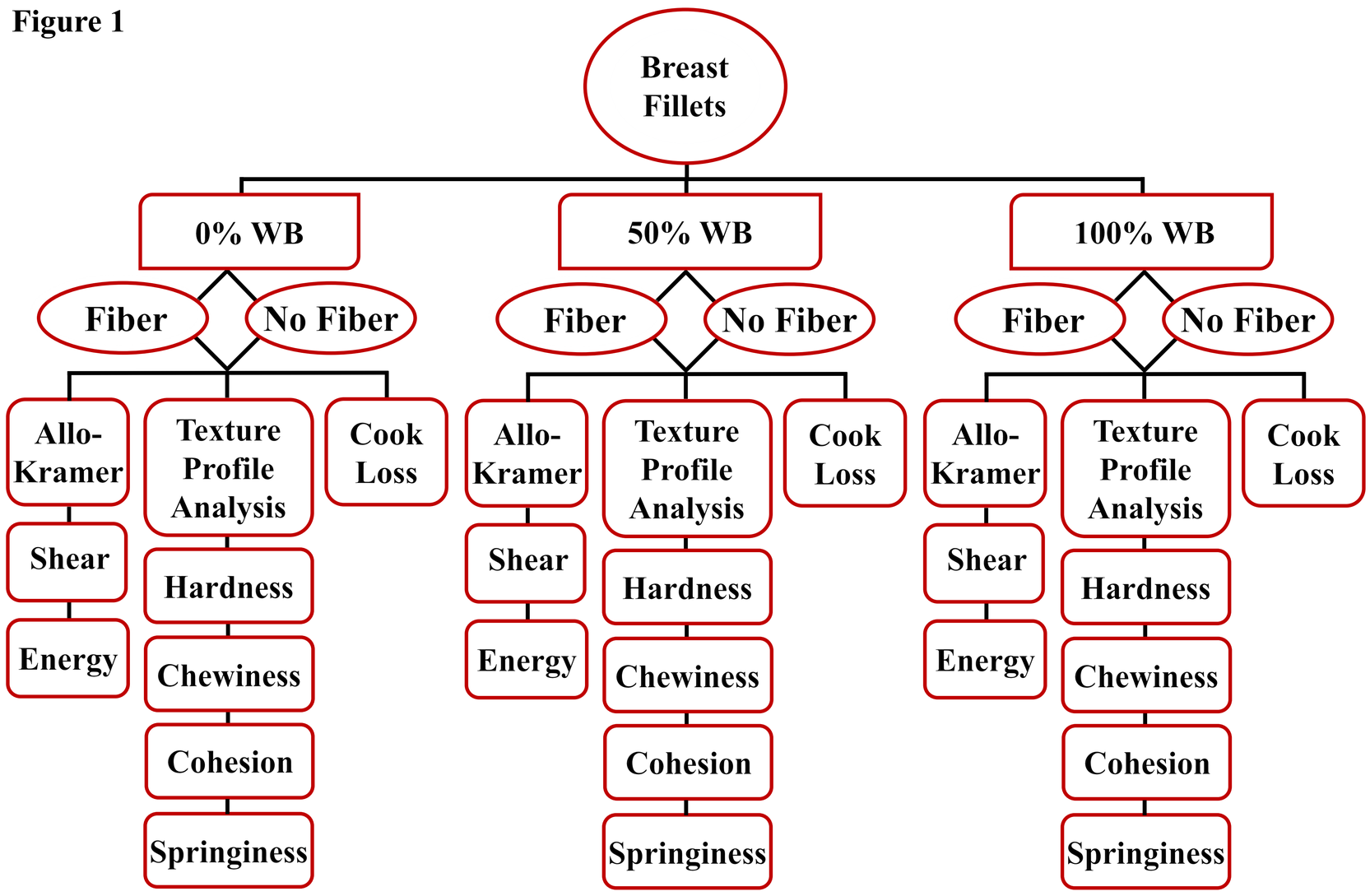
Introduction

- Wooden breast (WB) has caused substantial loss of revenue for the poultry meat industry
- WB has increased adipose and connective tissue leading to hardness and diminished WHC
- Utilising WB meat in further processed products is being explored as a new avenue for value addition
- Incorporation of WB in ground meat products (meatballs and patties) decreased product quality and negatively impacted water-holding capacity, gelation, and rheological properties
- Inclusion of citrus fiber may mitigate negative aspects of WB in processed products

Objective:

- Determine if citrus fiber could be used in ground and formed chicken nugget batter made with WB to improve water holding capacity and textural properties

Figure 1



Materials & Methods

Sample Collection & Treatments: (Figure 1)

- Across 3 replications, 475 kg normal and severe WB broiler breast meat were selected 4 h postmortem from a commercial facility
- Removal of central cartilage, fascia, rib meat, fat and visible connective tissue
- By category, fillets were coarse ground (1.27cm) and separated into six 11.34 kg batches based on WB content resulting in 2 batches each for 0% WB (0), 50% WB (50), and 100% WB (100)
- One batch from each WB blend had 0.1134 kg (1%) removed and replaced with 0.1134 kg citrus fiber (Nutrava, CP Kelco, Atlanta, GA)
- A 2.5% spice blend (0.75% NaCl, 0.65% sucrose, 0.6% onion powder, 0.3% garlic powder, and 0.1% white pepper and paprika), 10% water, and the fiber (F or NF), when required, was added to the meat, mixed, and fine ground (0.48 cm)
- Batters were extruded through a three-slot die (0.95 x 3.17 cm; Colosimo's Original Inc, Magna, UT) attached to a vacuum stuffer (Model 500; Vemag Maschinenbau GmbH, Verden, Germany) to form nugget strips
- Strips were frozen (-40°C) for 30 min and cut to 5 cm lengths. Twenty nuggets (10 texture and 10 Allo-Kramer shear) were randomly selected from each treatment
- Nuggets were cooked (steam combination oven) to 76°C and subjected to Texture Profile Analysis (TPA) and Allo-Kramer shear force

Results

Figure 2

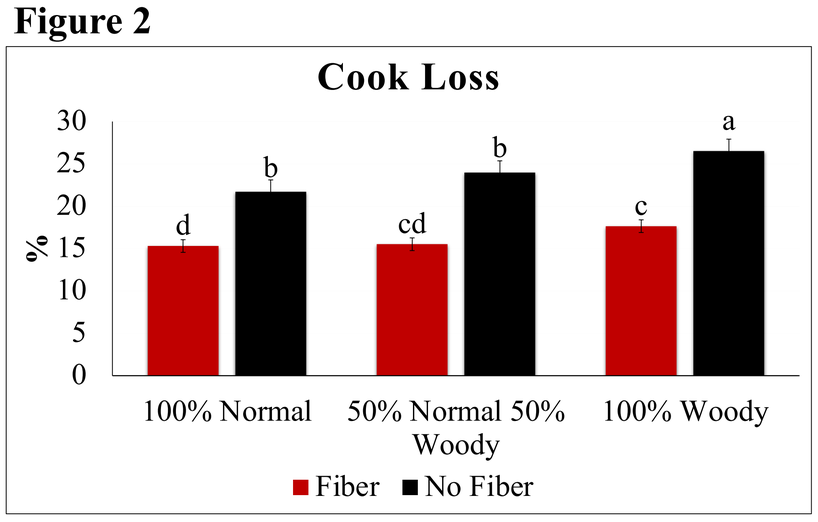


Figure 3

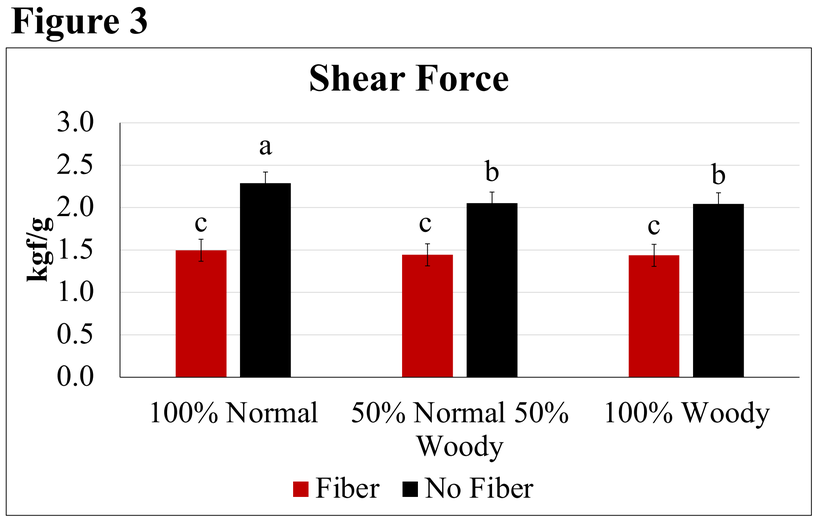


Figure 4

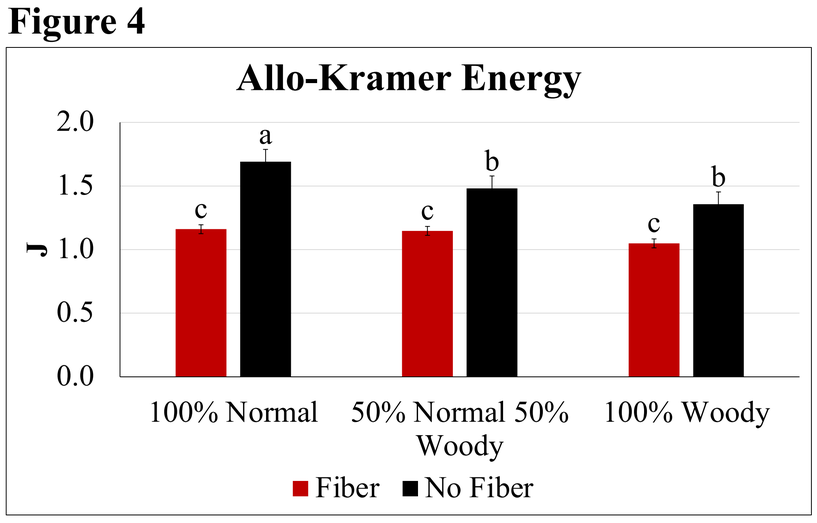
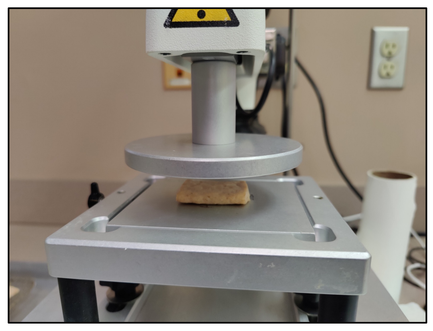


Table 1. Least square means Texture Profile Analysis of formed and cooked chicken nugget batter with severe wooden breast (0, 50, 100%) with and without citrus fiber (F, NF)

	Treatment						
Trait	0F	50F	100F	0NF	50NF	100NF	SEM
Hardness, g	5848^{c}	5442^{c}	4944^{c}	9480^{a}	8812^{a}	7107^{b}	267.4
Chewiness, g	222,231^{c}	216,350^{c}	190,497^{c}	561,987^{a}	514,225^{a}	402986^{b}	14,952.4
Cohesion, %	58.9^{b}	58.2^{bc}	55.8^{c}	73.8^{a}	72.2^{a}	72.0^{a}	0.86
Springiness, %	64.5^{c}	67.8^{bc}	68.7^{b}	80.3^{a}	81.1^{a}	78.9^{a}	0.98

^{abc}Means in the same row with with different superscripts differ ($P < 0.01$).



Conclusion

Chicken nugget processors can include citrus fiber in chicken nugget batter containing up to 100% wooden breast meat to improve cook yield. The addition of citrus fiber produced a chicken nugget that was softer, required less force and energy to shear than nuggets without citrus fiber, and ameliorated the effects of WB.

Acknowledgement

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