Influence of utilizing breast meat afflicted with woody breast myopathy on sausage textural properties

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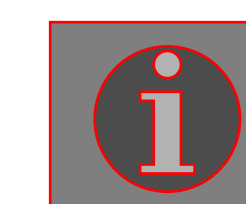[3]Department of Poultry Science, The University of Georgia

Introduction

- Woody breast (WB) myopathy reduces the utility and value of breast meat for the broiler industry

- WB meat may be included in comminuted products to increase utility and ultimately add value to the broiler industry

- Information on the textural and quality characteristics that WB inclusion has on further processed products is limited in the literature

- The objective of this research was to evaluate the quality of sausage made with WB meat of varying degrees of severity

Material & Methods

- Chicken sausage (15% fat) was produced with WB fillets following:
  - A. 100% Normal breast fillets
  - B. 25% Moderate WB fillets
  - C. 50% Moderate WB fillets
  - D. 100% Moderate WB fillets
  - E. 25% Severe WB fillets
  - F. 50% Severe WB fillets
  - G. 100% Severe WB fillets

- Sausages were linked, IQF, vacuum packaged and kept frozen (-20℃) until analysis

- Sausages were evaluated for: proximate analysis (protein, moisture, fat, soluble collagen, insoluble collagen, and total collagen), objective color, and texture profile analysis (hardness, springiness, cohesiveness, gumminess, and chewiness)

- Data were analyzed using Proc Mixed (SAS v9.4), as a completely randomized split plot design

Results

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- Inclusion of breast fillets exhibiting WB myopathy, into a chicken sausage formulation increases the total collagen ($P < 0.01$) of the sausage batter as percent inclusion and severity increases

- The inclusion of WB fillet meat in the sausage formulation had an affect on the lightness values (L* values) of both raw ($P < 0.04$) and cooked sausage formulations ($P < 0.01$)

- Instrumental texture analysis showed no difference in sausage texture for hardness, cohesiveness, and springiness ($P > 0.06$)

- Cook loss for sausages incorporating WB fillet meat in the formulation showed no difference between treatments ($P > 0.14$)


Conclusion

The similarities among sausage formulations for hardness, cohesiveness, springiness, and percent cook loss shows promise for the inclusion of, or use of, woody breast meat in comminuted, linked sausage products. Trained and consumer sensory testing are still needed to confirm differences observed for gumminess and chewiness and to ascertain acceptability levels for woody breast inclusion.

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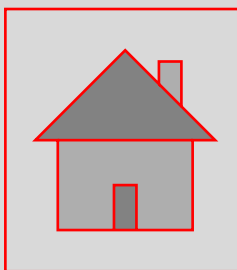
Least squares means for proximate analysis of comminuted raw breast fillets

	Normal	Moderate	Severe	SEM	P-value
Moisture, %	75.86[b]	77.04[a]	77.77[a]	0.31	<0.01
Protein, %	21.89[a]	20.63[b]	19.26[c]	0.22	<0.01
Fat, %	2.25	2.34	2.97	0.31	0.21

[abc]Means within and attribute with differing superscript differ; $\alpha < 0.05$

Least square means of texture profile analysis for cooked chicken sausage

	Normal	Moderate			Severe			SEM	P-value
	100%	25%	50%	100%	25%	50%	100%		
Hardness, g	7389	7294	7394	6568	6948	6348	6013	376	0.06
Cohesiveness	0.46	0.49	0.41	0.42	0.41	0.43	0.38	0.04	0.53
Springiness, %	79.87	79.98	79.08	78.35	79.43	79.32	80.16	1.21	0.95
Gumminess[1]	3357[a]	3432[a]	3047[ab]	2700[bc]	2713[bc]	2688[bc]	2237[c]	212	<0.01
Chewiness[1]	2690[a]	2755[a]	2402[ab]	2105[bc]	2156[bc]	2128[bc]	1798[c]	174	<0.01
Cook loss, %	11.86	10.31	11.80	13.75	13.51	13.39	12.33	0.96	0.15

[abc]Means within an attribute with different superscript differ; $\alpha < 0.05$
[1] Values for Gumminess were calculated by multiplying the hardness by the cohesiveness; Values for chewiness were calculated by multiplying the hardness by the cohesiveness by the springiness

Least square means of proximate analysis of raw formulated chicken sausage

	Normal	Moderate			Severe			SEM	P-value
	100%	25%	50%	100%	25%	50%	100%		
Moisture, %	68.44	68.79	68.18	68.13	68.78	68.84	68.65	0.73	0.95
Protein, %	17.67[a]	17.21[ab]	16.56[bc]	15.36[d]	16.84[bc]	16.26[c]	14.46[e]	0.29	<0.01
Fat, %	11.64	11.48	12.99	14.00	13.22	12.20	13.90	0.93	0.33
Collagen, mg/g									
Soluble	1.15[a]	1.25[ab]	1.47[c]	1.37[bc]	1.34[abc]	1.50[c]	1.25[ab]	0.08	<0.05
Insoluble	4.36[ab]	3.74[a]	4.89[bc]	5.12[c]	5.12[c]	5.53[c]	6.23[d]	0.24	<0.01
Total	5.51[a]	4.99[a]	6.37[b]	6.49[b]	6.46[b]	7.03[bc]	7.47[c]	0.26	<0.01

[abc]Means within an attribute with different superscript differ; $\alpha < 0.05$

Least square means of formulated sausage link color

	Normal	Moderate			Severe			SEM	P-value
	100%	25%	50%	100%	25%	50%	100%		
Raw									
L*	69.31[a]	67.35[ab]	66.95[b]	65.99[b]	66.00[b]	67.86[ab]	66.05[b]	0.81	0.04
a*	0.98	0.76	0.95	0.84	0.90	0.91	1.00	0.11	0.74
b*	13.59	13.28	12.13	13.04	12.77	12.95	12.52	0.33	0.06
Cooked									
L*	79.80[ab]	80.80[a]	79.86[ab]	78.68[bc]	79.81[ab]	79.80[ab]	78.16[c]	0.48	<0.01
a*	0.95	0.71	0.79	0.81	0.70	0.74	0.86	0.08	0.33
b*	16.87	15.90	16.10	17.48	15.66	15.45	16.56	0.53	0.10

[abc]Means within an attribute with different superscript differ; $\alpha < 0.05$