

Supplemental Table 1. Effect of supranutritional zinc (Zn) and ractopamine hydrochloride (RAC) supplementation on quality characteristics of beef *longissimus thoracis* steaks at different postmortem timepoints.

Item	CON ¹		SUPZN ¹		P-value		
	NO ²	RAC ²	NO ²	RAC ²	ZNTRT	RACTRT	ZNTRT × RACTRT
Percent Purge³							
7 Days Postmortem	2.1 ± 0.2	2.3 ± 0.2	2.2 ± 0.2	2.3 ± 0.2	0.78	0.38	0.69
14 Days Postmortem	2.2 ± 0.2	2.3 ± 0.2	2.0 ± 0.2	1.9 ± 0.2	0.07	0.95	0.52
28 Days Postmortem	1.5 ± 0.1	1.7 ± 0.2	1.6 ± 0.1	1.5 ± 0.1	0.93	0.61	0.31
42 Days Postmortem	1.4 ± 0.1	1.5 ± 0.1	1.4 ± 0.1	1.4 ± 0.1	0.52	0.38	0.66
pH							
7 Days Postmortem	5.51 ± 0.02	5.49 ± 0.02	5.49 ± 0.02	5.48 ± 0.02	0.38	0.35	0.83
14 Days Postmortem	5.52 ± 0.01	5.52 ± 0.01	5.51 ± 0.01	5.50 ± 0.01	0.27	0.59	0.74
28 Days Postmortem	5.55 ± 0.01	5.54 ± 0.01	5.53 ± 0.01	5.51 ± 0.01	0.03	0.20	0.76
42 Days Postmortem	5.59 ± 0.01	5.54 ± 0.01	5.57 ± 0.01	5.54 ± 0.01	0.44	<0.01	0.35
Marbling Score⁴							
7 Days Postmortem	560 ± 30	470 ± 30	510 ± 30	490 ± 30	0.66	0.07	0.28
14 Days Postmortem	540 ± 30	470 ± 30	520 ± 30	460 ± 30	0.60	0.04	1.00
28 Days Postmortem	560 ± 30	480 ± 30	500 ± 30	460 ± 30	0.31	0.06	0.51
42 Days Postmortem	600 ± 40	530 ± 40	540 ± 40	480 ± 40	0.15	0.12	0.85
Percent Cook Loss⁵							
7 Days Postmortem	23.4 ± 0.9	23.5 ± 1.0	23.7 ± 0.9	25.5 ± 0.9	0.24	0.31	0.34
14 Days Postmortem	24.5 ± 1.1	26.0 ± 1.2	22.6 ± 1.1	24.5 ± 1.1	0.14	0.14	0.86
28 Days Postmortem	24.3 ± 0.9	24.3 ± 1.0	22.6 ± 0.9	26.0 ± 0.9	0.95	0.07	0.07
42 Days Postmortem	26.0 ± 0.9	24.9 ± 1.0	24.8 ± 0.9	25.9 ± 0.9	0.88	0.97	0.24
L*⁶							
7 Days Postmortem	42.67 ± 0.55	42.61 ± 0.60	42.22 ± 0.55	41.99 ± 0.55	0.35	0.79	0.88
14 Days Postmortem	43.56 ± 0.55	44.33 ± 0.60	44.10 ± 0.55	43.78 ± 0.55	1.00	0.69	0.35
28 Days Postmortem	45.39 ± 0.52	45.65 ± 0.56	44.64 ± 0.52	44.61 ± 0.52	0.10	0.84	0.79
42 Days Postmortem	45.42 ± 0.57	45.72 ± 0.6	44.60 ± 0.57	44.17 ± 0.57	0.05	0.91	0.53
a*⁶							
7 Days Postmortem	19.89 ± 0.27	19.22 ± 0.29	20.18 ± 0.27	19.59 ± 0.27	0.23	0.03	0.89
14 Days Postmortem	20.07 ± 0.35	19.64 ± 0.38	20.17 ± 0.35	20.55 ± 0.35	0.17	0.94	0.26
28 Days Postmortem	19.98 ± 0.44	19.31 ± 0.47	20.58 ± 0.44	20.21 ± 0.44	0.11	0.25	0.74
42 Days Postmortem	21.72 ± 0.43	21.22 ± 0.46	21.64 ± 0.43	22.20 ± 0.43	0.31	0.94	0.24
b*⁶							
7 Days Postmortem	17.90 ± 0.26	17.43 ± 0.28	18.10 ± 0.26	17.55 ± 0.26	0.55	0.07	0.87
14 Days Postmortem	18.53 ± 0.26	18.62 ± 0.28	18.83 ± 0.26	19.02 ± 0.26	0.20	0.61	0.86
28 Days Postmortem	19.07 ± 0.27	18.72 ± 0.29	19.24 ± 0.27	19.09 ± 0.27	0.33	0.36	0.72
42 Days Postmortem	20.33 ± 0.25	20.04 ± 0.27	20.04 ± 0.25	20.22 ± 0.25	0.82	0.83	0.37
Hue Angle⁷							
7 Days Postmortem	41.99 ± 0.42	42.22 ± 0.46	41.89 ± 0.42	41.83 ± 0.42	0.59	0.85	0.74
14 Days Postmortem	42.69 ± 0.42	43.51 ± 0.45	43.05 ± 0.42	42.78 ± 0.42	0.67	0.53	0.21
28 Days Postmortem	43.67 ± 0.44	44.11 ± 0.47	43.11 ± 0.44	43.42 ± 0.44	0.17	0.41	0.88
42 Days Postmortem	43.14 ± 0.42	43.38 ± 0.46	42.81 ± 0.42	42.34 ± 0.42	0.13	0.80	0.42
Chroma⁸							
7 Days Postmortem	26.76 ± 0.31	25.95 ± 0.34	27.11 ± 0.31	26.30 ± 0.31	0.28	0.02	0.99
14 Days Postmortem	27.32 ± 0.39	27.06 ± 0.42	27.61 ± 0.39	28.00 ± 0.39	0.14	0.86	0.42

Supplemental Table 1. (Continued)

Item	CON ¹		SUPZN ¹		P-value		
	NO ²	RAC ²	NO ²	RAC ²	ZNTRT	RACTRT	ZNTRT × RACTRT
28 Days Postmortem	27.62 ± 0.46	26.90 ± 0.50	28.18 ± 0.46	27.80 ± 0.46	0.13	0.26	0.72
42 Days Postmortem	29.75 ± 0.44	29.19 ± 0.48	29.50 ± 0.44	30.03 ± 0.44	0.52	0.98	0.24

¹CON = no supplemental Zn (analyzed 36 mg Zn/kg dry matter); SUPZN = CON + 60 mg Zn/kg dry matter from ZnSO₄ + 60 mg Zn/kg dry matter from Zn-amino acid complex (Avalia-Zn; Zinpro Corporation, Eden Prairie, MN). Fed for the entire 89 d trial.

²NO = no supplemental RAC; RAC = 300 mg RAC per head per d (Actogain45; Zoetis, Parsippany, NJ) starting 28 d before harvest.

³Percent steak purge = (weight of package with purge - weight of package without purge/steak weight) × 100.

⁴Marbling Scores: 400 = small; 500 = modest; 600 = moderate.

⁵Steaks were cooked to an internal temperature of 68°C on clamshell grills. Percent cook loss = [(raw steak weight – cooked steak weight)/raw steak weight] × 100.

⁶Commission Internationale de l'Eclairage L^* , a^* , and b^* values were determined with a HunterLab Miniscan EZ instrument using illuminant D65 light source, 2.4 cm aperture, and a 10° observer angle.

⁷Hue angle was calculated using the following equation: $\arctangent(b^*/a^*)$.

⁸Chroma value was calculated using the following equation: $(a^{*2} + b^{*2})^{1/2}$.

CON-NO= No Zn or RAC supplementation. **CON-RAC**= No Zn supplementation, only RAC supplementation. **SUPZN-NO**= Zn supplementation, no RAC supplementation. **SUPZN-RAC**= Zn and RAC supplementation.