

CATTLEMEN'S DAY 2024

BEEF CATTLE RESEARCH

SUMMARY PUBLICATION



CATTLEMEN'S DAY 2024



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Long-Term Effects of April, August, or October Prescribed Fire on Yearling Stocker Cattle Performance and Native Rangeland Plant Composition in the Kansas Flint Hills

Zachary Duncan

Objective: The objective of our experiment was to determine if prescribed fire applied in April, August, or October influenced stocker growth performance or plant community characteristics in the Kansas Flint Hills over a 6-year period.

Study Description: A total of 1,939 yearling stocker cattle were assigned to one of three prescribed-burn treatments: spring (April 11 ± 5.7 days), summer (August 25 ± 6.2 days or fall (October 2 ± 9.0 days) over a 5-year period. Calves were grazed from May to August for 90 days. Individual body weights were recorded at the start and end of the grazing season. Native plant composition and soil cover were evaluated annually in June using a modified step-point method.

Effects of prescribed-fire timing on stocker cattle performance and basal plant cover (% of total basal vegetation cover) in the Kansas Flint Hills

Item	Prescribed-fire season			SEM ¹	P-value ²
	Spring	Summer	Fall		
Initial BW, ³ lb	633	639	629	5.6	0.23
Final BW, lb	847 ^a	842 ^a	828 ^b	5.5	0.01
Total BW gain, lb	213 ^a	202 ^b	199 ^b	4.6	0.02
Basal grass cover	89.4	89.3	85.8	2.53	0.30
Basal forb cover	9.97	9.79	12.53	2.517	0.49
Basal shrub cover	0.50 ^z	1.20 ^y	1.58 ^y	0.438	0.06

¹ Standard error of the mean (SEM) associated with comparison of treatment main-effect means.

² Treatment main effect.

³ Body weight.

^{a,b} Within rows, means with unlike superscripts differ ($P \leq 0.05$).

^{y,z} Within rows, means with unlike superscripts tend to differ ($P \leq 0.10$).

The Bottom Line: Shifting prescribed fire from April to August or October reduced yearling stocker cattle weight gains by 10 to 14 lb during a 90-day grazing season. Ranchers are encouraged to consider the cost associated with herbicides versus the costs associated with reduced growth performance when developing a strategy for sericea lespedeza (*Lespedeza cuneata*) control.

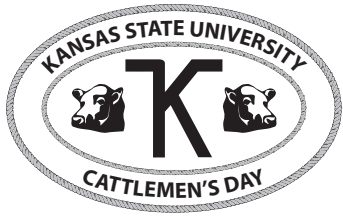


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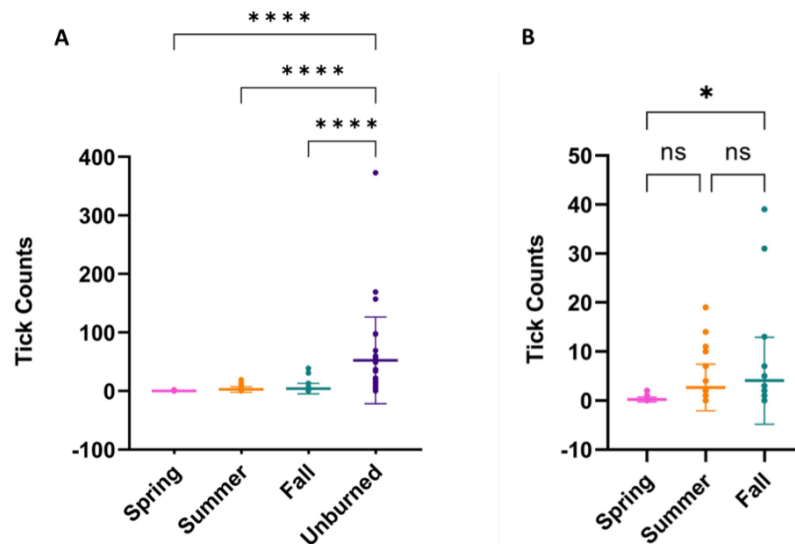
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Reducing Tick Populations Through Prescribed Burning

Andrea Salazar

Objective: Explore the effect of prescribed fire on tick population dynamics in the Kansas Flint Hills.

Study Description: Ticks were collected from spring (April), summer (August), or fall (September) burned pastures as well as control, unburned areas. Burning had been carried out for four consecutive years prior to this study. Tick populations were sampled every other week from March to August using material dragging and dry ice bait sampling methods. Tick species, sex, and life stage were identified morphologically and the total numbers for each burn treatment were calculated.



Effects of prescribed fire season treatments (spring, summer, fall, and unburned control) on tick counts

A) Comparison between ticks collected from prescribed burned and unburned areas from each collection event.

B) Comparison between the seasonal time of prescribed burn with relation to tick counts. Each dot represents the total number of ticks collected on each sampling day.

* $P < 0.05$. **** $P < 0.0001$. ns = not significant. Error bars show standard deviation.

The Bottom Line: Consecutive burning of grazing pasture could be considered an effective tick control treatment to reduce tick abundance in cattle pastures and reduce the need for the use of chemical acaricides on Flint Hills prairie.



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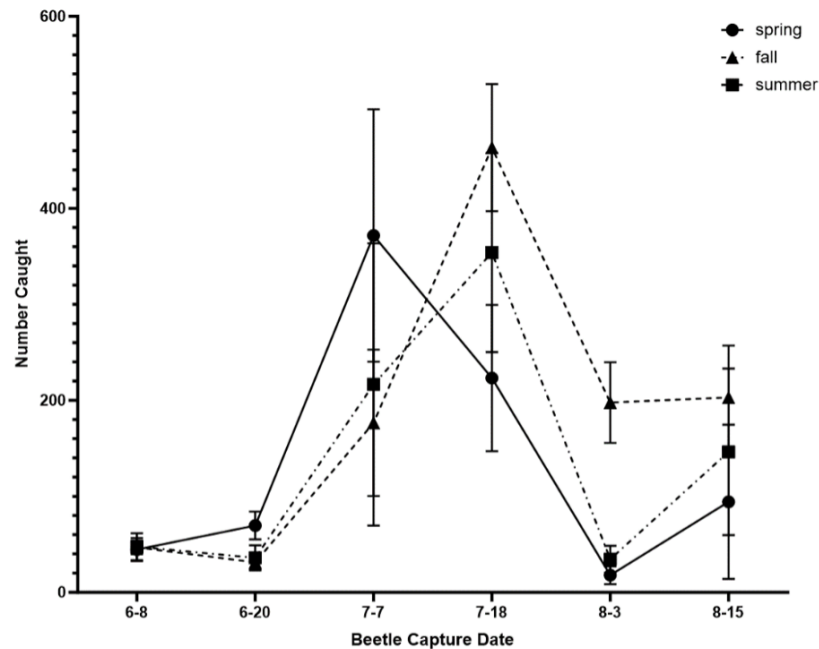
The Effects of Seasonal Prescribed Burning on Flint Hills Dung Beetle (*Scarabaeinae*) Populations

Herman Griese

Objective: This study aimed to determine if the season of prescribed burning impacted dung beetle communities on pastures grazed by cattle in the Flint Hills.

Study Description: Dung beetle populations at the Kansas State University Beef Stocker unit were sampled biweekly for three months over the summer grazing period to determine if beetle populations varied between spring, summer, or fall burned pastures.

Results: At least eight species of dung beetles were identified with a total of 8,646 dung beetles collected. Dung beetle populations were not different ($P > 0.05$) between spring, summer, and fall burned pastures although peak beetle populations were observed two weeks earlier in the spring burned pastures than summer and fall.



Average number of dung beetles caught on each sampling date with no differences ($P > 0.05$) between spring, summer, or fall treatments.

The Bottom Line: Dung beetle populations were not impacted by the season of the burn and producers can select a burn season which best suits their needs without impacting dung beetle diversity or population density.

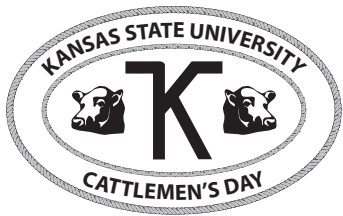


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Effects of Dietary Energy Concentration and Feed Intake on Growth Performance of Newly Received Growing Cattle Fed Diets Based on Corn and Corn Co-Products

Colton Weir

Objective: This study's focus was to evaluate if feeding equal amounts of energy from a high-energy limit-fed diet has an effect on growth performance of growing beef cattle when compared to traditional high-roughage *ad libitum* diets.

Study Description: A total of 392 crossbred heifers were fed one of four experimental diets for a 70-day receiving period. Treatments included a high-roughage diet formulated to provide 45 Mcal of net energy for gain (NE_g) per 100 lb of dry matter (DM) and fed for *ad libitum* intake (AL) or a high-energy diet formulated to provide 60 Mcal of NE_g per 100 lb of DM and fed at 75% (LIM-75), 80% (LIM-80), or 85% (LIM-85) of *ad libitum* intake. Treatments were designed to equalize for energy intake between calves assigned to AL and LIM-75.

Effects of dietary energy concentration and feed intake on growth performance of growing beef cattle

Item	Treatment				SEM ¹	P-value
	AL	LIM-75	LIM-80	LIM-85		
Number of pens	8	8	8	8		
Number of animals	98	98	98	98		
Body weight, lb						
Day 0	605	604	605	605	0.2	0.34
Day 70	805 ^c	813 ^{bc}	828 ^{ab}	841 ^a	6.4	< 0.01
Average daily gain, lb/day	2.86 ^c	2.98 ^{bc}	3.18 ^{ab}	3.37 ^a	0.090	< 0.01
Dry matter intake, lb/day	23.46 ^c	17.37 ^b	18.68 ^{ab}	19.04 ^a	0.557	< 0.01
Feed:Gain, lb/lb	8.26 ^b	6.24 ^a	6.38 ^a	6.22 ^a	0.517	0.04

¹ Standard error of the mean.

^{a-c} Within rows, means with unlike superscripts differ ($P \leq 0.05$).

The Bottom Line: Restricting feed intake while maintaining energy intake does not negatively influence growth performance of newly received growing beef cattle. In times of high forage cost or shortened growing periods producers could program gains based on their own financial and personal needs.

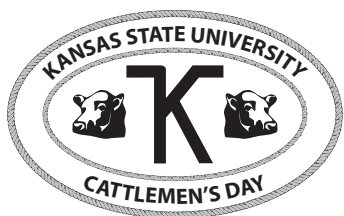


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Post-Weaning Feed Intake and Performance of Bulls Developed in an Automated Feed Intake Management System

James Banks

Objective: Our objectives were to compare expected and observed dry matter intake (DMI) and average daily gain (ADG) using modeled nutrient requirement equations, and to evaluate change in DMI over time of beef bull calves fed in an automated feed intake system.

Study Description: Feed intake and performance data from purebred Angus, Hereford, and Simmental bull calves across two calf crops [birth years 2021 ($n = 40$) and 2022 ($n = 37$)] were utilized for this analysis. Projected DMI and ADG were calculated for each group of bulls by year on an individual basis using the Growing Bull module of the Excel-based Beef Ration and Nutrition Decision Software (BRANDS) formulation program (Iowa State University, Ames, IA). These predicted figures were compared to the Insentec intake data and analyzed via SAS.

Results: In 2021–2022, a strong positive correlation ($r = 0.78$, $P < 0.01$) was observed between actual and predicted DMI. There was a highly correlated ($r = 0.84$, $P < 0.01$) relationship for the observed and predicted DMI for 2022–2023 as well. Actual ADG for both years was markedly higher than predicted. This result supports that BRANDS more accurately predicts DMI compared to ADG, and that substantial individual intake variation exists.

Actual and predicted bull performance means by year

Item	2021–2022			2022–2023		
	Actual	SD ¹	Predicted	Actual	SD	Predicted
Initial BW, ² lb	800	107	---	805	119	---
Ending BW, lb	1080	118	---	1063	158	---
DMI, ² lb/day	18.5	2.1	21.1	20.1	3.7	21.1
ADG, ² lb	3.33	.57	1.66	3.59	0.89	2.32
F:G ²	5.71	1.20	---	5.9	1.48	---

¹ Standard deviation.

² BW = body weight. DMI = dry matter intake. ADG = average daily gain. F:G = feed to gain ratio.

Correlation coefficients for actual and predicted intake and gain of bulls by year

Item	2021–2022				2022–2023			
	Actual	Predicted	r	P -value	Actual	Predicted	r	P -value
DMI, ¹ lb/day	18.5	21.1	0.78	< 0.01	20.1	21.1	0.84	< 0.01
ADG, ¹ lb	3.33	1.66	0.36	0.03	3.59	2.32	0.73	< 0.01

¹ DMI = dry matter intake. ADG = average daily gain.

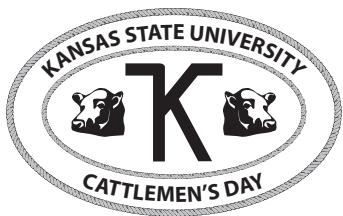


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The Bottom Line: DMI increases over time as days of test period increase for growing bulls in an individually fed intake system, and though significant day-to-day variation exists, the BRANDS program appears to more accurately predict DMI than ADG.

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Comparing the Performance of Cattle Castrated Using Different Techniques Upon Arrival at the Feedlot

Tyler Blackwood

Objective: To determine the least detrimental castration technique in terms of growth performance when castrating cattle upon entry to the feedlot.

Study Description: Intact bulls were sourced from the Southeastern U.S. and received at the Kansas State University Beef Stocker Unit. After backgrounding, 700-lb bulls were castrated using various techniques, including banding, banding with splitting of the distal scrotum, use of the Henderson Tool, and use of a burdizzo clamp. A group of intact bulls served as a negative control group. Weights were obtained at regular intervals throughout the 56-day study to quantify and compare growth performance.

Results: The day 0 to day 56 average daily gain (ADG) showed no difference between treatment groups ($P = 0.0643$) but there was a trend for the Henderson group to gain at a lower rate than all other treatment groups. All other groups ended the 56-day study period with similar ADG. In addition, a trend was found for cattle castrated using the Henderson Tool to exhibit a lower activity time per hour than the other study groups for much of the day on average, as well as a greater number of minutes per hour ruminating on average. Jaw movement recorded as rumination was thought to be teeth grinding due to pain response and the lower amount of activity time would support this assessment. While the burdizzo group performed the best of all castrated groups, the labor-intensive process associated with applying the burdizzo clamp is not practical for cattle of this size. Cattle castrated using the band and band-cut methods performed better than those castrated using the Henderson Tool. The results of this study indicate that any castration technique that is surgical in nature is not ideal for castrating cattle at the feedlot.

The Bottom Line: Use of a latex band for castrating cattle at entry to the feedlot appears to be the technique least detrimental to growth performance.

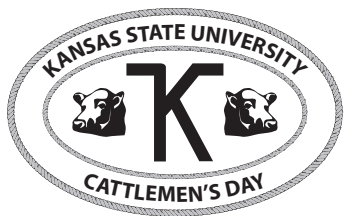


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Restricting Bunk Space Allotments to 6 or 10 Inches Has Minimal Impact on Growth Performance in Limit-Fed Receiving Cattle

William Ellis

Objective: The objective of our experiment was to determine if bunk allotments of 6, 10, 14, or 18 in per head in pens containing 18 to 28 head impacts growth performance of growing calves limit-fed a high-energy diet based on corn and corn co-products.

Study Description: A total of 332 crossbred heifers were blocked by source, stratified by individual arrival weight, and assigned to a pen. Pens were randomly assigned to one of four treatments: 6, 10, 14, and 18 in of bunk space per head. Pens contained 18 to 28 head per pen. Heifers were limit-fed once daily at 2.0% of body weight (BW) [dry matter (DM) basis] for a 56-day period.

Results: Final BW and average daily gains (ADG) following the 56-day period did not differ ($P \geq 0.20$) among treatments. The standard deviation of ADG responded quadratically ($P = 0.05$) where variation in weight gain was greater in calves allotted 14 in of bunk compared with calves allotted 6, 10, or 18 in of bunk.

Effects of bunk space allotment of growth performance of limit-fed growing heifers¹

Item	Treatment, in				SEM ²	P-value ³		
	6	10	14	18		Linear	Quadratic	Cubic
BW, lb								
Day 0	657	655	655	654	1.75	0.09	0.72	0.42
Day 56	794	788	778	789	7.23	0.29	0.14	0.28
ADG, lb/day	2.43	2.37	2.18	2.40	0.116	0.48	0.12	0.17
ADG standard deviation, lb/day	0.58	0.68	0.86	0.64	0.10	0.30	0.05	0.18

¹ Heifers were allotted 6, 10, 14, or 18 in of bunk per head and limit-fed at 2.0% of BW daily (DM basis) for 56 days.

² Standard error of the mean.

³ P-value associated with linear, quadratic, or cubic effects of bunk allotment.

The Bottom Line: Bunk allotments as low as 6 in per head did not reduce the growth performance of limit-fed growing cattle during a 56-day receiving period.

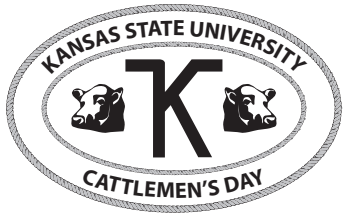


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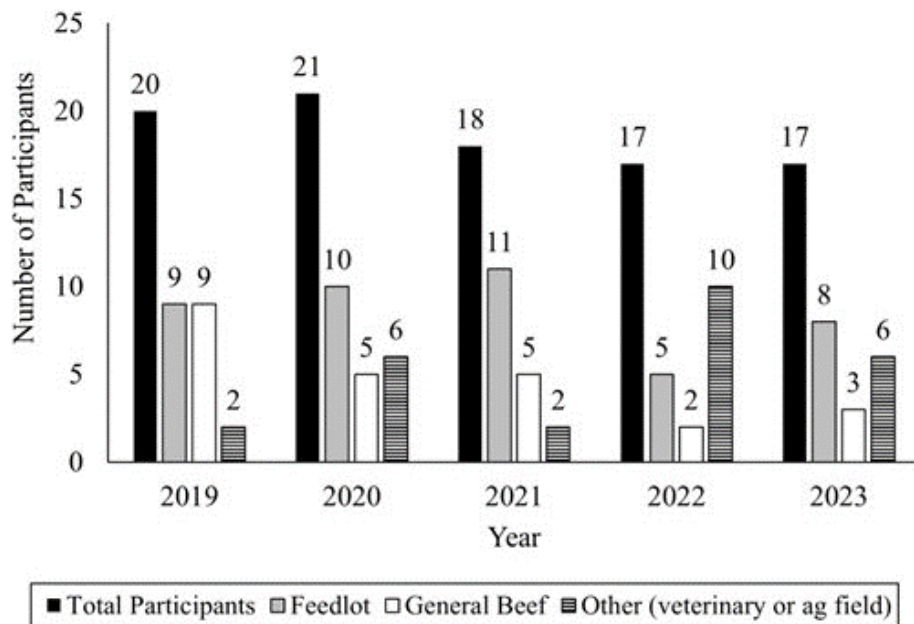
Kansas State University Feedlot Boot Camp and Teaching Program: Growing Student Interest and Engagement in the Feedlot Industry

Danielle Stock

Objective: Our objectives were to summarize the development and structure of the Kansas State University Feedlot Boot Camp and Teaching Program and examine student interest in careers in the feedlot industry after participation.

Study Description: Since 2019, 95 Kansas State University College of Agriculture undergraduate students participated in the Feedlot Boot Camp Program. The aim was to develop students' knowledge, skills, and professional relationships in feedlot management to help meet the critical need for trained professionals in the industry. Components are a four-day Feedlot Boot Camp, student presentations, animal health day, and an optional feedlot internship. Students who completed all components earned a \$2,500 scholarship.

Results: A total of 163 undergraduate students applied to participate in the program in its first five years. Of those applicants, 95 were selected to participate in the Feedlot Boot Camp Program. In surveys following the completion of the Boot Camp portion of the program, over 96% (91/95) of student participants agreed with the statement, "My interest in pursuing an internship and (or) career in the feedlot industry grew as a result of this Boot Camp." Approximately 45% of participants proceeded to participate in feedlot internships or entered full-time jobs working in a feedlot six months after completing the Boot Camp.



Students' internship or job path six months after the Boot Camp.

The Bottom Line: The Feedlot Boot Camp program has made progress in growing student interest and awareness of career opportunities in the feedlot industry and fostering communication between employers and prospective employees.



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Supplementation of Methionine or Choline Did Not Improve Health or Growth Performance in High-Risk, Newly Received Beef Heifers

Madeline Grant

Objective: This study was conducted to determine if supplemental methionine or choline improves health or growth performance in high-risk, newly received beef heifers.

Study Description: In a 3-year experiment, 1,440 beef heifers (480 per year; 493 lb initial weight; Tennessee origin) were received in 15 truckloads (five per year) in October of 2020, 2021, and 2022. Heifers were limit-fed in 60-day receiving trials to evaluate the effects of supplemental methionine or choline on health and growth performance. Cattle received one of five treatments: control (no added methionine or choline); 5 or 15 g/day available methionine (8.33 or 25 g/day Smartamine M; Adisseo USA Inc., Alpharetta, GA; ruminally protected methionine); or 1.17 or 3.5 g/day available choline (26 or 78 g/day ReaShure; Balchem Corp., Montvale, NJ; ruminally protected choline).

Results: Small differences among treatments were observed for final body weight, average daily gain, and gain:feed ($P \leq 0.10$), but none of the treatments differed from the control. No differences among treatments were observed for respiratory morbidity or mortality ($P \geq 0.30$).

Effects of methionine or choline on performance and health of growing beef heifers

Item	Control	Methionine, g/day		Choline, g/day		SEM ¹	P-value
		5	15	1.17	3.5		
Number of pens	24	24	24	24	24	---	---
Body weight, lb							
Day 0	492	492	494	494	494	2.0	0.26
Day 60	642 ^{ab}	639 ^b	646 ^a	639 ^b	632 ^b	4.6	0.09
Average daily gain, lb/day	2.51 ^{ab}	2.45 ^{ab}	2.56 ^a	2.43 ^b	2.40 ^b	0.075	0.09
Dry matter intake, lb/day	12.1	12.0	12.1	12.1	12.0	0.07	0.48
Gain:feed, lb/lb	0.208 ^{ab}	0.204 ^{ab}	0.212 ^a	0.201 ^b	0.201 ^b	0.0058	0.10
Morbidity, %	23.8	24.1	22.6	23.1	27.6	4.15	0.71
Mortality, %	0.6	0.6	0.6	0.9	0.9	0.54	0.97

¹ Standard error of the mean.

^{ab} Means without a common superscript differ, $P < 0.05$.

The Bottom Line: Supplemental methionine or choline did not affect health or growth performance of high-risk, newly received heifers.

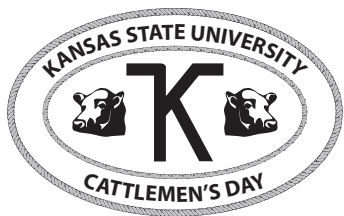


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GreatO⁺ Supplementation Leads to Greater Proportions of Omega-3 Fatty Acids in the Small Intestines of Holstein Steers

Ross Thorn

Objective: This study aimed to determine if supplementation of GreatO⁺, an extruded blend of flaxseed and microalgae (NBO3, Manhattan, KS), in Holstein steers would lead to greater amounts of fatty acids, particularly omega-3s, in the small intestines.

Study Description: This study utilized 12 cannulated Holstein steers assigned to two treatments: with or without supplementation of GreatO⁺ as a source of omega-3 fatty acids. Two periods were utilized, consisting of a 15-day adaptation interval and a four-day collection interval. After the end of the collection period, each steer was transitioned to the other treatment for the second period. This study was conducted at the Kansas State Intake Facility, equipped with automated feed and water troughs.

Apparent amounts of fatty acid present in the duodenum and feces

Item	Nutrient intake			Nutrient to duodenum			Nutrient in feces		
	Control	GreatO ⁺	SEM ¹	Control	GreatO ⁺	SEM	Control	GreatO ⁺	SEM
Fatty acid, g									
C16:0	46.6 ^a	61.8 ^b	1.8	33.7 ^a	47.4 ^b	2.1	8.5 ^a	12.9 ^b	0.53
C18:0	7.8 ^a	16.8 ^b	0.4	108.9 ^a	203.2 ^b	11.4	24.3 ^a	63.6 ^b	3.48
C18:1n9c	61.5 ^a	107.6 ^b	2.8	9.3 ^a	17.5 ^b	1.0	2.8 ^a	6.1 ^b	0.32
C18:2n6c	132.0 ^a	171.0 ^b	4.9	9.3 ^a	11.3 ^a	0.9	3.4 ^a	5.0 ^b	0.41
C18:3n3	20.1 ^a	134.8 ^b	3.0	1.6 ^a	6.3 ^b	0.5	0.6 ^a	3.5 ^b	0.27

¹ Standard error of the mean.

^{a,b} Values with common superscript letters within a row and nutrient site are not statistically different ($P > 0.05$).

The Bottom Line: Cattle supplemented with GreatO⁺ have greater amounts of omega-3 fatty acid available for absorption in the small intestines.

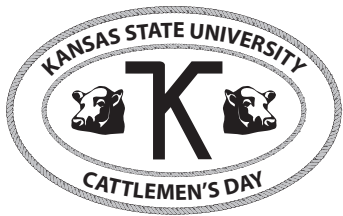


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A Novel Approach of Using Electrostatic Field to Reduce Thawing Time and Improve Frozen Beef Quality

Grace Corrette

Objective: The objective of this study was to evaluate the impact of applying an electrostatic field (EF) on thawing characteristics, such as thawing speed and purge loss, as well as its impact on quality attributes during subsequent aging and retail display of beef.

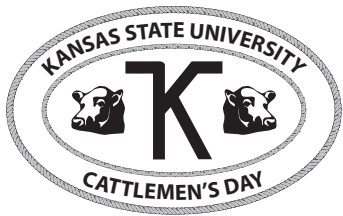
Study Description: Striploins from both sides of USDA Choice carcasses ($n = 12$) were collected and portioned into four equal parts ($n = 48$). Portions were vacuum packaged and frozen at -40°F for 14 days and randomly assigned to one of four EF thawing treatments: 0 kV (control), 2.5 kV (EF-2.5), 5 kV (EF-5), and 10 kV (EF-10). Within each EF treatment, half of the striploin portions were thawed in an inside cooler (32°F) and half in an outside cooler (36°F). The thawing process was considered complete when all striploin portions reached 30.2°F . After thawing, striploin portions were weighed and purge was collected for analysis, and portions were fabricated into steaks. One steak was used for histological analysis to assess muscle fiber damage and remaining steaks were vacuum packaged and subjected to either 0 or 14 days of aging. After the aging, steaks were placed on Styrofoam trays, overwrapped with polyvinyl chloride, and retail displayed for either 0 or 7 days. Steaks were evaluated daily for objective color as well as subjective evaluation of discoloration. After completion of the designated aging and display period, steaks were utilized for Warner-Bratzler shear force (WBSF), sarcomere length, lipid oxidation, pH, and myofibrillar protein degradation analysis.

Results: There was an increase in purge loss for all EF samples compared to the control in the outside cooler location ($P < 0.05$). Application of EF did not reduce thawing times ($P > 0.05$), with EF-10 taking longer to reach the targeted 30.2°F ($P < 0.05$). All EF treatments reduced purge aerobic plate count ($P < 0.01$) in the outside cooler location. The EF-10 had lower WBSF ($P < 0.05$), and EF-10 samples from the outside cooler location tended to have greater muscle fiber spacing ($P = 0.09$). For the 0-day aged samples, EF-5 on day 7 resulted in more discoloration than the rest of the treatments ($P < 0.05$). In samples aged for 14 days, the EF-5 and EF-2.5 had less discoloration than the control and EF-10 ($P < 0.05$). When looking at the impact of EF on a^* (redness), EF-5 had higher a^* values (more redness) than the control and EF-2.5 on days 4 and 5 of retail display ($P < 0.05$). The EF applications did not alter myofibrillar protein degradation, sarcomere length, lipid oxidation, and purge protein concentrations ($P > 0.05$).

The Bottom Line: The application of EF during thawing did not reduce purge loss and thawing times but showed potential as an antimicrobial intervention and color stabilizer.

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Evaluation of Thaw Curves of Beef Strip Loin Steaks Using Various Thaw Methods

Lauren Frink

Objective: The objective of this study was to evaluate and determine thaw rate and time of strip steaks thawed using methods that are recommended by the U.S. Department of Agriculture and those commonly used by consumers.

Study Description: Strip steaks collected from a beef packing facility were randomly assigned a thaw method. Initially, steaks were vacuum packaged and then frozen at -40°F until thawed. Two thawing methods were USDA-approved: thawing in a refrigerator (REF) and in cold water (CW); while the other two methods evaluated are commonly used by consumers: thawing on the countertop (CT) and in hot water (HW). The thawing temperatures were: REF at $35.6\text{--}37.4^{\circ}\text{F}$ in the refrigerator; CW maintained at $35.6\text{--}37.4^{\circ}\text{F}$ in water; CT at 68°F ; and HW at 104°F . Temperatures of the steaks were recorded every 30 minutes for CW and REF, every 10 minutes for CT, and every thirty seconds for HW to determine the thaw time and rate.

Results: Thawing time differed ($P < 0.05$) among treatments in this study ($\text{HW} < \text{CT} < \text{CW} < \text{REF}$), ranging from 10 minutes to 14 hours and 42 minutes. Additionally, thawing rates differed ($P < 0.05$) among treatments with a similar trend ($\text{HW} < \text{CT} < \text{CW} < \text{REF}$), ranging from 33.46°F per minute to 32.01°F per minute. CW temperatures differed ($P < 0.05$) from REF until 5 hours prior to thaw point, at which point the temperatures were similar ($P > 0.05$) for the remaining thawing period. Moreover, REF steaks were warmer ($P < 0.05$) than CW steaks from 13 to 5 hours prior to thaw point. In the final 5 hours, CW and REF steaks were similar ($P > 0.05$) in temperature. Furthermore, among all treatments, CT steaks were the coldest ($P < 0.05$) from 5 to 2 hours prior to thaw point. However, in the final 2 hours, CT steaks were at similar ($P > 0.05$) temperatures as CW and REF. Due to the short period of thawing time and the observed rapid thawing rate, HW samples were the coldest ($P < 0.05$) in the final 10 minutes prior to thaw point.

The Bottom Line: Of the four thaw methods utilized in this study, the safest methods are those approved by the USDA (CW and REF). Thawing meat on the countertop or in hot water may be efficient and convenient methods for consumers, but it is important to take the extra time to thaw meat properly for safety.



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The Effects of Thawing Methods on Trained Sensory Evaluation of Beef Palatability Traits and Instrumental Measurements of Quality

Lindsey Decker

Objective: Using beef strip loins steaks, evaluate six common thawing methods and assess the quality attributes through a trained panelist evaluation and an array of instrumental quality measures.

Study Description: Paired Low Choice strip loins ($n = 15$) were collected from a beef packing facility. The paired loins were fabricated into 1-in steaks and blocked into six blocks of four steaks. Each block was assigned a different thawing method, and each steak within the block a test, then aged 21 days and frozen. Thaw methods consisted of the four USDA-approved thaw methods: refrigerator (REF), cold water (CW), microwave (MIC), cooking from frozen (COOK); and two methods commonly used by consumers: countertop (CT) and hot water (HW). Steaks assigned to REF were thawed in a refrigerator at 34–37°F for 24 hours prior to cooking. Steaks assigned to CW were thawed in individual containers of 34–37°F water for 24 hours prior to cooking. COOK steaks were cooked immediately upon removal from the freezer, while still in a frozen state. CT steaks were thawed at ambient temperature (68°F) for 5 hours. HW steaks were thawed in a sous vide machine set to 104°F for 20 minutes (± 2 minutes). MIC steaks were microwaved at 50% power for 3.5 minutes, flipped, and repeated in a retail microwave. Fifteen trained panels were performed, with eight panelists consuming six samples from the same loin. Each steak was cooked to a peak temperature of 160°F on clamshell style grills. Data were analyzed as a completely randomized block design.

Results: As a whole, thawing method had a minimal impact on palatability. There were no ($P > 0.05$) differences among thawing methods for initial juiciness, sustained juiciness, connective tissue, pressed juice percentage, L^* (lightness), lipid oxidation, Warner-Bratzler shear force and slice shear force. For myofibrillar tenderness, COOK steaks were tougher ($P < 0.05$) than REF and CW. Also, MIC and COOK steaks were lower ($P < 0.05$) than CW and REF steaks for overall tenderness, while all other treatments were similar ($P > 0.05$). The COOK steaks were rated higher ($P < 0.05$) than all other treatments for beef flavor intensity. The MIC steaks had lower ($P < 0.05$) cooked a^* (redness) and b^* (yellowness) values than REF, HW, and CW steaks, while CT samples had higher ($P < 0.05$) values than COOK and MIC. The MIC steaks had the highest ($P < 0.05$) cook loss, followed by COOK ($P < 0.05$), with all other treatments being similar (MIC > COOK > CT = HW = CW = REF). MIC and HW had a higher ($P < 0.05$) thaw loss than CW, CT, and REF (MIC = HW > CW = CT = REF). Moreover, MIC, COOK, and HW steaks had a higher ($P < 0.05$) percent total moisture loss than REF, CW, and CT. This increase in total moisture loss and thaw loss could indicate a total economic loss of steaks thawed using these methods. Lastly, COOK steaks had higher ($P < 0.05$) cooked expressible moisture than CT, CW, and REF.

The Bottom Line: Consumers and food service establishments may use whichever thawing method is the most economical and convenient for them, as thawing method has minimal impact eating quality, although food safety should be the upmost concern.

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The Effects of Thawing Method on Consumer Palatability Ratings of Beef Strip Loin Steaks

Stephanie Witberler

Objective: The objective of this study was to determine palatability differences in beef strip loin steaks among various U.S. Department of Agriculture approved thawing methods and those commonly utilized by consumers.

Study Description: Paired Low Choice beef strip loins ($n = 15$) were collected and fabricated into six sections, each section was fabricated into 1-in steaks and assigned one of six thawing methods including: countertop, cook from frozen, cold water, hot water, microwave, and refrigerator. Steaks were cooked to an internal peak temperature of 160°F and consumers were given samples which they evaluated for juiciness, tenderness, flavor liking, overall liking, attribute acceptability, and perceived level of quality. Samples were rated on a 100-point scale with 0 indicating dry, tough, or dislike extremely, and 100 indicating extremely juicy, extremely tender, or like extremely.

Results: For beef demographic data, consumers reported that the most important beef palatability trait was flavor with 56.7% of consumers indicating it as the most important. Tenderness was rated as the most important by 33.3% of consumers. Additionally, consumers reported the trait they experienced the most variability with was tenderness. Results of consumer sensory evaluation indicated that there were no differences ($P > 0.05$) among the six thaw methods for juiciness, tenderness, flavor, and overall liking. However, all treatments had an average rating of at least 57 for overall liking, indicating a high level of eating satisfaction. For all thaw methods, at least 82% of steaks were rated as overall acceptable. Additionally, for all thaw methods, consumers rated at least 79.1% of steaks acceptable for juiciness, tenderness, and flavor liking. Furthermore, thaw method did not have an impact ($P > 0.05$) on the perceived level of quality of samples.

The Bottom Line: Beef strip loin steak palatability was not impacted by thawing method, and therefore consumers should use whichever thawing method is most convenient, or best suits their needs.



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