

Effects on injectable Trace minerals and Vitamins supplementation on growth and antioxidant status in heifers during feedlot receiving.

Mattioli Guillermo A

Faculty of Veterinary Science,
Universidad Nacional de La Plata,
Argentina

contact author:
mattioli@fcv.unlp.edu.ar

Rosa Diana E

Faculty of Veterinary Science,
Universidad Nacional de La Plata,
Argentina

Turic Esteban

Biogénesis Bagó S.A. Garín, Argentina

Relling Alejandro

Department of Animal Sciences, The
Ohio State University, Wooster 44691,
USA.

Fazzio Luis E

Faculty of Veterinary Science,
Universidad Nacional de La Plata,
Argentina

Objectives

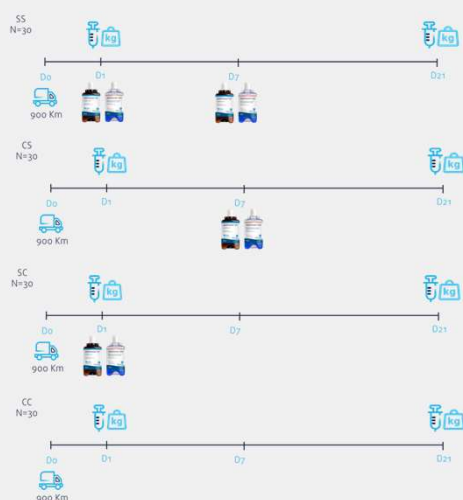
In beef cattle production, weaning, transportation, and feedlot entry are the most stressing stages leading to lower weight gain secondary to oxidative stress. The hypothesis for the current experiment was that supplementation with injectable vitamins (A and E) and minerals (Cu, Zn, Mn, and Se) improves growth and parameters related to oxidative stress in cattle entering the feedlot.

The aim of this work was to evaluate the effects of supplementation on day 1 and/or 7 after feedlot entry on body weight, Total antioxidant status (TAS) and thiobarbituric acid reactive substances (TBARS) in weaned cattle.

Materials y Methods

Healthy crossbred Bos indicus × Bos Taurus heifers (255 ± 26 kg) were shipped 900 km. Heifers were randomly assigned to four groups (n = 30 each) in a 2×2 factorial arrangement of treatment. The main factors were supplementation (S) or not (C) on day 1 and supplementation (S) or not (C) on day 7 (CC, CS, SC and SS groups). The parenteral vitamin supplement (subcutaneous 1 ml /50 kg BW; Adaptador Vit®, Biogénesis Bagó SA, Buenos Aires, Argentina) contained 63000 IU/mL of vitamin A (as palmitate), and 50 IU/mL of vitamin E (as acetate). The mineral supplement (subcutaneous 1ml /50 kg BW; Adaptador Min®, Biogénesis Bagó SA, Buenos Aires, Argentina) contained 10 mg/mL Cu (as cooper edetate), 10 mg/mL Mn (as manganese edetate), 5 mg/mL Se (as sodium selenite), 40 mg/mL Zn (as zinc edetate). (Figure 1)

Figure 1: Activities upon animal's arrival



Plasma concentration of TAS (n = 8 animals per group) and TBARS, (n = 8 animals per group) were determined through commercial kits (Cayman Assay Kit 10009055 and 709001 for TAS and TBARS, respectively). Data were analyzed as a complete randomized design with a 2×2 factorial arrangement of treatments using SAS mixed procedure (9.4). The model included supplementation or non-supplementation at day 1, at day 7, and their interaction.

Results

There was a day 1 × day 7 interaction ($P \leq 0.07$) for final BW, average daily gain (ADG). Heifers that did not receive supplementation (CC) had less BW (293.6 kg) and ADG (1.86 kg/d) compared with CS (300.1 kg; 2.20 kg/d), and SS (298.9 kg; 2.10 kg/d) groups. There was no interaction in day 1 × day 7 ($P \geq 0.41$), nor for day 1 supplementation ($P \geq 0.11$) effects for plasma TAS and TBARS. Increased antioxidant capacity (0.59 vs 0.51 mmol/L; $P = 0.01$) and lower lipid peroxidation (5.96 vs 6.70 μ M MDA; $P = 0.01$) were observed on heifers supplemented on day 7 (CS and SS) compared with the non-supplemented (CC and SC) on day 7. (Table 1)

Table 1. Effects of parenteral supplementation with liposoluble vitamins and trace minerals on weight, average daily gain (ADG), thiobarbituric acid reactive substances (TBARS) and total antioxidant status (TAS), in feedlot heifer calves.

Day 1	C		S		SEM	P-values		
	Day 7	C	S	C		Day 1	Day 7	Day 1 × Day 7
Final Weight ¹	293.6 ^a	297.6 ^b	300.1 ^b	298.9 ^b	1.42	<0.01	0.33	0.07
ADG ²	1.86 ^a	2.1 ^b	2.2 ^b	2.1 ^b	0.07	<0.01	0.33	0.07
Cortisol ²	115.9 ^a	150.4 ^b	181.1 ^c	156.9 ^b	4.87	<0.01	0.31	<0.01
TAS ²	0.52	0.61	0.51	0.58	0.03	0.42	0.01	0.77
TBARS ²	7.05	6.08	6.35	5.84	0.28	0.11	0.01	0.41

TAS: total antioxidant status; TBARS: thiobarbituric acid reactive substances; S = subcutaneous supplementation with trace minerals and vitamins (Adaptador Min® and Adaptador Vit®, Biogénesis Bagó SA, Buenos Aires, Argentina). C = without supplementation on both days. ¹The initial value was used as a covariate. ²The initial value was not used as a covariate.

Conclusions

Heifers supplemented with vitamins and minerals improved weight and ADG at feedlot entry. However, the supplementation with two doses (day 1 and 7) did not differ from a single dose (day 1 or 7) in the final weight or ADG. In the same way, vitamin and mineral supplementation on day 7 showed greater antioxidant capacity and lower lipid peroxidation.

Efecto de la suplementación inyectable de minerales traza y vitaminas en el crecimiento y estatus antioxidante de vaquillonas durante el ingreso al engorde a corral

Objetivos: En la producción de bovinos las situaciones de mayor estrés para los animales son el destete, el transporte y el ingreso al engorde a corral, conduciendo a bajas ganancias de peso secundarias al estrés oxidativo. La hipótesis del presente estudio fue que la suplementación inyectable con vitaminas (A y E) y minerales (Cu, Zn, Mn y Se) mejora el crecimiento y distintos parámetros relacionados al estrés oxidativo en bovinos cuando ingresan a un engorde a corral. El objetivo de este trabajo fue evaluar el efecto de la suplementación al día 1 y/o 7 días después del ingreso al engorde a corral sobre el peso, estatus antioxidante total (TAS) y sustancias reactivas al ácido tiobarbitúrico (TBARS) en vaquillonas.

Materiales y Métodos: Vaquillonas cruce *Bos indicus* x *Bos taurus* (255 ± 26 kg) clínicamente sanas fueron transportadas 900 km. Los animales se asignaron al azar a cuatro grupos (n=30 cada uno) en un diseño factorial 2x2. Los factores principales fueron Suplementación (S) o no (C) al día 1, y Suplementación (S) o no (C) al día 7 (los cuatro grupos fueron: CC, CS, SC y SS). La suplementación vitamínica parenteral (1 mL/50 kg de peso vivo vía subcutánea; Adaptador VIT[®], Biogénesis Bagó SA, Buenos Aires, Argentina) contenía 63000 UI/mL de vitamina A (como palmitato), y 50 UI/mL de vitamina E (como acetato). El suplemento mineral (1 mL/50 kg de peso vivo vía subcutánea; Adaptador MIN[®], Biogénesis Bagó SA, Buenos Aires, Argentina) contenía 10 mg/mL de cobre (como edetato de cobre), 10 mg/mL de manganeso (como edetato de manganeso), 5 mg/mL de selenio (como selenito de sodio) y 40 mg/mL de zinc (como edetato de zinc). Las vaquillonas se pesaron al día 1 y al día 21 de ingresadas al establecimiento. Las concentraciones plasmáticas de TAS (n=8 animales por grupo) y TBARS (n=8 animales por grupo) fueron determinadas con kits comerciales (Cayman Assay Kit 10009055 y 709001 para TAS y TBARS, respectivamente). Los datos se analizaron como un diseño completamente aleatorio, con un arreglo factorial 2x2 de los tratamientos usando el Procedimiento MIXED de SAS (9.4). El modelo incluyó la suplementación o no al día 1 y al día 7, y su interacción.

Resultados: Se observó una interacción de día 1 x día 7 ($P \leq 0,07$) para el peso vivo (PV) final y la ganancia diaria de peso (GDP). Las vaquillonas que no recibieron suplementación (CC) tuvieron el menor PV (293,6 kg) y GDP (1,86 kg/día) comparadas con las vaquillonas de los grupos CS (297,6 kg de PV y 2,10 kg/día), SC (300,1 kg de PV y 2,2 kg/día) y SS (298,9 kg de PV y 2,1 kg/día). No se observó efecto del día 1 ($P \geq 0,11$) ni de la interacción día 1 x día 7 ($P \geq 0,41$) para los valores plasmáticos de TAS y TBARS. Sin embargo, se observó un incremento de la capacidad antioxidante (0,59 vs 0,51 mmol/L; $P=0,01$) y menor lipoperoxidación (5,96 vs 6,70 μ M MDA; $P=0,01$) en vaquillonas suplementadas al día 7 (CS y SS) comparado con las no suplementadas ese día (CC y SC).

Conclusiones: Las vaquillonas suplementadas con vitaminas y minerales aumentaron el PV y la GDP al final de etapa de adaptación. Sin embargo, la suplementación con dos dosis (día 1 y 7) no se diferenció del uso de una sola dosis (día 1 o día 7) en el PV o la GDP. En el mismo sentido, la suplementación con vitaminas y minerales al día 7 generó una mayor capacidad antioxidante y menor lipoperoxidación.

and 4 alarms were detected (66.6% of success). For diarrhea, 12 cases were diagnosed, and 9 alarms were detected (88.8% of success). For subclinical ketosis (BHB > 1.2 mmol/L), 25 cases were diagnosed, and 15 alarms were detected (60% of success). For estrus detection, 99 events were identified by farm personnel, and 97 alarms were recorded (97.97% of success). When comparing average daily milk yield up to 150 days postpartum, the AMS group produced 46.4 kg/d while the control group produced 45.7 kg/d. Mortality rate was 3.19% in the AMS group vs. 4.6% in the control group. Culling rate was 3.19% in the AMS group vs 7.9% in the control group. It is concluded that the AMS device helped in the early diagnosis of diseases and estrus detection, reducing the culling rate and increasing the milk yield when compared with a control group.

Keywords: automated monitoring system, dairy, diseases, heat detection, Chile.

AH-P26

Effects on injectable Trace minerals and Vitamins supplementation on growth and antioxidant status in heifers during feedlot receiving

Guillermo Mattioli¹, Diana Rosa¹, Esteban Turic², Alejandro Relling³, Luis Fazzio¹.

¹Facultad de Veterinaria (Univ. Nac. La Plata), La Plata, Argentina; ²Biogénesis Bagó SA, Garín, Buenos Aires, Argentina; ³Animal Sciences, The Ohio State University, Wooster, United States.

Objectives: In beef cattle production, weaning, transportation, and feedlot entry are the most stressing stages leading to lower weight gain secondary to oxidative stress. The hypothesis for the current experiment was that supplementation with injectable vitamins (A and E) and minerals (Cu, Zn, Mn, and Se) improves growth and parameters related to oxidative stress in cattle entering the feedlot. The aim of this work was to evaluate the effects of supplementation on day 1 and/or 7 after feedlot entry on body weight, total antioxidant status (TAS) and thiobarbituric acid reactive substances (TBARS) in weaned cattle.

Materials and methods: Healthy crossbred *Bos indicus* × *Bos taurus* heifers (255 ± 26 kg) were shipped 900 km. Heifers were randomly assigned to four groups (n = 30 each) in a 2×2 factorial arrangement of treatment. The main factors were supplementation (S) or not (C) on day 1 and supplementation (S) or not (C) on day 7 (CC, CS, SC and SS groups). The parenteral vitamin supplement (subcutaneous 1 ml /50 kg BW; Adaptador Vit®, Biogénesis Bagó SA, Buenos Aires, Argentina) contained 63000 IU/mL of vitamin A (as palmitate), and 50 IU/mL of vitamin E (as acetate). The mineral supplement (subcutaneous 1ml /50 kg BW; Adaptador Min®, Biogénesis Bagó SA, Buenos Aires, Argentina) contained 10 mg/mL Cu (as copper edetate), 10 mg/mL Mn (as manganese edetate), 5 mg/mL Se (as sodium selenite), 40 mg/mL Zn (as zinc edetate). Plasma concentration of TAS (n = 8 animals per group) and TBARS, (n = 8 animals per group) were determined through commercial kits (Cayman Assay Kit 10009055 and 709001

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Keywords: ruminants, body weight, oxidative stress, antioxidant, feedlot.

AH-P27

Defining clinical diagnosis and treatment of puerperal metritis in dairy cows: A Scoping Review

Adriana Garzon¹, Gregory Habing², Fabio Lima¹, Noelia Silva-Del-Rio³, Festus Samah¹, Richard Pereira¹.

¹Department of Population Health and Reproduction, School of Veterinary Medicine, University of California, Davis, Davis, United States; ²Department of Veterinary Preventive Medicine, Ohio State University, Columbus, United States; ³Veterinary Medicine Teaching and Research Center, School of Veterinary Medicine, University of California, Davis, Tulare, United States.

Objective: Puerperal metritis (PM) is a common infectious disease in dairy cattle. Currently there are discrepancies between clinical case definitions within and between available peer-reviewed literature and on-farms practices. The inconsistent use of PM criteria across studies and on-farms practices can result in disparities related to recommendations for treating cows, affecting judicious use of antimicrobials. Our objective was to systematically review literature for clinical signs used as diagnostic criteria for PM, including local (e.g., vaginal discharge) and systemic signs of infection (e.g., fever, drop in milk).

Methods: The Preferred Reporting Items for Systematic Review and Meta-Analysis extension for Scoping Reviews