

THE EFFECT OF UNDERNUTRITION AND SUPPLEMENTATION WITH HYDROXYTYROSOL IN LATE PREGNANCY ON BEEF CATTLE SOCIAL BEHAVIOR

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Social behavior can be used as a welfare indicator informing an animal's adaptation to its production environment challenges. The present study is part of a larger project investigating fetal undernutrition and hydroxytyrosol (HT) supplementation (a proved antioxidant) in a beef production system (FETALNUT; grant no PID2020-113617RR-C22). The specific objective was to assess the effects of restricted feeding on beef cattle social behavior during the last trimester of pregnancy. Cows from Parda de Montaña and Pirenaica breeds were allocated to four treatments, (2x2 factorial design), by the level of maternal feeding (100 vs. 60% of estimated total requirements) and HT supplementation HT (0 or 178 mg HT/kg of unifeed) on mixed breeds pen. The experiment started at the morning unifeed delivery, lasting two hours, as suggested by the Welfare Quality® protocol. Individuals' exact identities and the location at the feed bunk were collected at the observation unit. Information (indoors 2021-22) from 1420 behavioral scans (10 min duration, segments of 4-7 cows) was obtained, and 109 animals were embedded in this analysis (4 observers). The frequency of behaviors was expressed as the number of animals affected from the total number assessed on each scan. Different affiliative and cohesive behavior (licking, sniffing, and vocalizations) were recorded. Preliminary analysis shows the undernourished group performed more cohesive behaviors than the group fed 100% energy requirements (0.42 vs. 0.12%, $P < 0.001$) and more head rub and tongue playing as specific behaviors, whereas no differences were observed in agonistic encounter behaviors. Restricted-fed Pirenaica cows performed more vocalizations than their control counterparts. Likewise, differences were observed in tongue playing according to HT supplementation, which is more frequent in the non-supplemented group of Parda breed. The two breeds performed similarly in total frequency of behaviors. However, both breeds performed significantly more steps back, head shakes, brushes, tongue playing, and headbanging, but only Parda vocalized more after the meal. Parda dams located in a peripheral position tended to vocalize more than those at central position of the feeder. There were no differences in vocalizations in Pirenaica breed regarding the feeding time or position at the feed bunk. Unlike Parda de Montaña breed, Pirenaica breed in a peripheral position step-backs more frequently and tended to lick more than those in a central position. Overall, undernutrition and HT supplementation seem to modify social and other behavior, interplaying with the cattle breed. Further analyses are needed before recommending the inclusion of antioxidant supplementation

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BEHAVIOR



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Introduction

Undernutrition during pregnancy can affect cows at different levels. Social behavior can be used as a welfare indicator informing an animal's adaptation to its production environment challenges.

Objective

The aim is to assess the effects of restricted feeding and hydroxytyrosol (HT) supplementation (a proven antioxidant) during the last trimester of pregnancy on beef cattle social behavior.



Pirenaica

Parda de Montaña

Material and methods

- n=109, divided in 4 groups (2x2 factorial design), mixed breeds pen
- The level of maternal feeding (100 vs. 60% of estimated total requirements)
- HT supplementation (0 or 178 mg HT/kg of unifeed)



- Scans of 10 mins duration (total of 2h/day and group)
- 4 observation days
- Information recorded:
 - Affiliative and cohesive behavior
 - Individuals' exact identities and the location at the feed bunk

Results

BEHAVIOR	VARIABLES	SIGNIFICANT EFFECT	FREQUENCIES (number of events / hour)
AGONISTIC	Headbutt	None	0.0108
	Displacement	None	0.0025
COHESIVE	Cohesive behaviors (licking, sniffing)	Feeding level	0.13 vs 0.44 (100 vs 60%)
	Licking	Position x Breed	0.37 vs 0.06 (Central Pi vs Peripheral Pi)
	Vocalizations	Feeding level x Breed	0.01 vs 0.08 (100% Pi vs 60% Pi)
		Position x Breed	0.06 vs 0.23 (Central Pa vs Peripheral Pa)
FRUSTRATION	Head shakes	Time (meal)	0.16 vs 0.14 (During vs After Meal)
		Position x Breed	0.25 vs 0.43 (Central Pi vs Peripheral Pi)
	Steps back	Time (meal)	0.19 vs 0.57 (During vs After Meal)
		Feeding level	0.02 vs 0.16 (100 vs 60%)
		HT x Breed	0.04 vs 0.16 (HT Pa vs Control Pa)
	Tongue playing	Time (meal)	0.03 vs 0.26 (During vs After Meal)
Feeding level		0.07 vs 0.82 (100 vs 60%)	
TOTAL	Total frequency of behaviors	None	

CONCLUSION: Undernutrition and HT supplementation seem to modify social and other behavior, interplaying with the cattle breed.

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