



Effects of zilpaterol hydrochloride and soybean oil on feedlot and carcass traits of lambs in summer

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Introduction

Heat stress conditions result in reduced feed intake by finishing lambs, so factors such as daily gain, feed efficiency, carcass yield and meat quality may also decreased. Use of β -adrenergic agonists (β -AA), such as zilpaterol hydrochloride (ZH), could be an alternative to improve feedlot performance and carcass traits in lambs, even when feed intake is reduced because of heat stress. However, studies to evaluate effects of ZH on growth and carcass traits in lambs under heat stress conditions are lacking. High energy dense ingredients such as vegetable oils might improve growth and carcass traits of sheep under heat stress. Addition of vegetable oils from 3 to 5% in diets do not affect rumen fermentation. Though, oil supplementation has not been evaluated in sheep experiencing heat-stress. The combination of ZH and vegetable oil in finishing diets could increase caloric intake and thus improve performance and carcass traits.

Therefore, the objective of this study was to evaluate the effects of ZH and soybean oil (SO) supplementation on feedlot performance and some carcass characteristics of hair-breed ram lambs under heat stress conditions.

Materials and Methods

Animal, Housing, and Treatments

Climatic conditions during the study were of moderate heat stress (Temperature: 35.7 C, Relative humidity: 32.63% RH, ITH: 83.6 units)

- Treatment 1: 0 ZH + 0% SBO
- Treatment 2: 10 mg ZH + 0% SBO
- Treatment 3: 0 ZH + 6% SBO
- Treatment 4: 10 mg ZH + 6% SBO
10 mg of ZH/d/animal

3 Periods Evaluated
(1-17 d)
(18-34 d)
(1-34 d)

- Feedlot measurements:
- BW, kg
 - Total gain, kg
 - ADG, kg/d
 - Feed intake, kg/d
 - G:F



Diets



Ingredients	CONTROL	ZH	SBO	ZH + SBO
Wheat grain	68.00	68.00	50.50	50.50
Alfalfa hay	12.10	12.10	10.00	10.00
Wheat straw	3.00	3.00	12.00	12.00
Soybean meal	10.50	10.50	15.00	15.00
Cane molasses	5.00	5.00	5.00	5.00
Soybean oil	0	0	6.00	6.00
Limestone	0.20	0.20	0.20	0.20
Calcium phosphorus	0.70	0.70	0.80	0.80
White salt	0.50	0.50	0.50	0.50
ZH (mg/d/animal)	0.00	10.00	0.00	10.00
Chemical composition				
CP, %	19.4	19.4	19.7	19.7
ME, Mcal/kg ¹	2.92	2.92	2.92	2.92

Statistical Analysis

- Randomized block design with a 2x2 factorial arrangement
- Initial BW was considered as block (10 blocks)
- Proc Mixed from SAS was used

Results

Feedlot performance in lambs supplemented with ZH and SBO

Items	ZH (mg/d/animal)		SBO (%)		S.E.	P-value		
	0	10	0	6		ZH	SBO	ZH x SBO
Initial BW, kg	30.32	30.32	30.07	30.57	0.78	0.95	0.70	0.95
BW at d 17, kg	34.38	35.37	35.55	35.20	0.76	0.05	0.20	0.51
BW at d 34, kg	37.68	38.41	37.97	38.11	0.75	0.35	0.85	0.59
Period 1 (1-17 d)								
Gain, kg	4.07	5.04	4.49	4.62	0.70	0.04	0.76	0.45
ADG, kg/d	0.25	0.33	0.28	0.29	0.02	0.03	0.75	0.45
Feed Intake, kg/d	1.00	1.04	1.02	1.03	0.03	0.40	0.46	0.46
G:F	0.25	0.30	0.28	0.28	0.01	0.02	0.96	0.46
Period 2 (18-34 d)								
Gain, kg)	3.18	3.29	3.56	2.91	0.68	0.83	0.24	0.50
ADG, kg/d	0.20	0.21	0.22	0.18	0.02	0.85	0.24	0.49
Feed Intake, kg/d	1.06	1.06	1.08	1.04	0.03	0.93	0.35	0.18
G:F	0.18	0.19	0.21	0.17	0.02	0.72	0.23	0.79
Total period (1-34 d)								
Gain, kg)	7.34	8.13	7.92	7.54	0.71	0.29	0.60	0.65
ADG, kg/d	0.23	0.25	0.25	0.23	0.02	0.29	0.56	0.70
Feed Intake, kg/d	1.03	1.03	1.03	1.04	0.03	0.91	0.76	0.25
G:F	0.22	0.24	0.24	0.22	0.01	0.18	0.42	0.99

Carcass characteristics in lambs supplemented with ZH and SBO

Items	ZH (mg/d/animal)		SBO (%)		S.E.	P-value		
	0	10	0	6		ZH	SBO	ZHxSBO
HCW, kg	17.4	18.3	18.0	17.8	0.34	0.07	0.62	0.55
CCW, kg	17.1	17.9	17.6	17.4	0.33	0.08	0.72	0.52
Dressing, %	47.7	49.2	49.2	47.7	0.39	<0.01	<0.01	0.65
Cooling loss, %	2.13	2.26	2.36	2.02	0.18	0.62	0.18	0.55
Conformation ⁴	8.06	8.40	8.39	8.08	0.19	0.21	0.26	0.81
KPH fat, %	3.85	2.84	3.19	3.50	0.27	0.01	0.41	0.43
Fat thickness, cm	1.35	1.18	1.15	1.37	0.12	0.29	0.17	0.12
LM area, cm ²	17.5	19.1	18.9	17.7	0.50	0.03	0.12	0.73
pH <i>postmortem</i> 45 min	6.80	6.82	6.80	6.81	0.02	0.44	0.69	0.79
pH <i>postmortem</i> 24 h	5.97	6.19	6.03	6.13	0.07	<0.01	0.24	0.43

Conclusions

- ZH reduced KPH and increased dressing percentage and LM area without affecting feedlot performance of hair-breed ram lambs under heat stress conditions.
- Supplementation of SBO had no effect on feedlot performance and decreased dressing in hair-breed ram lambs under heat stress.