Fattening Sheep in a Warm Shed to Compensate for Energy Deficiency in Winter in North-west China

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Key words : sheep ,warm shed ,fatty acid calcium salts (FACS) ,Small Tail Han sheep (STHS) ,finishing effect

Introduction Grasslands in north-west of China can experience extremely cold weather conditions which can restrict forage quality and quantity . This leads to a situation of low sheep growth rates and poor body condition . The main reason for low sheep growth rates is the additional energy requirements required to resist cold not being met by forage supply . In theory , improving energy intake can have the same effect as increasing shed temperature . FACS is a kind of by-pass rumen fat and energy additive ,and research has shown that feeding it can improve ruminant ADG (Lai ,2002 ; Zhao ,2001) . In this experiment ,we added FACS to a sheep diet so as to test the effect on fattening sheep in both a warm and ordinary shed .

Table 1 *Experimental design .*

Shed type (A)	Intake of FACS(g/sheep · day)		
	B_1(0g)	B_2(30g)	B_3(60g)
A_1(ordinary shed)	A_1B_1(10 sheep)	A_1B_2(5 sheep)	A_1B_3(5 sheep)
A_2(warm shed)	A_2B_1(10 sheep)	A_2B_2(5 sheep)	A_2B_3(5 sheep)

Materials and methods This experiment was arranged in Huajia biotechnical corporation in Lintao County ,China ,where the altitude was 1915m ,average annual temperature is 10 .1 ℃ ,and January being the coldest month . An experiment from Nov 20th to Jan 15th involved 40 healthy 5 month old STHS ewes weighing on average 23 kg body weight . The experimental design is given in Table 1 . The nutritious level of basal diet accorded with the daily nutrient requirements of Xinjiang fine wool sheep (expected daily gain was 200 g) .

Results and discussion The results (Table 2) showed that in an ordinary shed ,the ADG of 30g FACS trait and 60g FACS trait were 13 .3% and 33 .2% higher than the control treatment (A_1B_1) ,and ADG of 60g FACS trait (A_1B_3) was 17 .6% higher than 30g FACS trait (A_1B_2) ($P<0$ .05) . In a warm shed ,ADG and average feed intake (AFI) among three traits was similar ($P>0$ .05) ,indicating that the effect of adding FACS was correlated to feed condition . The ADG and feed conversion efficiency of fattening sheep in a warm shed (A_2B_1) was improved by 9 .4% and 4 .4% compared that that of an ordinary shed (A_1B_1) . The highest profit was obtained for treatment A_2B1 (¥22 .23) ,where no FACS was added to daily sheep intake in a warm shed . At higher levels of FACS intake ,profit declines due to the high price of FACS not being offset by larger gains in ADG .

Table 2 *Fattening sheep effect of adding FACS into dietary in both shed .*

Trait		ADG (g/day)	Average feed intake(kg)				Feed conversion efficiency	Profit (Yuan)
			Concentrate	Alfalfa	Silage without ears	Total		
A_1	B_1	143 .08±33 .64	0 .65±0 .00	0 .17±0 .01	0 .21±0 .04	1 .04±0 .04	13 .79±3 .01	18 .03±16 .95
	B_2	162 .14±20 .64	0 .67±0 .01	0 .17±0 .00	0 .18±0 .02	1 .02±0 .03	15 .88±2 .11	17 .42±10 .80
	B_3	190 .63[a]±37 .21	0 .70±0 .01	0 .17±0 .00	0 .19±0 .07	1 .06±0 .08	17 .80±2 .73	18 .65±17 .56
A_2	B_1	156 .47±21 .93	0 .65±0 .01	0 .18±0 .00	0 .24±0 .03	1 .07±0 .06	14 .39±1 .89	22 .23±10 .37
	B_2	157 .85±35 .48	0 .66±0 .03	0 .18±0 .00	0 .23±0 .03	1 .07±0 .07	14 .86±3 .80	13 .58±19 .27
	B_3	158 .21±15 .02	0 .70±0 .02	0 .17±0 .01	0 .19±0 .05	1 .07±0 .05	14 .85±1 .01	1 .150±6 .11

Conclusions In this experiment the impact of combinations of adding FACS to daily sheep intake in both ordinary and warm sheds were evaluated . Maximum profit was obtained with a warm shed with no FACS . Adding FACS to sheep diets in a warm shed reduced profit whereas in an ordinary shed there was a slight positive effect for 60g/day FACS in an ordinary shed .

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