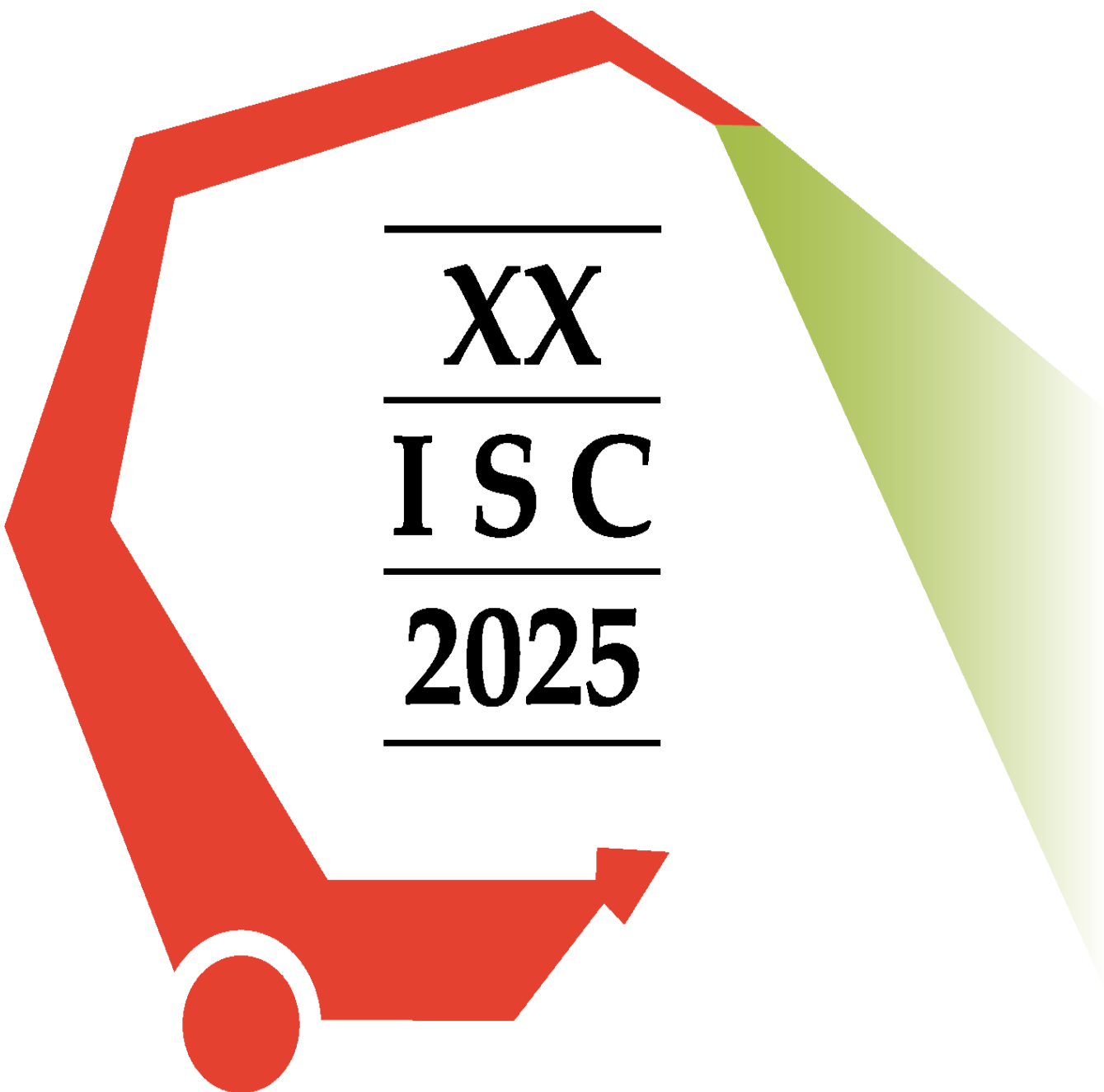




INFLUENCE OF INOCULATED CORN-ALFALFA MIXED SILAGE ON GROWTH PERFORMANCE OF HU SHEEP

Saleh Jibril Umar¹², Pu Wu¹², Babangida Ahmed¹², Maqiyu Qian¹², Samaila Usman¹³ and Yuying Shen¹²

¹State Key Laboratory of Herbage Improvement and Grassland Agro-ecosystems of Lanzhou University, Lanzhou China, email: yy.shen@lzu.edu.cn
² Qingyang National Field Scientific Observation and Research Station of Grassland Agro-Ecosystems, College of Pastoral Agriculture Science and Technology, Lanzhou University, Lanzhou, China
³ School of Life Sciences, Probiotics and Life Health Research Institute, Lanzhou University, Lanzhou, China



INTRODUCTION

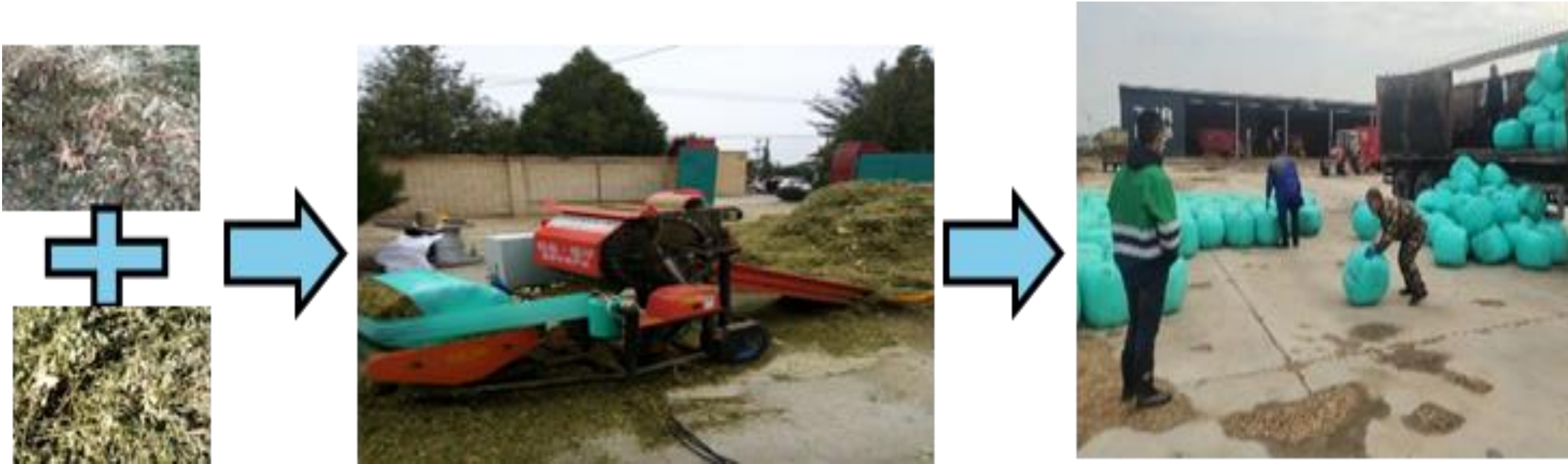
Silage from whole corn is good in terms of fermentation and energy; silage from alfalfa is characterized by poor fermentation, low energy, and high nutrient loss. Previous research (Ozturk et al., 2006) has demonstrated that mixing corn and alfalfa forages improves the quality of silage; however, the investigations are primarily small-scale laboratory experiments without any feeding trials. This study incorporates whole corn and alfalfa forage to complement each other’s inadequacies. The addition of *Lentilactobacillus buchneri* as an inoculant can help to improve aerobic stability and fermentation

OBJECTIVE

To determine the effects of feeding whole corn–alfalfa mixed silage-based TMR on the growth performance of Hu sheep.

MATERIALS AND METHODS

Silage: The silage comprised three proportions of whole corn to alfalfa forage at 0, 30, and 40% alfalfa inclusion.



Treatments: There were 6 treatments, prepared as TMR with 50% concentrate mix + 50% (0, 30, and 40% alfalfa inclusion) with or without *Lentilactobacillus buchneri* inoculation in each case.

Table 1: Experimental diets (%)

Item	100% Corn		70% Corn + 30% Alfalfa		60%Corn + 40% Alfalfa	
	NIT	IT	NIT	IT	NIT	IT
Corn grain	25.40	25.00	30.30	30.30	34.40	33.40
Sugar beet pellets	11.80	12.10	9.90	10.00	9.00	10.10
Commercial concentrate	12.30	12.40	9.30	9.20	6.10	6.00
Silage	50.00	50.00	50.00	50.00	50.00	50.00
Sodium bicarbonate	0.50	0.50	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00	100.00	100.00
Crude Protein (%)	15.23	15.18	15.79	15.73	15.74	15.65
Metabolizable Energy (MJ/Kg DM)	11.51	11.62	11.48	11.56	11.57	11.58
Cost/kg (\$)	1.76	1.77	1.71	1.72	1.65	1.65
Dry Matter (%)	64.81	64.22	63.26	63.15	62.44	62.27
Acid Detergent Fiber (%)	20.72	20.36	21.79	21.19	24.33	22.78
Neutral Detergent Fiber (%)	30.16	29.06	31.72	31.02	32.05	31.73
Ether Extract (%)	2.56	2.43	2.28	2.23	2.02	2.08
Calcium (%)	0.57	0.62	0.79	0.60	0.86	0.95
Phosphorus (%)	0.43	0.45	0.41	0.41	0.40	0.41

NIT= Non inoculated, IT= Inoculated

Animals: Ninety (90) male Hu sheep of 5 months of age, weighing 29.27±1.3kg, were fed the diets for 3.5 months (15 days adjustment and 90 days collection period). There were 15 sheep in each treatment, divided into 3 pens (replicates) with 5 animals.



RESULTS

Dry matter intake (DMI) was adversely affected by alfalfa inclusion, with treatments devoid of alfalfa exhibiting greater DMI, even though alfalfa addition is reported to improve acceptability and thus DMI (Wang et al., 2021). This could be due to increase in fiber content and bulkiness due to the characteristics of alfalfa forage. However, Hu sheep fed a *Lentilactobacillus buchneri*-inoculated 60% corn + 40% alfalfa diet had the highest final body weight (50.57 kg), daily weight gain (237.45 g/day), and feed efficiency (17.03%), along with the lowest feed cost per kg gain (\$2.07). Inoculation improved performance, with alfalfa inclusion enhancing growth and cost efficiency over corn-only diets.

Table 2: Effect of *Lentilactobacillus buchneri* inoculated whole corn - alfalfa mixed silage-based diets on growth performance of Hu sheep (n = 90)

Item	100% Corn		70% Corn + 30% Alfalfa		60%Corn + 40% Alfalfa		SEM	P value		
	NIT	IT	NIT	IT	NIT	IT		R	I	R x I
IBW (kg)	30.51	28.76	28.02	28.19	28.88	29.20	0.871	0.203	0.544	0.491
FBW (kg)	48.81 ^{abc}	45.5 ^{bc}	45.46 ^c	45.78 ^{bc}	49.77 ^{ab}	50.57 ^a	1.262	0.015	0.600	0.283
DMI (Kg)	1.55 ^a	1.45 ^b	1.35 ^{cd}	1.33d	1.42 ^{bc}	1.37 ^{bcd}	0.025	<0.001	0.013	0.306
TWG (kg)	18.30 ^{bc}	16.74 ^c	17.44 ^c	17.59 ^c	20.90 ^{bc}	21.37 ^a	0.892	0.002	0.655	0.625
ADG (g)	203.36 ^{bc}	186.03 ^c	193.79 ^c	195.41 ^c	232.20 ^{ab}	237.4 ^a	9.517	0.001	0.665	0.448
FE (%)	13.06 ^c	12.72 ^c	14.07 ^{bc}	14.71 ^{abc}	16.35 ^{ab}	17.03 ^a	0.733	0.001	0.598	0.735
Daily Intake as fed (kg)	2.34	2.21	2.14	2.13	2.26	2.19	0.163	0.713	0.626	0.917
Cost of Feed Intake (\$)	0.58	0.55	0.52	0.51	0.52	0.51				
Cost of kg weight gain(\$)	2.84	2.96	2.71	2.63	2.18	2.07				

^{abc} = means with different superscript across rows are significantly different (P < 0.05), NIT= Non inoculated, IT= Inoculated, IBW=Initial Body Weight, FBW=Final Body Weight, DMI=Dry Matter Intake, ADG=Average Daily Gain, FE=Feed Efficiency

Conclusion

This study provided insight into the growth performance of Hu sheep fed mixed whole corn-alfalfa silage. The inclusion of alfalfa (40%) improved the sheep’s performance in terms of ADG and total weight gain at a reduced cost. Inoculation with *Lentilactobacillus buchneri* improved diet utilization significantly.

References

Ozturk, D., Kizilsimsek, M., Kamalak, A., Canbolat, O., & Ozkan, C. O. (2006). Effects of Ensiling Alfalfa with Whole-crop Maize on the Chemical Composition and Nutritive Value of Silage Mixtures. *Asian-Australasian Journal of Animal Sciences*, 19(4), 526–532. <https://doi.org/10.5713/ajas.2006.526>

Wang, J., Yang, B., Zhang, S., Amar, A., Chaudhry, A., Cheng, L., Abbasi, I., Al-Mamun, M., Guo, X., & Shan, A. (2021). Using mixed silages of sweet sorghum and alfalfa in total mixed rations to improve growth performance, nutrient digestibility, carcass traits and meat quality of sheep. *Animal*, 15(7), 100246. <https://doi.org/10.1016/j.animal.2021.100246>