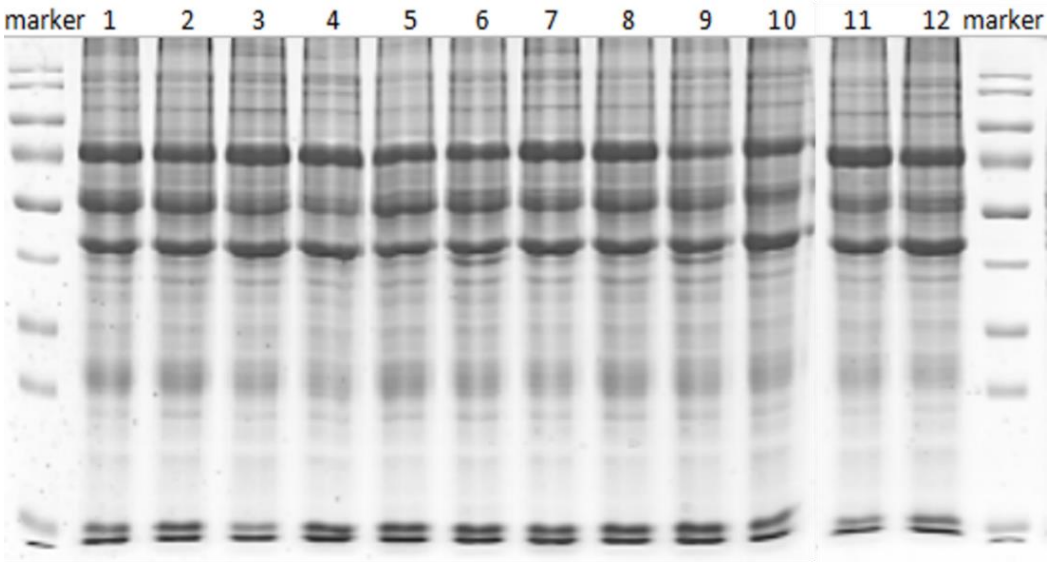
Supplemental Table S1 Compositions and nutrients levels of the basal diets (air-dry basis)

raw materials	Percentage（%）	Nutritional level	Percentage（%）
Corn silage	50.00	DM	60.13
Chinese wildrye	20.00	Metabolic energy（MJ/kg DM）	12.51
Corn	15.00	Crude protein	13.42
Soybean meal	8.02	Organic matter	86.38
Wheat bran	4.98	NDF	38.67
Calcium bicarbonate	0.50	ADF	31.07
Sodium chloride	0.50	Ca	0.68
Premix[#]	1.00	P	0.49
Total	100.00		

[#]Per kilogram of premix of the diet contains vitamin A 55,000 IU, vitamin D 11,500 IU, vitamin E 13,000 IU, $MgSO_4 \cdot H_2O$ 110 g, $CuSO_4 \cdot 5H_2O$ 0.7 g, $FeSO_4 \cdot 7H_2O$ 3.0 g, $MnSO_4 \cdot H_2O$ 2.5 g, $ZnSO_4 \cdot H_2O$ 5.0 g, Na_2SeO_3 15 mg, KI 40 mg, $CoCl_2.6H_2O$ 28 mg. DM, dry matter; NDF, neutral detergent fibre; ADF, acid detergent fibre.

Supplemental Table S2 primer parameters of each gene

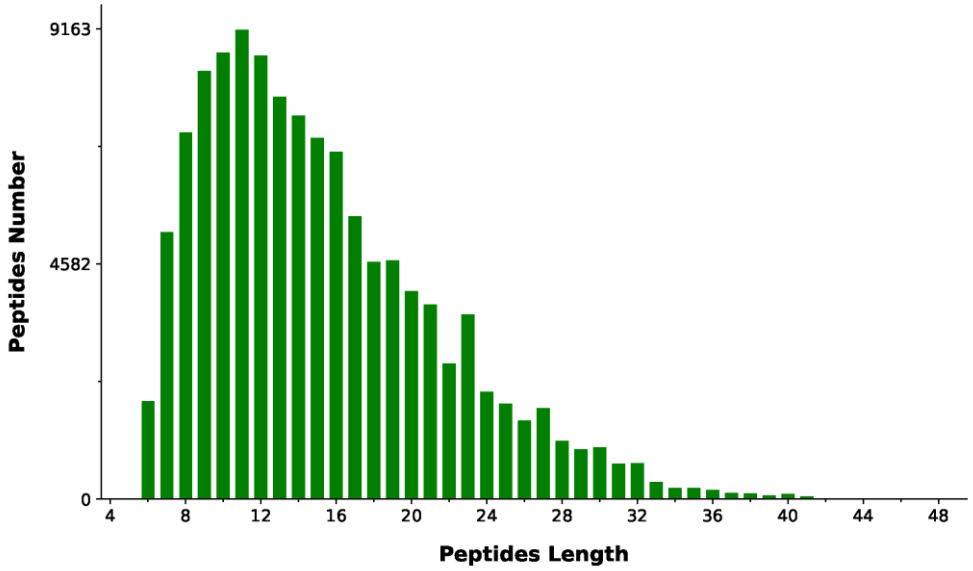
Gene name	Primer sequence（5'-3'）	GenBank ID	Fragment size /bp	Tm/°C
PELO	F：AACCGCCAGTTCACCCT R：GCCTTTCCGTTTCCGAG	XM_005694722.2	201	57
SLC27A4	F：GCAATGAGTTTGTGGGT R：CAGAAGAGGTTGAGCGA	XM_018055876.1	199	57
SLC2A1	F：TGATTGGTTCCTTCTCCG R：AGGACTTGCCCAGTTTTG	NM_001314223.1	126	57
ITGAL	F：TTTGCGGCTGTTCAGTTTT R：TTCTGTTCGTCGGTGGCTT	NM_001314316.1	239	57
GFAP	F：CAGTGGCGTCCAGCAACAT R：CTCCAGGTCGCAAGTCAAG	XM_018065254.1	163	57
OLFML3	F：CAGAGCAGCAGTGGGATA R：CGGGGGAAATAAGGGAGT	XM_005677850.3	178	57
TUBA4A	F：TGATGAGATCCGAAATGG R：TAGTCAACAGAGAGCCGC	XM_018059034.1	258	57
TOMM20	F：AGCAAACTCTCCCACCACC R：TCCACATCATCTTCAGCCA	XM_018042526.1	103	57
β-actin	F：AGATGTGGATCAGCAAGCAG R：CCAATCTCATCTCGTTTTCTG	XM_018039831.1	139	57



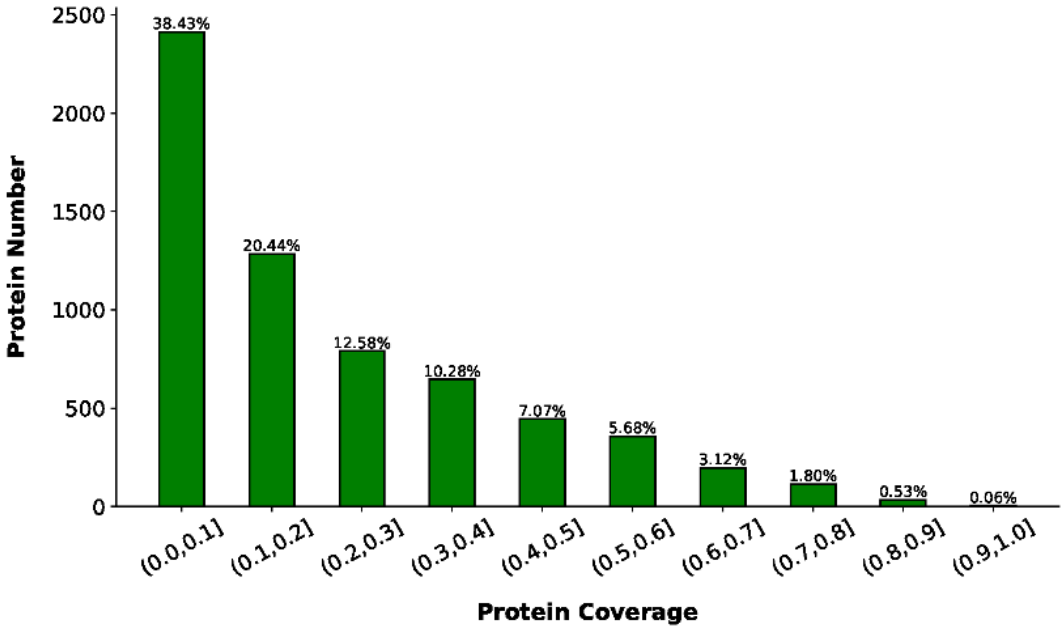
Supplemental Figure S1 Identification of uterine horn protein by SDS-PAGE

SDS-PAGE gel electrophoresis to test the quality of ewe uterine keratin samples

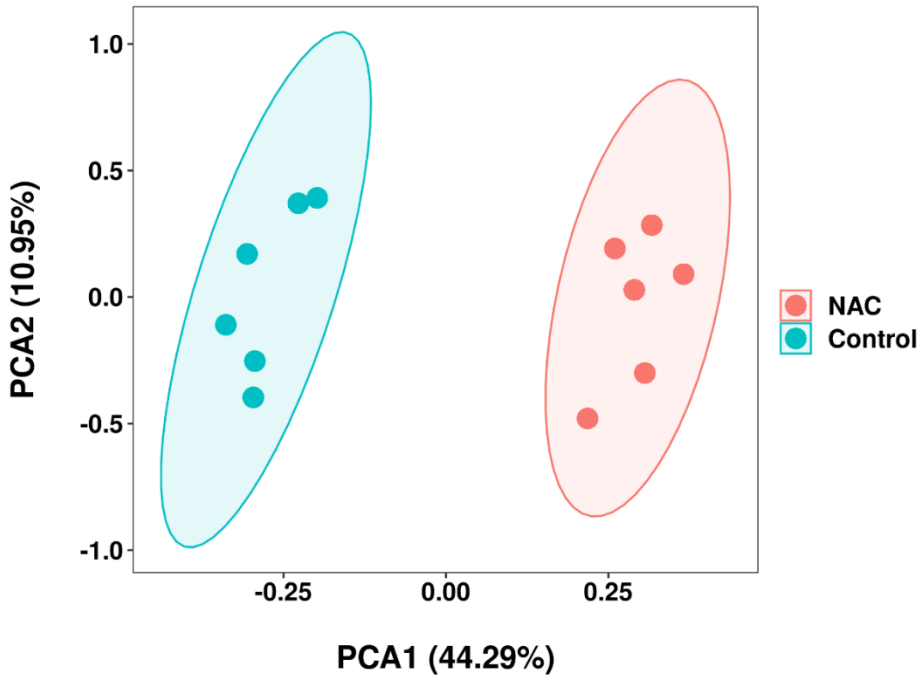
The loading amount is 15ug, which 1-6 is the control group, and 7-12 is the N-acetylcysteine group



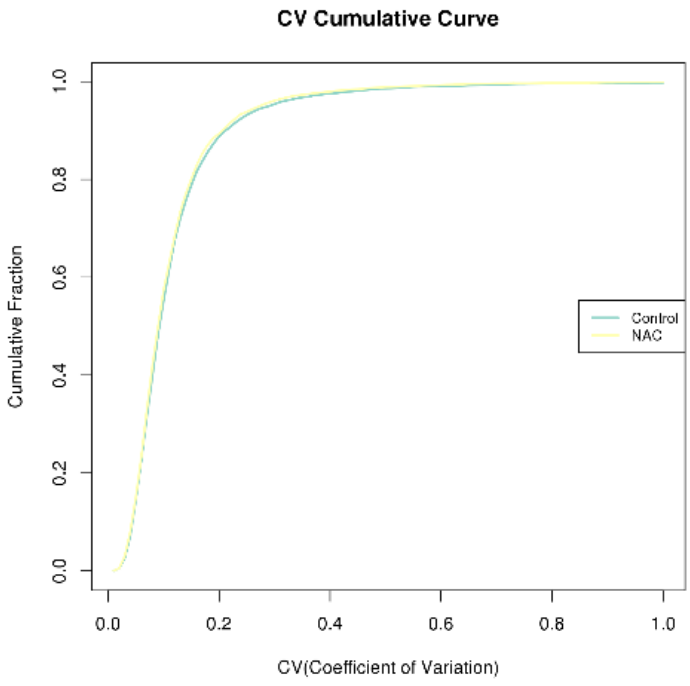
Supplemental Figure S2 Peptide length distribution



Supplemental Figure S3 Protein coverage distribution



Supplemental Figure S4 Principal component analysis



Supplemental Figure S5 Coefficient of variation analysis