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Presenter Information

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Effects of alfalfa saponin on fermentation functions and protozoal populations in the rumen of sheep

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Key words : sheep ,alfalfa saponin , ruminal fermentation , protozoal

Introduction Alfalfa Saponins are secondary plant glycosides with a polycyclic aglycone moiety of triterpenoid attached to carbohydrate moiety .Several biological effects have been ascribed to Alfalfa Saponins in nonruminant animals , Some effects in ruminants were pronounced . However ,little is known about the effect of alfalfa saponins on microbial fermentation in the rumen .Protozoa ,together with bacteria and fungi ,are an integral part of the rumen microbial population , all are involved in rumen fermentation and digestion of feed . The objective of this study was to investigate the effects of supplementing sheep with different levels of alfalfa saponins on ruminal fermentation ,protozoal populations and to provide some valuable data for use of alfalfa saponins in sheep production .

Materials and methods Two years old Inner Mongolian semi-fine wool wethers of 35kg body weight ,with permanent ruminal and proximal duodenum cannulas , were divided into 4 groups of 3 in one factor experimental design and fed a diet with 2 :8 concentration : forage ratio to study the effects of 4 adding levels of alfalfa saponin (0g/d ,8g/d ,16g/d ,32g/d) on fermentation function and protozoal population in the rumen of sheep . After 15d of adaptation period , rumen fluid samples were collected via cannula of each animal at 0h ,2h ,4h ,6h ,8h and 12h after feeding 1d ,2d ,3d ,6d ,9d ,12d and 21d . The pH of rumen fluid was determined immediately after straining it through muslin cloth by using a systomic PH meter (made in shanghai ,chain) . Rumen volatile fatty acids were determined by gas Chromatography . The microbial protein was determined by using RNA as a marker . Total protozoa numbers was counted with a method described by Lu and Xie (1990) , ammonia-N Concentration was estimated by a spectrometer (Model 721)using colorimetry with the NH_4Cl Solution as a standard (Feng and Gao ,1993) .Data were analyzed by ANOVA , multiple comparisons were analyzed using Duncan . Saponins extracted from whole alfalfa plants were purchased from hebei baoen biotechnology Co .Ltd . it was in power form , light-yellow , and contained 20% triterpenoid saponin .

Results When alfalfa saponin was added , the value of pH in the rumen was not altered significantly ($p > 0.05$) ; At day 3 and day 6 , $\text{NH}_3\text{-N}$ concentration was decreased significantly ($p < 0.05$) ;The total VFA in the rumen of the sheep were similar among treatments ($p > 0.05$) ,the average concentration of acetate in the rumen digesta was significantly lower ($p < 0.05$) , and at the same time ,the ratio of acetate to propionate decreased significantly ($p < 0.05$) ;Bacteria protein synthesis in the rumen was higer than control group($p < 0.05$) . When the level was 8g/d , at day3 , the protozoa number was greatly reduced by 20% ($p < 0.05$) .

Conclusions Alfalfa saponins as antiprotozoal agent for ruminant feeding is relatively less toxic to animal with the levels of 8g/d , 16g/d and 32g/d . From the present results it was concluded what the antiprotozoal activity of the alfalfa saponin is transient , with an effective period of only up to d6 , at the same time ,the level of addition appear to be 8g/d , which could be an excellent Supplement to sheep .

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