Characteristics of the Chemical Composition and Carbohydrate/ Protein Fractions along with the Growth of Alkali-Grass (*Puccinellia tenuiflora*) as Feed for Ruminants

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Key words : alkali-grass , protein/carbohydrate fractionation , alkalinized lands , ruminant , feedstuff

Introduction Alkali-grass (*Puccinellia tenuiflora*) , a perennial plant in the *Poaceae family* , grows well in heavily alkalinized , high pH soils presumably due to its neutralizing effect on alkali soil . Alkali-grass can be fed to ruminants , but the optimum combinations with other feedstuffs are unclear because the chemical composition of alkali-grass has not been evaluated in detail . Therefore , the present study was conducted to clarify the characteristics of carbohydrate/protein fractions along with the growth of the plants .

Materials and methods Alkali-grasses cultivated for three years in the alkalinized region in Jilin Province of China were harvested at four stages : vegetative , reproductive (flowering and post-flowering) and post-reproductive growth phases . The carbohydrates and proteins of the growing alkali-grasses and control samples (*Aueurolepidium chinense* , alfalfa and timothy hey) were fractionated according to the methods of a net carbohydrate and protein system (Hall *et al* . , 1988 ; Licitra *et al* . , 1996) .

Results and discussion Analysis of the chemical composition of alkali-grass showed that the crude protein contents of the plant were relatively high and decreased from the vegetative to reproductive stages (from 17 .5 to 13 .2% DM) , but it was very low after post-reproductive stage (7 .1%) . It was also demonstrated that alkali-grasses of the vegetative and reproductive stages had very high levels of protein A fraction which mainly consists of NPN (non protein nitrogen ; about 50% of CP) and very low levels of carbohydrate A and B_1 fractions , which mainly consist of saccharides , organic acids , starches and pectin . On the other hand , alfalfa hay had higher levels of protein B_1 and carbohydrate A and B_1 fractions than those of the growing alkali-grasses , *Aueurolepidium chinense* and timothy hay .

Conclusions It was demonstrated in the present study that the growing alkali-grass contains relatively high levels of CP , very high level of NPN and very low levels of soluble carbohydrates , showing that combination of alkali-grass and alfalfa hay as feed for ruminants would be best for compensate of nutrient balance among the feedstuffs used in the present study .

References

Hall , M . B . , A . N . Pell and L . E . Chase (1998) Characteristics of neutral detergent-soluble fiber fermentation by mixed ruminal microbes . *Animal Feed Science and Technology* , 70 , 23-39 .

Licitra , G . , T . M . Hernandez and P . J . Van Soest (1996) Standardization of procedures for nitrogen fractionation of ruminant feeds . *Animal Feed Science and Technology* , 57 , 347-358 .