

# **Development and Application of a Method to Estimate Feed Digestibility in Sheep Grazing Differently Managed Grasslands in Inner Mongolia, China**

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The steppe of Inner Mongolia is overgrazed by sheep, which leads to reduced grassland and animal productivity, to deterioration of these grasslands and to desertification. Changing the grazing system from continuous grazing to rotational grazing may be beneficial for grassland and animal productivity, which is largely determined by intake and digestibility of feed. The objectives of this thesis were first to develop a method to estimate the organic matter (OM) digestibility in grazing sheep, and second to determine the effect of continuous and 10-day rotational grazing on herbage intake, OM digestibility and animal growth at a moderate grazing intensity during two grazing seasons. With data from digestibility trials with sheep fed forages harvested in Germany and in Inner Mongolia, a regression equation was developed to predict OM digestibility of forage-based diets from contents of crude protein in fecal OM. The developed equation accurately fitted the data, as indicated by the relatively small mean square prediction error (MSPE) and large proportion of the MSPE due the overall bias. Although the regression equation slightly overestimated the OM digestibility of hay from Inner Mongolian grassland, the equation can be used to accurately estimate OM digestibility of herbage ingested by sheep grazing in the Inner Mongolia steppe. The herbage mass was similar in both grazing systems, but herbage intake and digestibility were lower at rotational than continuous grazing in both grazing seasons. However, average daily live weight gain of sheep did not differ between rotational and continuous grazing. These findings may be affected by the very low annual precipitation. Therefore, the experiment should be continued under different weather conditions and to determine the long term effects of grazing system on plant and animal productivity.