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Comparative study on forage qualities evaluated with grading index and relative feed value

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Introduction RFV is the most popular forage grading index used widely in the United States. Grading Index (GI) is developed by Chinese scholar on the base of correcting the shortage of RFV (lack of crude protein) and inherit its virtue (including dry matter intake). The mathematical expression formula for GI is: $GI = (ME \times CP \times DMI) / NDF$, Where ME is metabolizable energy, MJ; CP is crude protein, %DM; DMI is voluntary forage dry matter intake, kg/d or g/d $w^{0.75}$.

Materials and methods Forages used in the experiment were milkvetch hay (MH), alfalfa hay (AH), Chinese wildrye hay (CWH), meadow grass hay (MGH), dahuria wildryegrass hay (DWH), corn stalk (CS), millet straw (MS), corn stover silage (CSS) and 2 mixtures which was composed of AH, CWH, DWH, CS, CSS in the ratio of 3:1:1:1:1 (C₁), AH, CWH, DWH, CS in 2:1:1:1 (C₂). The DM, CP, Ash was determined according to AOAC (1990). NDF and ADF was analyzed as outlined by Van Soest *et al.* (1991). Thirty half-sib, semi-fine wool Inner Mongolian wether sheep with a mean weight of 40.91 (± 3.43) kg and aged about two years old were randomly divided into ten groups of three animals each in a randomized design for determining DMI.

Results The DMI of trial forages by sheep must corrected to that by sheep with standard body weight (40 kg) when GI and RFV were calculated. GI ranked as follows: MGH (3.48) > MH (3.37) > AH (1.72) > C₂ (1.18) > DWH (1.10) > C₁ (0.79) > CWH (0.57) > CSS (0.42) > CS (0.20) > MS (0.17), the figures in parentheses were GI, MJ. The GI of MGH was sixteen times of that of DWH, and that of C₂ was one, two and six times of those of DWH, CWH, and CS respectively, but less than one half, more than two thirds, one point three, two, and four times of AH, DWH, CWH, CSS and CS respectively. RFV was calculated according to the formula introduced by John (2002). RFV ranked as follows: MH (169.47) > MGH (140.64) > AH (119.08) > C₂ (112.38) > DWH (111.59) > CWH (106.47) > C₁ (69.33) > CSS (66.52) > CS (66.11) > MS (63.02), the figures in parentheses is RFV. In contrast with GI, several shortages for RFV's ranking were: First, didn't protrude the top quality of MGH, but next to the MH. Second, didn't differentiate the quality of DWH and CWH ($P > 0.05$), but they were fifth and seventh according to GI. Third, the RFV between C₂ and DWH, DWH and CWH, CSS and CS, CSS and MS were similar ($P > 0.05$), showed that RFV couldn't tell the fine distinctions, because the interaction between energy and nitrogen was not considered in RFV.

Conclusion GI is more useful than RFV in forage grading, but further investigation is necessary.

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