



MINISTRY OF JIHAD-E-AGRICULTURE

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Determination of nutritive value and silage characteristics of different varieties of sorghum

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Abstract

The aim of this study was to determine the metabolizable energy, chemical composition and silage properties of different forage sorghum cultivars in Alborz, Golestan, Khorasan Razavi and Isfahan provinces with eight cultivars (Speed Feed, Pegah, KFS-2, KFS-18, Siloking, Titan, PHFS-27 and FGCSI12) and Mazandaran with four cultivars (Speed Feed, Pegah, KFS-2 and PHFS-27) were studied and determined. Experimental cultivars were planted in May to early June, depending on climatic conditions in each province, and were harvested in Dough state) in September. In the experimental seeds (about 60% of the seeds were in a Dough cultivars, nutrients including: dry matter, crude protein, crude ash, ADF, NDF, water-soluble carbohydrates were determined. The amount of metabolizable energy of sorghum cultivars was estimated using Tilly and Terry test. To determine the silage characteristics of cultivars, forage in 30 sorghum was chopped in size of 3 to 4 cm for each cultivar. Four replicates were ensiled in 10 kg thick plastics for 60 days. For silage samples, in addition to the above parameter, appearance and pH were determined. The general results of the provinces showed that in green forage sorghum (all regions) the dry matter varied from 436 to 209 g kg⁻¹ (P <0.05), the amount of crude protein between sorghum cultivars was 41 to 126 g kg⁻¹ in DM and had significant difference (P <0.05). Sugar (water-soluble carbohydrates) was obtained from a maximum of 159 to a minimum of 81 g kg⁻¹ in DM (P <0.05), and finally an average metabolizable energy was 2.28 Mcal kg⁻¹ DM and these data showed the experimental sorghum cultivars had forage characteristics. In forage silage sorghum (whole areas) the amount of dry matter ranged from 384 to 181 g kg⁻¹ (P <0.05), the amount of crude protein varied between 40 to 102 g kg⁻¹ (P <0.05). Sugar (water-soluble carbohydrates) was obtained from a maximum of 76 to a minimum of 41 g kg⁻¹ in DM (P <0.05), and finally the metabolizable energy was 2.24 Mcal kg⁻¹ DM. Comparison of experimental sorghums showed that due to silage, the amount of dry matter, crude protein and sugar decreased, but the amount of metabolizable energy did not change significantly. In Alborz province, the highest amount of metabolizable energy in silage of internal cultivar KFS-2 with 2.44 Mcal kg⁻¹ DM and in Isfahan province, the highest amount

of metabolizable energy in silage of the same cultivar of Alborz province (KFS-2) with 2.29 Mcal kg⁻¹ DM was observed. In Khorasan Razavi province, the highest amount of metabolizable energy in silage was domestic cultivars KFS-2 with 2.61 and Pegah with 2.64 Mcal kg⁻¹ DM, the difference between them was not significant. In Golestan province, Siloking hybrid cultivar showed the highest amount of metabolizable energy in silage. Overall, the results showed that domestic cultivars are qualitatively among the top cultivars after ensiling.

Keywords: chemical compounds, metabolizable energy, silage of forage sorghum, Tilly and Terry test