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Investigation of prussic acid and nitrate concentration as anti-nutrients in eighteen varieties of forage sorghum

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Abstract

The aim of this study was to investigate the concentration of Prussic acid and Nitrate as main anti-nutrients in 18 varieties of sorghum forages. The sorghum varieties include four domestic Iranian sorghums named: pegah, speed-feed, KFS-2 and KFS-18 and 14 imported varieties named: CSSH.1, FGCSI09, FS one BMR, Juicy sweet BMR SSH.1, Juicy sweet BMR SSH.2, Silo king, Titan, PHFS-27, PFS-21, FGCSI10, FGCSI12, Sucrose photo BMR, HFS1 and Juicy sweet 2. All sorghum varieties were cultivated in the farm of Seed and Plant Improvement Institute. General condition such as irrigating, fertilizing, light and temperature were the same for all varieties. Samples were harvested at blooming stage and concentration of prussic acid and nitrate was determined. Concentration of prussic acid was determined indirectly by measuring the liberated para-hydroxybenzaldehyde and Nitrate concentration was determined by spectrophotometric method. The results of different varieties of sorghum were analyzed. Statistical analysis was performed using SPSS software using one-way ANOVA. The highest concentration of nitrate was detected in Juicy sweet2 (2416ppm) and Juicy Sweet BMR SSH.1(2088 ppm) and the highest concentration of prussic acid detected in FS one BMR (481 ppm) PHFS-27(408 ppm) and FGCSI10(381 ppm).

By comparing the concentrations of prussic acid and nitrate in these 18 varieties of forage sorghum with the tables of anti-nutrition hazard level, it was found that the concentration of anti-nutritional substances in all of these varieties was lower than the level of dangerous for livestock consumption and, under present conditions, no one of these varieties is not toxic for ruminants even if it is the only feedstuff in the diet.

Key words: Anti Nutrition; Forage Sorghum; Nitrate; Prussic Acid; Variety.