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Determination of nutritive value, fermentability and ruminal degradability in Quinoa residue

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Abstract

Quinoa (*Chenopodium quinoa* willd.) is an annual plant considered as pseudocereals and belongs to the family Chenopodiaceae. Quinoa has excellent properties as low water requirement for growth, resistant to drought and salinity and nutritional good quality, which are the reason for the great interest in IRAN. The objective of this study was to determine nutritive value, fermentability, ruminal degradability, ruminal and post-ruminal dry matter (DM) disappearance in two genotypes of Quinoa crop residues (Sjama and Sjama Iranshahr) and with four planting times (22 July, 3 August, 15 August and 27 August) in a completely randomised design factorial experiment. Complete Quinoa plant were harvested from an experimental farm and were dried in the shade and then the seeds were separated. The sample of Quinoa crop residues were used for determine of chemical composition, fermentability, ruminal degradability, ruminal and post-ruminal DM disappearance. There is no different in concentration of chemical composition including crude protein (CP), ether extract, non-fiber carbohydrate, crude ash, neutral detergent fiber and acid detergent fiber between two genotypes of Quinoa crop residues. The averages of chemical compositions were 12.77, 1.82, 25.19, 14.05, 46.17 and 34.82 % in Sjama genotype and 13.45, 1.53, 20.29, 13.30, 51.43 and 3.55 % in Sjama Iranshahr genotype, respectively. The gas production after 24h, potential of gas production (b), rate of gas production (c), metabolisable energy and short chain fatty acid were not different across two genotypes of Quinoa and were similar to values in alfalfa hay. The amounts of ruminal DM disappearance (51.60 vs. 57.76 %) and total tract DM disappearance (54.80 vs. 60.57 %) were lower ($P < 0.01$) for Sjama genotype than Sjama Iranshahr genotype, while the post-ruminal DM disappearance was similar in both genotypes. Furthermore, rapidly degradable DM fraction (a), slowly degradable DM fraction (b) and rate constant of degradation of the b fraction (c) were lower ($P < 0.05$) for Sjama genotype than Sjama Iranshahr genotype. In general, the concentration of CP in Quinoa crop residues is higher than cereal straw and other residues of agriculture crops, and according to Proper coefficients of DM degradability and the values of total tract DM disappearance (about 55-60%), Quinoa crop residues can be used as a new feedstuff for provide nutritive requirement of ruminants.

Keywords: Chemical composition, Degradability, Fermentability, Nutritive value, Quinoa straw