

Nutritional Value Determination of Different Varieties of Oats and Barley Using Near-Infrared Spectroscopy Method for the Horses Nutrition

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Abstract : In horse nutrition, the most suitable cereal for their rations composition could be defined as oats and barley. Oats have high nutritive value because it provides more protein, fiber, iron and zinc than other whole grains, has good taste, and an activity of stimulating metabolic changes in the body. Another cereal – barley is very similar to oats as a feed except for some characteristics that affect how it is used; however, barley is lower in fiber than oats and is classified as a "heavy" feed. The value of oats and barley grain, first of all is dependent on its composition. Near-infrared spectroscopy (NIRS) has long been considered and used as a significant method in component and quality analysis and as an emerging technology for authenticity applications for cereal quality control. This paper presents the chemical and amino acid composition of different varieties of barley and oats, also digestible energy of different cereals for horses. Ten different spring barley (n = 5) and oats (n = 5) varieties, grown in one location in Lithuania, were assayed for their chemical composition (dry matter, crude protein, crude fat, crude ash, crude fiber, starch) and amino acids content, digestible amino acids and amino acids digestibility. Also, the grains digestible energy for horses was calculated. The oats and barley samples reflectance spectra were measured by means of NIRS using Foss-Tecator DS2500 equipment. The chemical components: fat, crude protein, starch and fiber differed statistically ($P < 0.05$) between the oats and barley varieties. The highest total amino acid content between oats was determined in variety Flamingsprofi (4.56 g/kg) and the lowest – variety Circle (3.57 g/kg), and between barley – respectively in varieties Publican (3.50 g/kg) and Sebastian (3.11 g/kg). The different varieties of oats digestible amino acid content varied from 3.11 g/kg to 4.07 g/kg; barley different varieties varied from 2.59 g/kg to 2.94 g/kg. The average amino acids digestibility of oats varied from 74.4% (Liz) to 95.6% (Fen) and in barley – from 75.8 % (Tre) to 89.6% (Fen). The amount of digestible energy in the analyzed varieties of oats and barley was an average compound 13.74 MJ/kg DM and 14.85 MJ/kg DM, respectively. An analysis of the results showed that different varieties of oats compared with barley are preferable for horse nutrition according to the crude fat, crude fiber, ash and separate amino acids content, but the analyzed barley varieties dominated the higher amounts of crude protein, the digestible Liz amount and higher DE content, and thus, could be recommended for making feed formulation for horses combining oats and barley, taking into account the chemical composition of using cereal varieties.

Keywords : barley, digestive energy, horses, nutritional value, oats

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