



THE CHEMICAL COMPOSITION, NUTRITION AND FRACTIONAL COMPOSITION OF WINTER RYE GRAIN PROTEINS AFTER VARIOUS METHODS OF EXPOSURE

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ABSTRACT

The choice of feed for cattle should be made by assessing the nutritional value of the feed, as well as the animal's nutritional needs. Winter rye is a major crop in northern latitudes and can be used as feed for livestock. Rye grain contains a sufficient amount of protein, but its quality may not be optimal for cattle to fully digest it. Nevertheless, there are a number of methods for processing the grain that can improve its nutritional properties, including by changing the fractional composition and solubility of its proteins. This study analyzed the influence of thermal (toasting, autoclaving, steaming, extrusion) and chemical (fermentation) methods for processing winter rye grain. Toasting and extrusion led to the greatest changes in its composition. After toasting the grain, the sugar content increased 5.81 times, while the amount of soluble fractions and protein degradability decreased by 17.92% and 11.65%, respectively, in comparison to untreated grain. Extrusion processing of winter rye led to an increase in sugar, crude protein, and metabolic energy by 49.82%, 32.24%, and 22.53%, respectively. The insoluble fraction and protein non-degradability also increased by 1.22 and 1.13 times, respectively. The enzymatic treatment of rye grains led to an increase in the insoluble fraction of proteins, as well as a significant increase in the sugar content (by 5.75 times) compared to the control of untreated raw materials. The results of this study can be used to develop optimal methods for processing winter rye grain for cattle feed, taking into account the impact on the nutritional properties of the grain, the subsequent effect on animal productivity and the economic feasibility of the method.
