

FODDER GALEGA (*GALEGA ORIENTALIS* LAM.) - CHEMICAL COMPOSITION AND APPLICATION IN ANIMAL NUTRITION

Lubomir M. Darmohray¹, Olha O. Darmohray², Władysław Migdał^{3*}, Łukasz Migdał⁴

¹Department of Animal Feeding and Feed Technology, Lviv National University of Veterinary Medicine and Biotechnologies named after S. Z. Gzhytskyj, Pekarska Street 50, 79010 Lviv, Ukraine

²Lviv Secondary School № 2, Volodymyra Velykoho St, 55 A, 79053 Lviv, Ukraine

³Department of Animal Product Technology, Faculty of Food Technology, University of Agriculture in Krakow, Balicka 122, 31-149 Kraków, Poland

⁴Department of Genetics and Animal Breeding, Faculty of Animal Sciences, University of Agriculture in Krakow, Mickiewicza 24/28, 30-059 Kraków, Poland

*e-mail: wladyslaw.migdal@urk.edu.pl

Abstract

Of the six species of the genus *Galega* known in nature, the most common are the goat's rue - *Galega officinalis* L., and the fodder galega *Galega orientalis* Lam. These economically important, perennial legumes belong to the legume family - Fabaceae (Papilionaceae). Goat's rue is an ornamental and medicinal plant, and due to the content of poisonous alkaloids, it is not suitable for use for fodder purposes, while fodder galega is used for fodder purposes. *Galega* L. plants are a source of many bioactive compounds, including; guanidine derivatives (galegine and 4-hydroxygalegine), quinazoline derivative - peganin, glycosides, stachylose tetrasaccharides and flavonoid glycosides (luteolin, quercetin, kaempferol, isorhamnetin), saponins, tannins and chromium salts. The study aimed to analyze the chemical composition of fodder galega haylage and to assess the impact of its use in feeding dairy cows on productivity (milk yield) - Experiment I, and in feeding bulls on fattening results (daily weight gain) - Experiment II.

Experiment I - The study was carried out on 75 dairy cows of the Ukrainian black and white breed, at the peak of lactation, for 120 days of winter feeding. Cows were divided using the analog method into 3 feeding groups of 25 heads each: I - control - cows fed with a ration typical for the winter period, in which the main succulent fodder was maize silage (42%) with fodder beets (15%), meadow hay (22%), and a concentrate mix (21%). In experimental group II, 50% of maize silage was replaced with fodder galega haylage, while in experimental group III maize silage was replaced in 100% with fodder galega haylage. The animals' diet was balanced in terms of energy and basic nutrients. Experiment II - The research was carried out on 48 black-and-white and red-and-white Ukrainian bulls for 120 days of winter fattening. Bulls were divided using the analog method into 3 feeding groups of 16 animals each: I - control - bulls was fed with a dose consisting of barley straw chaff (10%), maize silage (62.3%), molasses (2.7%), and a concentrate mixture (25%). In experimental group II, 50% of maize silage was replaced with fodder galega haylage, while in experimental group III maize silage was replaced in 100% with fodder galega haylage. The content of basic nutrients in haylage samples was determined using standard AOAC methods, while neutral detergent fiber (NDF), acid detergent fiber (ADF), and lignin content (ADL - acid detergent lignin) were determined using the Van Soest method. Based on the determined chemical composition, the nutritional value of haylage for ruminants was also assessed according to the INRA system in the INRation-PrevAlim program. The differences between the mean values of the parameters examined were calculated using one-factor analysis of variance (ANOVA). Calculations were made with the use of Statistica ver. 12 PL (StatSoft, USA).

The fodder galega haylage was of good quality and contained: 46.5% dry matter, 6.2% crude protein, 1.1% crude fat, 21.8% crude fiber, where the neutral detergent fiber (NDF) was 69.4%, and ADF fiber 58.9%. Replacing maize silage with fodder galega haylage in the diet of dairy cows resulted in an increase in milk yield by 17.9 - 17.5% and an increase in fat and protein content in milk by 0.12 - 0.11%, and 0.15 - 0.13%, respectively compared to the control group of cows. The highest average daily gain during the experiment was found in the bulls of the 2nd

experimental group, where 50% of maize silage was replaced with fodder galega haylage. These increments were 11.4% ($P < 0.001$) higher when compared to the control group of bulls. The slaughter yield of the bulls of the II experimental group was 1.5% ($P > 0.05$) higher than in the control group.

Based on the obtained results, it can be concluded that fodder galega as feed has a high nutritional and biological value and can be used in feeding dairy cows.

Key words: *Fodder galega, Chemical composition, Dairy cows, Milk yield.*