

## Uptake of Selenium of Red Clover (*Trifolium pratense*)

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**Abstract:** The aim of this study was to determine the ability uptake of red clover (*Trifolium pratense*) forage of selenium after foliar application. There was established the pot experiment. Plants were placed in climabox with controlled-environment. In the experiment was selenium used in different forms (selenite and selenate) at a concentration equivalent to 4 mg.m<sup>-2</sup> Se. Samples of aboveground biomass were taken 14th, 28th and 42nd day after foliar application of selenium. Samples were analyzed by atomic absorption spectrometry with continuous radiation source with high resolution ContrAA 700. The content of selenium was affected (P <0.05) also date of taking green matter and form of the applied selenium.

**Key-Words:** perennial forage crops, selenite, selenate, pot experiment

### Introduction

Selenium is an important factor influencing the health status of animals and humans. Together with zinc and copper are classified as non-enzymatic antioxidants, but the function of enzymes related [1]. The main selenoenzymes is glutathione peroxidase, but the selenium is present in other proteins antioxidant [2].

Adequate intake of selenium in the diet is necessary for the protection of biological membranes from oxidative destruction [1]. As a result of the involvement of selenium compounds in many biological functions, disrupts its deficit overall health status of the animals. Deficiency may manifest as increases the susceptibility of cubs to infectious diseases, reproductive disorders caused or may be directly cause disease (eg. Nutritional myopathy) [3]. Simultaneously, however, be noted that in this micronutrient is the difference between the received and the maximum daily dose of toxicant is very small and its excess can cause serious poisoning which can lead to death [4]. According Panek [5], the content of selenium in plants depends on its content in the soil. In our conditions is an element deficient, and therefore no applied by spraying 25 days after sowing. After application of each group were regular 14 day

intoxication or if they are contained in the feed plant species that are capable of selenium in their tissues actively accumulate [4]. The amount of selenium deposited in animal products supply the body depends on this element of the feed, the organic form is better utilized than inorganic [6].

For this reason, Gupta et al. [7] recommended as one of the possible delivery of organic selenium to feed its foliar application.

The aim of the study was to investigate the accumulation of selenium foliar application in forage clover.

### Material and Methods

The experiment was included red clover (*Trifolium pratense*), a variety Amos. For foliar application solution was used at a concentration of selenium which corresponds to the amount of 4 mg.m<sup>-2</sup> Se in the form of selenate or selenite.

Red clover was sown in pots located in climabox with automatically controlled light, temperature and water regime. Two experimental groups (selenium as selenite, selenium as selenate) and one control group (no treatment) were created.

Selenium in the above concentration and form was intervals (day 14, day 28 and day 42 after application) sampled green mass. The samples were

weighed immediately after collection and subsequently sent out for analysis of organic selenium content present. Selenium was analyzed by atomic absorption spectroscopy with a continuous source of radiation with high resolution ContrAA 700 (ANALYTIK JENA, Germany, 2012). The results were processed using the program STATISTICA 10, multifactor ANOVA and Tukey test.

### Results and Discussion

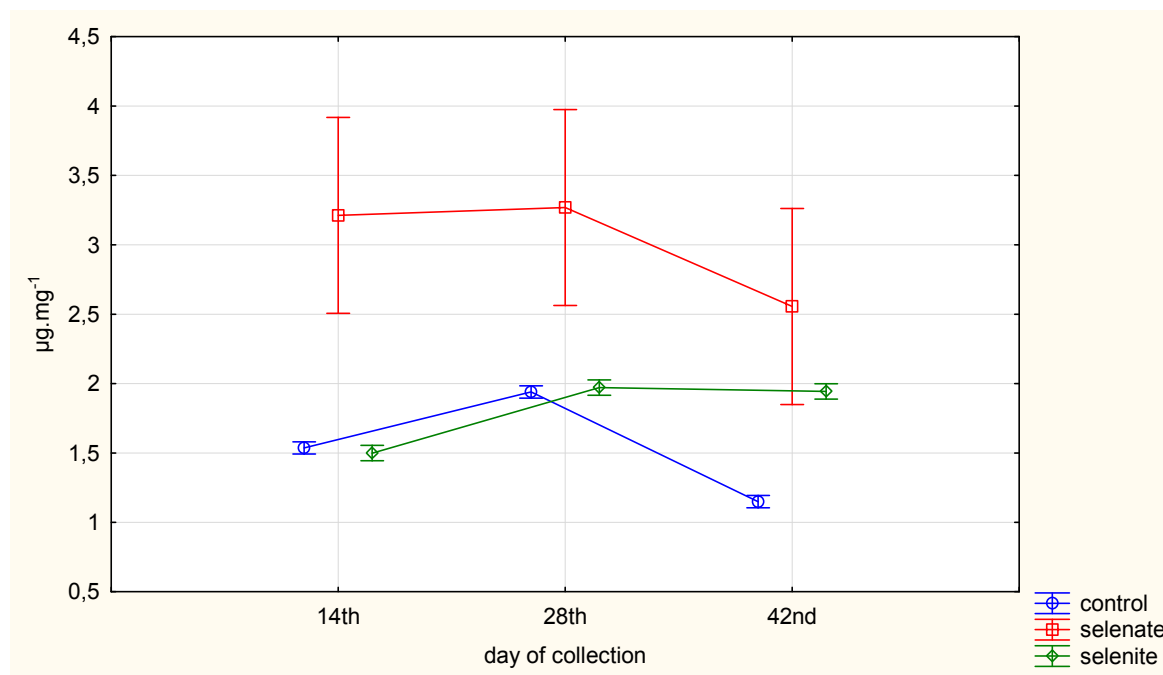
The observed selenium content in red clover forage was  $1.54 \mu\text{g}\cdot\text{mg}^{-1}$ . The selenium content was affected ( $P < 0.05$ ) date of taking and used form of selenium (Tab. 1). After application of selenite to selenium content in red clover increased ( $P < 0.05$ ) compared with the control group until day 42nd

after application. By contrast, selenate led to an increase ( $P < 0.05$ ) the content of selenium in clover already after 14 days compared with control group (Fig. 1). Uptake of selenium in the form of selenate was significantly higher, which corresponds to the findings of the other authors [8]. Experiments that conducted Hu et al. [9] for alfalfa also confirmed that foliar application increases the selenium content in forage plants. Polakova [10] in her work indicates that the chemical similarity of sulfur and selenium. Therefore, they are better able to accumulate selenium plants which have higher demands on sulfur. Red clover is considered a plant which has higher requirements on the sulfur content in the soil [11]. Therefore we can expect greater ability sulfur, respectively selenium receive.

Table 1 Effect of selenium used forms and date of collection aboveground mass detected on the selenium content

	SC	PC	F	p
sampling	1,0747	0,5373	4,753	0,022015
form	8,8058	4,4029	38,943	0,000000
sampling*form	2,1558	0,5390	4,767	0,008452
error	2,0351	0,1131		

Fig. 1 The content of selenium after the foliar application in red clover forage



## Conclusion

From the results it was evident that selenium intake influenced the form of selenium used a term sampling aboveground mass after by foliar application. Red clover reacted particular selenate fertilization. The lowest selenium content was observed by the 42nd day after foliar application.

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