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"Bridging the gap between increasing knowledge and decreasing resources"

Nutritive Improvement Possibilities in Pasture Production Using Ammonia-Loaded Zeolite

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Abstract

The farmyard manure (FYM) is an organic fertiliser produced on dairy farms, but it deplets due to large losses of ammonia during fermentation. Its application on pastures is a low-cost and sustainable source of nutritive matters, as it is part of the livestock - manure - plant cycle.

Natural zeolite - clinoptilolite is used in agriculture as soil conditioner and as nitrogen retaining medium for nitrogen fertilising improvements. In this study, clinoptilolite loaded with ammonia was used as a fertiliser and its influence on the growth of grass and legume species, was investigated.

Since two species are important for Serbian pastures and dairy production - Italian ryegrass (*Lolium multiflorum* Lam.) and red clover (*Trifolium pratense* L.), pot experiments were carried out to investigate the impact of ammonia loaded zeolite on their growth under controlled conditions. The experiment was conducted on two types of soil (Planosol and Dystric Cambisol) and it included four fertilising treatments: a) soil (control); b) soil+zeolite; c) soil+ammonia-loaded zeolite; d) nitrogen application by mineral fertiliser; all in 4 replications. The results suggest that different fertilising treatments could affect crop yield and its protein content. The yield of Italian ryegrass was higher on both experimental soils and the nitrogen application had a greater impact on this species. Unfavourable chemical properties of Dystric Cambisol had a negative impact on yield, so the effects of the treatments were reduced. The main goal of this study was to shed light on how zeolite added to FYM during the fermentation process affect crop yield. The results could serve as an indicator for the use of zeolite under field conditions on pastures.

Keywords: Farmyard manure, Italian ryegrass, red clover, zeolite

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