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Fertilization effects on quality of cabbage produced in the greenhouse



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Introduction

Cabbage (*Brassica oleracea* var. *capitata*), is a vegetable widespread and cultivated for ages. Every year about 70 million tons are grown worldwide. In Serbia, this vegetable occupies a very important place in relation to the total production and consumption of vegetables. There are numerous studies on various parameters of the quality of the vegetables. Concentration of macronutrients as well as nitrate content are very important aspects of quality of the cabbage and they have impact on human health (Mor et al, 2010). The aim of this research was to determine the effect of different fertilizers on quality of cabbage-heads produced in the greenhouse.

Results

Nitrate content significantly increased in fertilized cabbage with respect to the control (Figure 1). Composted pig manure 20 t/ha increased concentration of nitrate as much as 2.3 times. Concentration of N decreased significantly related to control by applying well-rotted beef manure (Figure 2). The applied fertilizer had a positive effect on the content of P and K (Figure 3 and 4). Well-rotted beef manure 20 t/ha + NPK had the biggest influence on increasing concentration of phosphorus (20%) and potassium (9%).

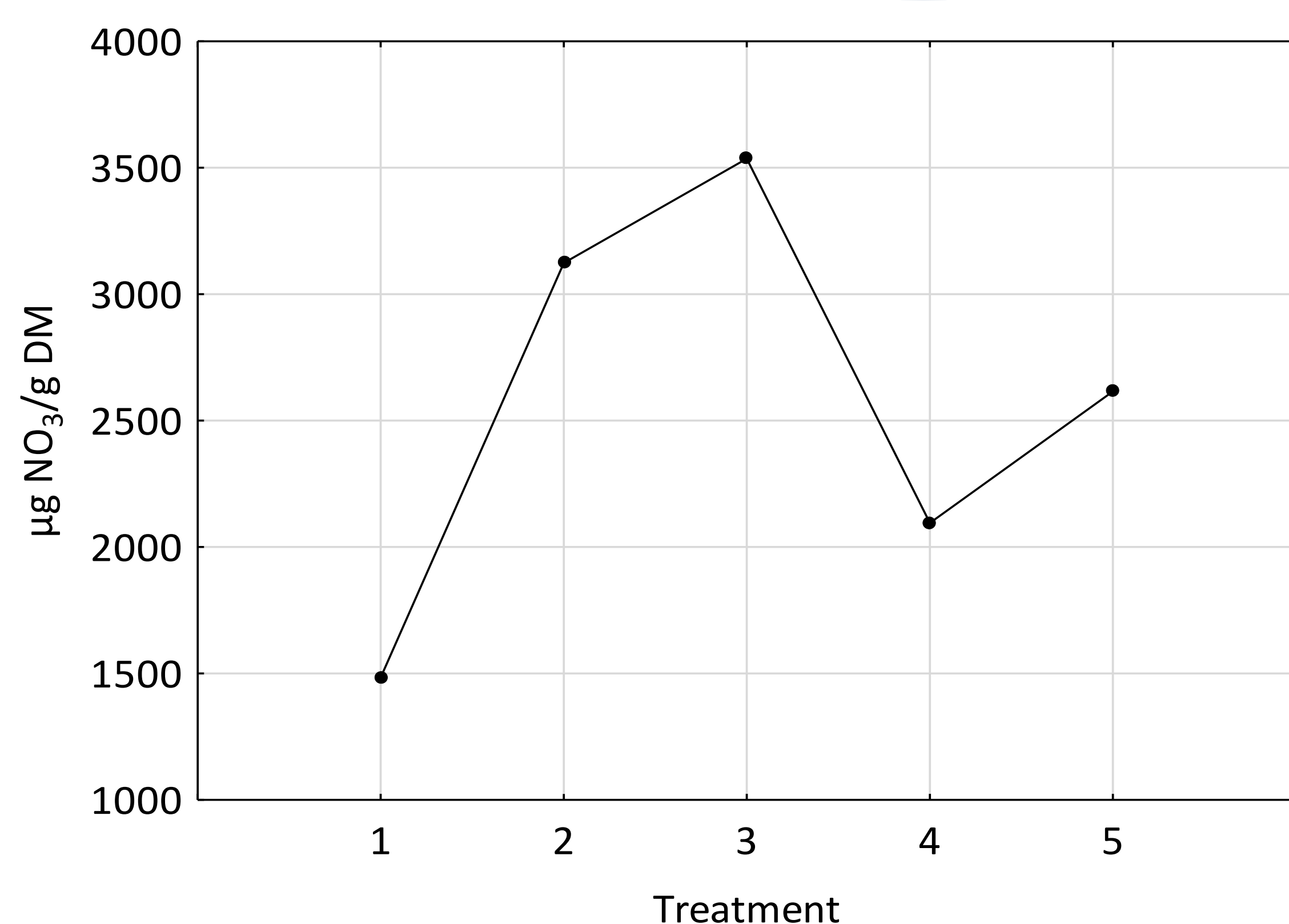


Figure 1. Nitrate content in cabbage heads

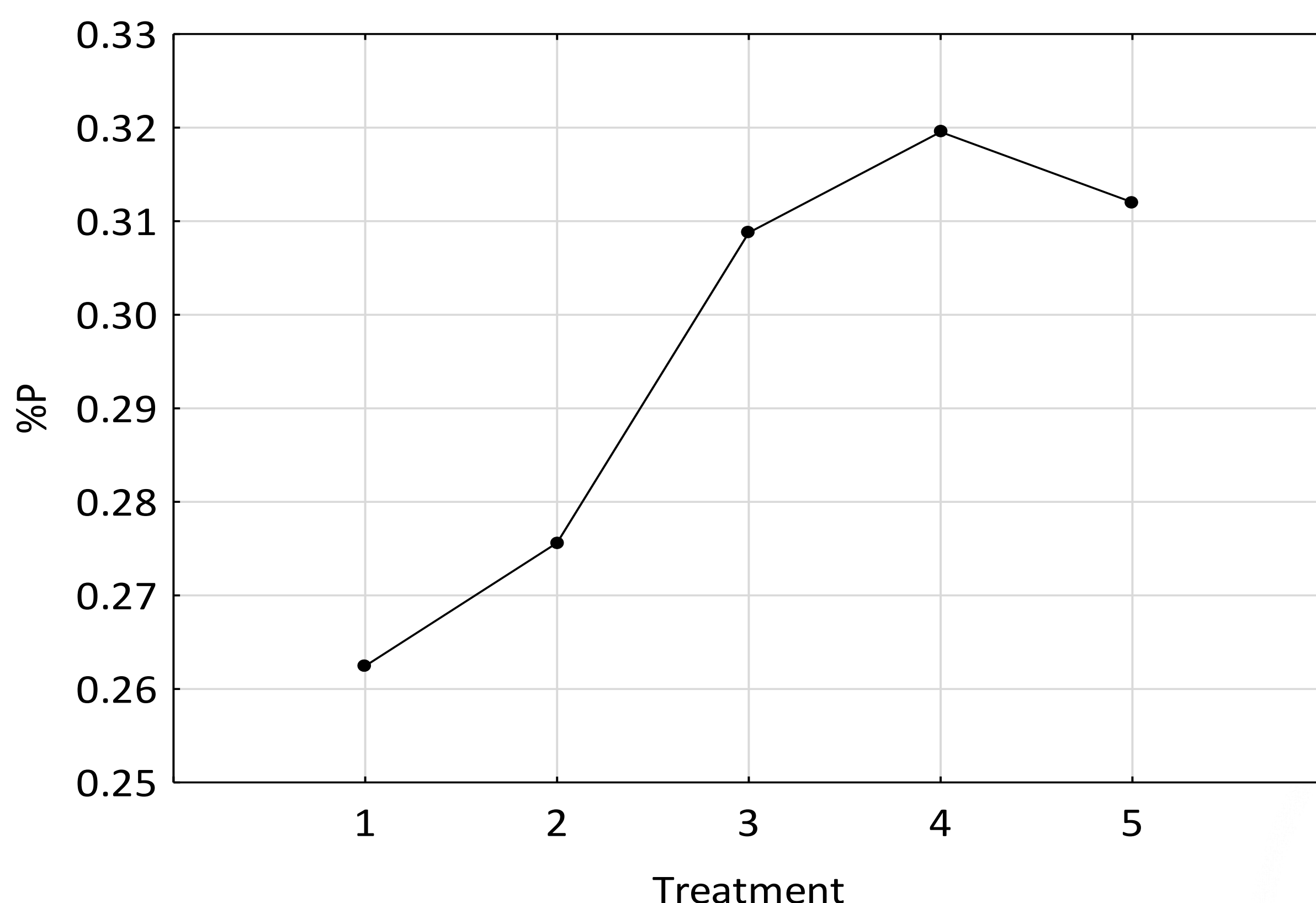


Figure 3. Concentration of P in cabbage heads

Conclusion

Cabbage chemical composition significantly changes depending on the applied fertilizer. Fertilization with beef and pig manure with or without added NPK increased concentrations of nitrate, phosphorus and potassium in relation to the control, while the nitrogen content decreased using the same fertilizers.



Materials and methods

Experiment was done in greenhouse, with cabbage variety Jetma. Cabbage was planted on plots 30x50 cm, 25 plants/plot. There were 5 different kinds of fertilization: 1) control (no fertilization); 2) beef manure 20 t/ha; 3) composted pig manure 20 t/ha; 4) beef manure 20 t/ha + 300 kg/ha NPK 11:11:21; 5) composted pig manure 20 t/ha + 300 kg/ha NPK 11:11:21 (Tab. 1.).

Table 1. Chemical composition of applied manure (Bogdanović et al., 2011)

Manure type	pH		%N	%P	%K
	H ₂ O	KCl			
Well-rotted beef manure	6.9	6.6	1.2	1.82	0.33
Composted pig manure	7.9	7.7	1.3	3.58	1.68

Experiment was done in four replications. Sampling was done at the time of harvest. Concentration of nitrate was determined spectrophotometrically, concentrations of N by Kjeldal (1883), K by flame photometry and P by the ammonium vanadate-molybdate method (Maksimović and Pajević, 2002). Statistical analysis was performed using STATISTICA 13.0 [StatSoft, University Licence, University of Novi Sad, 2016].

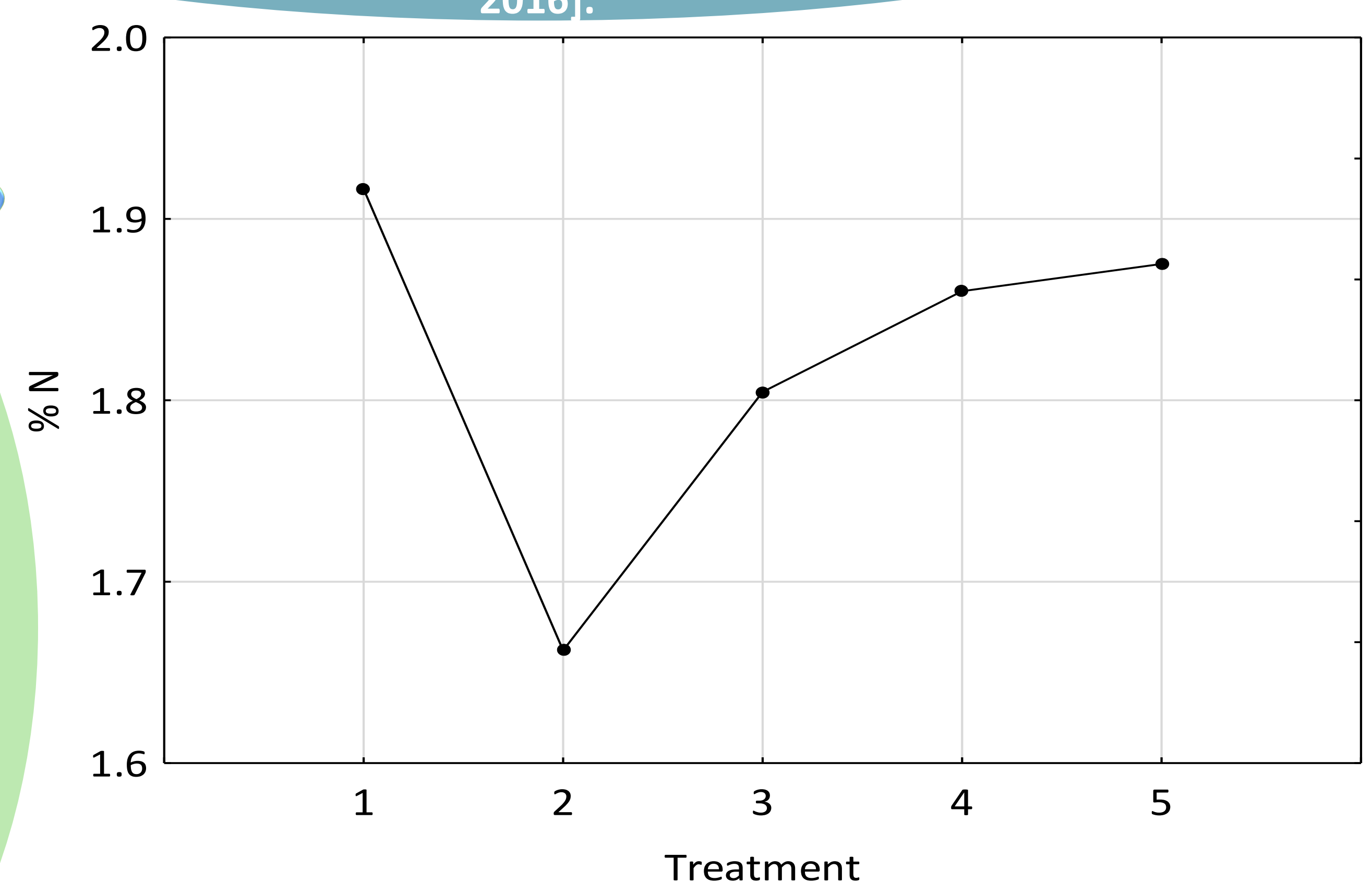


Figure 2. Concentration of N in cabbage heads

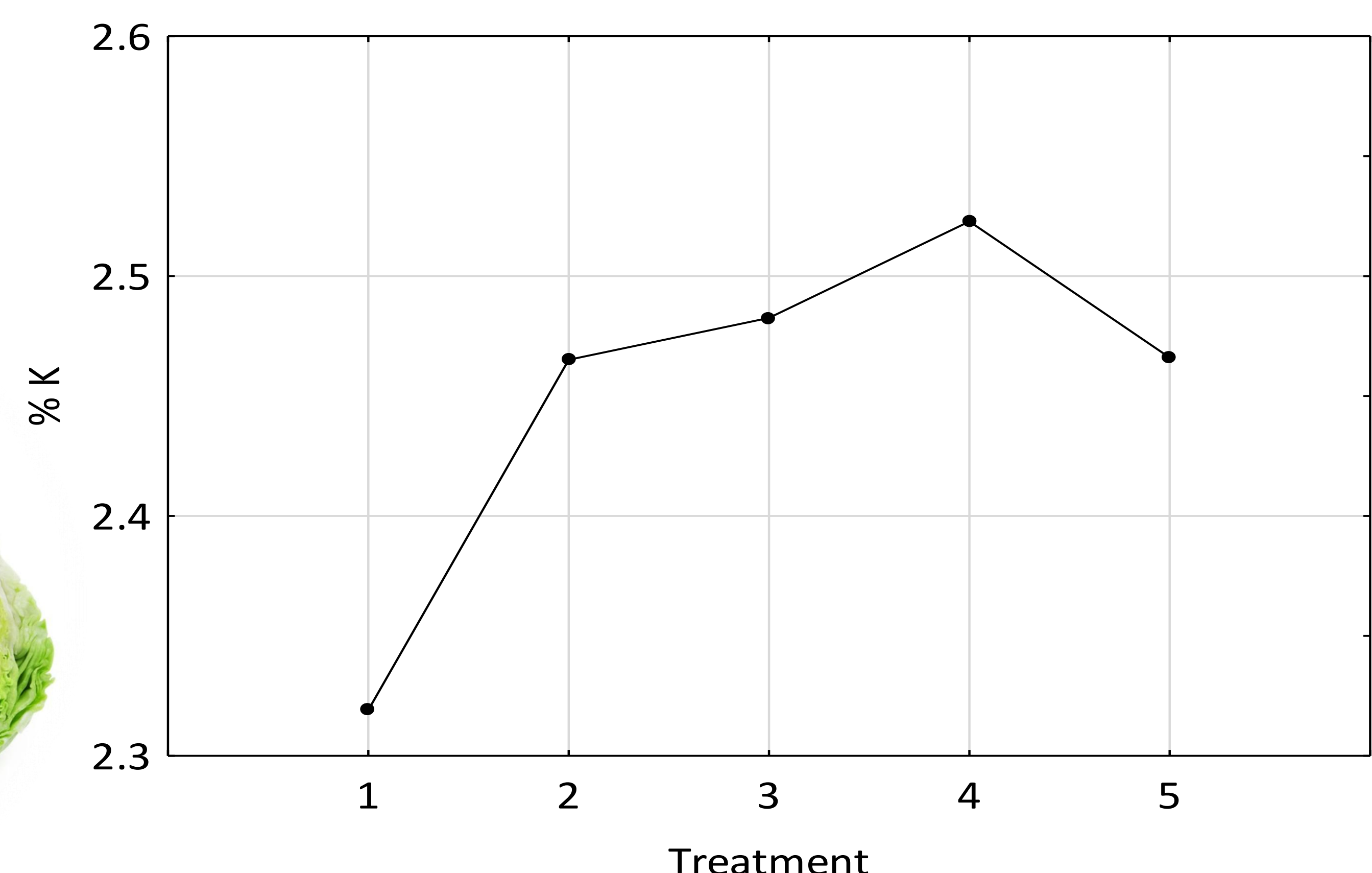


Figure 4. Concentration of K in cabbage heads

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