

## **Comparative study of soil conditioners in an Italian Riesling vineyard in Badacsony, Hungary**

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### **Introduction**

Grapes are not a particularly nutrition demanding plant. It is well known that it is able to produce a tolerable amount of fruit in case of malnutrition as well, if the provided cultivation operations (tillage, pruning and green work, plant protection) are performed (Bényei et. al, 1999). However, the amount of nutrients extracted from the fruit and the vegetative parts always needs to be replaced in order to achieve satisfactory yield. Alternatively, use of large amounts of natural fertilizers and preparations containing mineral nutrients could be an alternative solution to improve the soil structure in addition to nutrient supplementation. According to the results of former experiments, use of the Dudarit product can significantly reduce the environmental impact (Farkas et. al. 2010). In our study, two organic mineral substances (Dударit NPK, Biosol Forte) and a fertilizer (Mórafert 12-12-17 + 2Mg + ME) were applied for comparative nutrient supply studies in an Italian Riesling vineyard at NARIC Research Institute for Viticulture and Enology (NARIC RIVE) in Badacsony, Hungary.

### **Materials and methods**

Our experiment was set up in 2016 in a vineyard at NARIC RIVE in Badacsony. In this publication the results of 2016-2017 is published. The tests were set up in a plantation containing Italian Riesling B.20 clones, which were planted in 1994-1995 on Teleki 5C rootstock. Treatments were performed at the beginning of each vegetation period in the following dose: 1250 kg ha<sup>-1</sup> Dudarit NPK, 1040 kg ha<sup>-1</sup> Biosol Forte and 1040 kg ha<sup>-1</sup> Mórafert 12-12-17+2Mg+ME. After spreading, the listed chemicals were disked. All treatments were made in 4 repetitions. During the years of the study, soil samples were collected from 0-30 cm and 30-60 cm layers during flowering. Leaf samples were also collected from all of the experimental plots. The samples were analyzed in the laboratory of NARIC RIVE. The results were evaluated by ANOVA with Duncan Post-Hoc tests.

### **Results and discussion**

Based on the results in the 0-30 cm layer in 2016, pH and potassium content of the plots treated with Dudarit NPK increased slightly, while the Mg concentration increased

significantly compared to the control treatment (Table 1). Biosol Forte product significantly reduced magnesium concentration while the micronutrient concentration reduced slightly in these plots. In 2017, the effect of Dudarit NPK prevailed only in increasing magnesium concentration. In 2016 in the 30-60 cm layer, increasing effect of Dudarit NPK for Mg concentration, and increasing effect of Biosol Forte for phosphorus concentration was considerable. In this layer, similar effects were detected also in 2017.

Table 1: Results of the examined soil chemical parameters in 0-30 cm layer. Different letters mean significant differences within a parameter and a year based on Duncan Post-Hoc Test ( $p < 5\%$ )

		pH(KCl)	Humus	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Mg	Mn	Zn	Cu
2016	Control	7.30b	1.41b	245.25b	489.75a	159.75b	39.97d	4.59c	22.27d
	Dudarit NPK	7.40c	1.20a	134a	543b	215d	29.32a	3.23a	12.32a
	Complex	7.06a	1.22a	364d	674.50c	174.50c	37.95c	4.91d	16.17c
	Biosol Forte	7.33b	1.50c	283.25c	502.25a	102.75a	34.47b	4.24b	14.17b
2017	Control	7.12a	1.48d	320.75d	433.50d	168a	44.42d	4.63c	25.47d
	Dudarit NPK	7.35b	1.06a	211.25b	328a	199b	37.77c	3.41a	23.72b
	Complex	7.38b	1.10b	187a	391c	197.25b	35.40b	5.13d	21.1a
	Biosol Forte	7.43b	1.13b	278c	340.50b	167a	30.95a	3.68b	24.37c

Table 2: Results of the examined soil chemical parameters in 30-60 cm layer. Different letters mean significant differences within a parameter and a year based on Duncan Post-Hoc Test ( $p < 5\%$ )

		pH(KCl)	Humus	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Mg	Mn	Zn	Cu
2016	Control	7.33a	1.01c	213.25b	402.25c	152.75b	32.25d	3.47c	18.3c
	Dudarit NPK	7.37a	0.66a	106.25a	380b	188.75d	20.8a	2.14a	8.77a
	Complex	7.31a	0.89b	231.75c	456.50d	185c	28.5b	3.32b	11.72b
	Biosol Forte	7.4a	1.1d	295.75d	365.5a	85.50a	31.22c	3.59d	11.62b
2017	Control	7.42a	0.89b	255.25ab	323.25c	156.75a	38.25d	4.09c	16.7a
	Dudarit NPK	7.42a	0.89b	234.5a	293a	196.25d	35.02c	3.37b	23.02d
	Complex	7.54b	0.80a	348.5c	313.25b	189.25c	31.87b	11.97d	20.2b
	Biosol Forte	7.40a	0.99c	284.75b	349.5d	161b	31.17a	3.28a	21.37c

## Conclusions

Based on the experience of two years, the Dudarit NPK formulation is suitable for significant increasing of the magnesium concentration of the soil, which is valid for the entire 0-60 cm layer of soil. Based on the results, the use of Biosol Forte can be used to increase the amount of available phosphorus in soil.

## References

- Bényei, F., Lőrincz, A., Szendrődy, Gy., Sz. Nagy, L., Zanathy, G. (1999): Szőlőtermesztés. Mezőgazda Kiadó. Budapest 439.
- Farkas, J., Májer, J., Varga, P., Németh, Cs., Gyórfyné Jahnke, G. (2010): Növelt hatóanyag tartalmú humusztrágya kifejlesztése, a készítménnyel végzett laboratóriumi és növénytermesztési kísérletek bemutatása, LII. Georgikon Napok cikkadatbázis\_/upload/publications/2010-08-23\_07-33-56\_dudarit-cikk-1.doc