

Potassium-Magnesium Petiole Contents in Relation to Grapevine Yield and its Quality

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Abstract : Our research hypothesis is that to study the correlation between potassium and magnesium- petioles contents and yield and quality of grapevine (*vitis vinifera L., cvs*) to define the optimum contents of both at which high grapevine yield with best quality can be reaching .In addition, define the proper rates of potassium and magnesium which can be applied through fertigation system in sandy loam calcareous soil and their effects on nutritional status. Therefore, two field experiments were carried out in a grapevine farm at Nubaria region, Egypt during two successive seasons. Five potassium rates as potassium sulfate (50 % K₂O) , namely , K1; 25, K2; 50, K3; 100 , K4 ; 150 and K5 ; 200 g K₂O/ vine/ year and five magnesium rates as magnesium sulfate (16 % MgO), namely, Mg1; 2.5 , Mg2 ; 5, Mg3 ; 10, Mg4 ; 15 and Mg5 ; 20 g MgO / vine / year were applied to the selected vine grapes. The results indicate that there was a positive correlation (0.282) between K- petioles contents and grape yield, the grape yield reached to a maximum value of 49.75kg/ 5 vines at the K-petioles contents of 1.65 % and at a rate of K-application K3. Whereas, at the highest K- petiole content (2.06%) a higher TSS (18.3%) was reported than at the others with a highly positive correlation coefficient (0.80) at a rate of potassium sulfate application of K5. The same trend was found with total acidity in berry juice. With respect to the relation between the Mg - petioles content and grape yield, the grape yield reached to a maximum value of 45.49 kg/ 5 vines when the Mg-petiole content reached to 0.43% and at a rate of magnesium sulfate application of 10 g / vine. In contrast a weakest correlation (0.007) was found between petioles- Mg content and TSS. Petioles- Mg content was more highly negatively correlated with total acidity where at low petioles- Mg content (0.23%) the total acidity was high (0.63%) at a rate of magnesium sulfate application of Mg1. According to high correlation between petiole concentrations of both potassium and magnesium and grape yield, the grape yield was significantly affected due to their antagonistic effect. In this respect, the maximum yield (59.40 kg / 5 vines) were gained by application of 100 g K₂O and 10 g MgO/ vine (K3Mg3 treatment) which associated with a K and Mg- petioles contents of 1.65% and 0.45 % , respectively. Also the highest TSS (19.1 %) was found at the K5Mg3 treatment and at which the K and Mg - petioles contents were 2.1 % and 0.32 % , respectively. Accordingly, the reliable correlation between K and Mg-inputs, their concentration in petioles and grape vine yield is strong enough to be used as a predictive tool for grape vine fertilization.

Key words : grapevine (*vitis vinifera L., cvs*), calcareous soils, fertigation system, potassium and magnesium petiole content, yield and quality.