

## Effects of Potassium Sulfate Soil Drench and Foliar Application of Magnesium Sulfate on Grapevine Tolerance to Artificial and Spring Frostbite

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Low temperature causing heavy damage to vineyards from different regions of the Iran every few years. The use of potassium fertilizer, regardless of other elements, cannot provide proper nutrition for grapevine. The main purpose of this investigation was to study effects balanced nutrition and its effects on *Vitis vinifera* L. cv. Bidane Sefid tolerance to frostbite. Grapevines have grown in 'Khazandeh' training system. In this system, the roots of the plants laid down in a trough (depth: 80 cm and width: 100cm), and the trunk is placed on a small mound formed after digging the streams. The experiment carried out as randomized complete block design (RCBD) with split plot arrangement with five replications during 2015 and 2016 in vineyards of Shazand, Iran. Different amounts of potassium fertilizer in four levels 0, 0.75, 1.5 and 2.25 kg per vine in main plots and foliar application at three levels 0, 9 and 18 kg of magnesium sulfate per 1000 liters of water (in 2 stages after fruit set within 10 days) in sub-plots were used. After the occurrence of early frostbite in late November 2016, the percentage of frostbite based on the percentage of sprouted buds investigated in the spring of 2017. The tolerance to artificial freezing evaluated based on electrolyte leakage. Two artificial cold stages applied on the buds of canes at temperatures of -3, -6, -9, and -12 °C. According to the results, consumption 1.5 kg of potassium sulfate per vine with foliar 9 kg of magnesium sulfate salt per 1000 liters of water increasing tolerance of vines to artificial with the least electrolyte leakage and natural frostbite. The percent of sprouted buds in this treatment was 32% and ratio of potassium to magnesium ions was five, indicating a balanced ratio between these two elements.

**Keywords:** Electrolyte leakage, Grape, Magnesium, Potassium, Training system.

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