The Content of Mg, K and Ca Ions in Vine Leaf under Foliar Application of Fertilizer on Calcareous Soils

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Abstract

Chlorosis frequently occurs in vine production on calcareous soils, which is usually attributed to high calcium concentrations in soil. If symptoms appear on older leaves, it is taken that chlorosis is caused by a deficit of Mg^{2+} ions. A method of preventing chlorosis is foliar application of magnesium; however, uncontrolled application can lead to imbalance with potassium and calcium ions. The research objective is to find out whether foliar application of magnesium can solve the problem of chlorosis, and whether magnesium affects ion interactions with potassium and calcium. The fertilizing trial was set up in vineyards, on anthropogenized rigosols, with different contents of available lime in soil (< 20, 25 and 30% CaO). Fertilizer was applied in three treatments during the growing period, in a total amount of 2500 g Mg ha^{-1}. According to the results, foliar application of magnesium can solve the problem of chlorosis only on soils with a lower lime content (< 20% CaO). Magnesium concentrations in leaf ranged from 0.25% (beginning of growing period) to 0.64% (post harvest), which is in agreement with literature data. On soils with a high lime content, negative correlation was determined between Mg and K ions in the plant (r = -0.78) while the correlation between Mg and Ca in the plant was positive (r = +0.90) over the entire grapevine growing cycle.

Key words: grape vine, magnesium, potassium, calcium, calcareous soils

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Količina iona Mg, K i Ca u listu vinove loze pri folijarnoj gnojidbi na karbonatnim tlima

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Sažetak

Prilikom uzgoja vinove loze na karbonatnim tlima pojava kloroze vrlo je učestala, a najčešće se povezuje s visokim količinama kalcija u tlu. Ukoliko se simptomi javljaju na starijem lišću govorimo o klorozi uvjetovanoj nedostatkom Mg^{2+} iona. Jedan od načina sprječavanja kloroze je folijarna gnojidba magnezijem, no, nekontroliranom primjenom može doći do neravnoteže s ionima kalija i kalcija. Cilj rada je utvrditi da li će folijarna gnojidba magnezijem riješiti problem kloroze, te da li magnezij utječe na ionske interakcije s kalijem i kalcijem. Gnojidbeni pokus je postavljen u vinogradima na antropogeniziranim rigosolima pri različitim količinama fiziološki aktivnog vapna u tlu (< 20, 25 i 30 % CaO). Gnojidba je obavljena u tri tretmana tijekom vegetacije s ukupnom količinom od 2.500 g Mg ha^{-1}. Prema dobivenim rezultatima, folijarna primjena magnezija rješava problem kloroze samo na tlima s nižom količinom vapna (< 20 % CaO). Količine magnezija u listu kretale su se u rangu od 0,25 % (početak vegetacije) do 0,64 % (nakon berbe) što je u skladu s podacima koje navodi literatura. Na tlima s visokom količinom vapna utvrđena je negativna korelacija između Mg i K iona u biljci (r = -0,78) dok je korelacija između Mg i Ca u biljci pozitivna (r = +0,90) tijekom cijelog vegetativnog ciklusa vinove loze.

Ključne riječi: vinova loza, magnezij, kalij, kalcij, alkalno tlo

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