

T07-P2

THE FATE OF CALCIUM APPLIED THROUGH FOLIAR FERTILIZATION ON OLEA EUROPEAE L.

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Olive trees fertilization through foliar pulverization is a more targeted oriented method than the application of chemical fertilizers to the soil. Many factors influence the performance of foliar nutrients sprays such as the presence of leaf cuticle, leaf hairs and leaf surface wax. Calcium is one of the most common macronutrients applied as foliar fertilizer due to its low mobility inside the plants. The presence of calcium in olive fruits, mainly in cell walls, will improve resistance to important pest problems as well as improve fruit quality.

The aim of this study was the evaluation in 'Galega vulgar' olive trees the efficacy of calcium foliar applications and the subsequent redistribution of this nutrient through the different cell components. Olive trees were sprayed four times from August until veraison with a commercial product containing 34% of calcium, in three different doses.

Our results confirmed that calcium applied through foliar pulverization increased calcium deposition in fruit cell wall as well as the total calcium in the fruits. It is also discussed the role of epidermal structures, the hydrophobicity of leaves surface and the presence of cuticle waxes, in the absorption of foliar-applied calcium.

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EFFECT OF SILICON ON THE INCIDENCE OF FUSICLADIUM OLEAGINEUM IN THE OLIVE

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Silicon is a non-essential element for plants, although it is considered beneficial since may prevent biotic and abiotic stresses. Little is known on the effects of silicon in plants, and nothing is known on its effect on olives. The aim of this study was to evaluate the effect of silicon applications on the incidence of olive leaf spot, one of the main diseases affecting this crop caused by the fungus *Fusicladium oleagineum*. For this purpose, young olive plants of 'Arbequina' and 'Picual' were subjected to foliar or soil applications of silicon. Actisil, a choline-stabilized orthosilicic acid, was applied in both forms at concentrations of 0.1, 0.2 or 0.4%. Six single plant replicates per treatment were used, arranged in a completely randomized design. Plants were grown for six months under greenhouse conditions applying foliar or soil treatments once or three times per week, respectively. After this time, the plants were inoculated with a conidial suspension of the pathogen. The evaluation was carried out 90 days after inoculation, attending to the incidence and severity of the disease, defined as percentage of affected leaves and percentage of affected foliar area, respectively. A disease index (DSI) was calculated and expressed as percentage. Results showed a significantly reduction of the disease index in plants treated with silicon compared to the control. No effect of silicon concentration or application form (soil or foliar) was observed.

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ASSESSMENT OF THE NUTRITIONAL STATUS OF OLIVE TREES ORCHARDS WITH DEVIATION FROM THE OPTIMUM PERCENTAGE (DOP) IN TUNISIA

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Foliar diagnosis is the most used tool by technical and researcher to the study of the nutritional status of olive trees which is done generally by July (the standard date for olive trees). Results of this diagnosis were often compared to reference value and this traditional method is denominated as the critical concentrations or sufficiency ranges. This method intends to evaluate isolated deficiency or excess values, without measuring the overall nutritional balance. However, to have a good interpretation of analytical data we should proceed to several concepts as binary relations, the DOP index (Deviation from the optimum percentage) and the DRIS method. In this work we developed the DOP approach for a set of macro nutrient (N, P, K, Ca and Mg) in 27 super high density olive orchards located in four different regions in Tunisia during two years. Our results indicated that most of studied orchards have a severe nutritional disequilibrium. The disequilibrium of the nutritional balance reflected by the Σ DOP is caused mainly by the lack of magnesium and calcium in the fertilization program of these orchards and sometimes to the excess of potassium fertilization.

Therefore, the use of DOP analysis provide further information on the nutritional balance as compared to sufficiency range and allow to know the limiting nutrient and to classify nutrients from the most limiting to the optimal ones. A better knowledge of the nutritional balance will ensure a good planning of fertilization program.

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EFFICIENCY OF FOLIAR FERTILIZATION FOR THE IMPROVEMENT OF BIOCHEMICAL FRUIT CONTENTS IN THE OLIVE CULTIVAR CHEMLALI

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Foliar fertilization in rain-fed olive orchards has been introduced to achieve higher yields for the olive oil industry. However few studies investigated the relationship between the nutrients and the quality parameters of olive fruits. For this purpose, the present work aimed to study the effect of foliar fertilization on the chemical composition of fruits. The foliar fertilization program consisted of the annual application of three fertilizers on Chemlali olive cultivar, cultivated under rain-fed conditions, at different stages from the vegetative cycle. The experiment has been set up in six treatments: T1 (rich in nitrogen) was applied at the start of vegetative growth, T2 (rich in boron) was applied at the beginning of flowering, Tni (a biostimulant rich in calcium) was applied during the pit-hardening, T1+2 (combination of T1 and T2), T1+2+Ni (combination of T1, T2 and Tni) and control. After two years of experimentation, fruits were harvested, freeze-dried and the following fruit traits were evaluated: fruit nutrients content, carbohydrates profile and individual polyphenols. Results showed differences in the mineral content of fruits between treatments. Regarding carbohydrates, glucose was the main sugar present in the fruits and varied between 8.8 µg/mg dry weight (d.w) and 36.43 µg/mg d.w. Changes were clearly observed in the pool of the phenolic fraction. The combined treatment T1+2+Ni showed the highest concentrations in Oleuropein and hydroxytyrosol and were equal to 742.6 and 112.94 µg/g of fresh weight respectively. This work showed that the fertilization management could be highlighted in order to enhance nutraceutical value of fruits.