

ABSTRACT

INVESTIGATION ON EFFECTS OF FOLIAR- APPLIED GLYCINEBETAINE AND PROLINE ON SALT-STRESSED OLIVE PLANT

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The aim of this thesis is to evaluate the effects of foliar-applied glycine betaine and proline on salt stressed olive plants. For this purpose one year old olive plants (cv. Gemlik and cv. Memecik) were exposed to NaCl- induced salinity (approx. 8 dS m⁻¹) in pot culture for 5 months under greenhouse conditions. The experiment was laid out in a randomized block design with 5 replicates. The plants were irrigated with saline solution containing 0.3% liquid fertilizer “Gübretaş 3-5-8” (N-P₂O₅-K₂O) enriched with micronutrients. The experimental treatments consisted of 4 levels (5 mM, 10 mM, 20 mM, 40 mM) of foliar-applied proline and glycinebetaine. Distilled water served as the control application. At the end of the experiment physiologically mature leaves, free of damage or defects, were sampled. The leaves had the same physiological age and were situated at one-third of the distance from the apex (couples of the 4th, 5th and 6th leaves). The leaf samples were immediately transported to the laboratory in closed polyethylene bags. In order to eliminate surface contamination, leaves were carefully washed with tap water and rinsed two times with deionized water. For chemical and biochemical analysis, the samples were placed in paper bags and dried in a forced-air oven at 70°C for 72 hours. The dried leaf samples were then ground in a stainless steel mill. Dry matter percentage, N, P, K, Ca, Mg, Na, Fe, Mn, Zn, Cu, B, Cl concentrations, 1,1-diphenyl-2-picryl hydrazyl (DPPH) scavenging activity, reducing power, total phenolic content, proline content and glycinebetaine content were determined in the samples.

The results showed that the foliar-applied osmoprotectants had no relevant effect on leaf dry matter percentages and leaf K concentrations of the plants. The cultivars differed in respect of leaf Na, P, Ca and Mg concentrations. In general leaf N and leaf micronutrients concentrations (except Cl) increased with the increasing levels of

the foliar-applied osmoprotectants. In terms of biochemical parameters: proline content, glycinebetaine content, DPPH scavenging activity and reducing power levels of the leaves were found more relevant with the increasing application levels of the osmoprotectants than that of total phenolic compounds contents of the leaves.

Key words: *Olea europae* L., cv. Gemlik, cv. Memecik, NaCl, osmoprotectant