The Effects of Foliar Applications of Calcium Chloride and Zinc Sulphate on Apple Performance in Damavand Region

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Zinc and calcium are essential elements for producing apples with good quality and texture. The micronutrients uptake especially zinc is unsatisfactory in the apple orchards of Damavand region because of high levels of $CaCO^3$ in soil and bicarbonates (higher than 2.50 mq/li) in the irrigation waters. The calcium deficiency in apple fruits is caused by high rates of transpiration at high temperatures which results in physiological disorders on apple fruits. Foliar application of calcium chloride and zinc sulphate presents a quick solution to meet these deficiencies which are common in the orchards in Iran. However, negligence in controlling the solution pH and concentration has often confronted the growers with production problems like yellowing and loss of leaves accompanied by fruit rossetting and low quality, discouraging the use of these fertilizers. High amounts of calcium absorbs the moisture and dries up the leaves' surface followed by their yellowing and loss.

An experiment with a factorial design was carried out in Damavand orchards in 2000 to determine the causes of the loss of apple leaves due to these treatments. Nearly all the treated trees displayed different degrees of yellowing and loss of leaves. Zinc sulphate improved the growth rate, leaf area and chlorophyll content, as well as branch development. However, zinc sulfate plus calcium chloride at concentrations of higher than 0.5% resulted in increased damage to apples. Results revealed that, high solution concentration and too many foliar applications of the solution per hectare caused yellowing and the loss of leaves. It is therefore necessary to limit the concentration of the solution to 0.5% as powder with its pH adjusted to 7.0 with sulfuric acid or with zinc sulphate and to spray the trees in the early morning or in the late evening.