COMPARISON OF DIFFERENT METHODS FOR DIAGNOSIS OF IRON CHLOROSIS IN AVOCADO

A. Neaman, G. Espinoza and R. Cautín

Facultad de Agronomía, Pontificia Universidad Católica de Valparaíso,
Casilla 4-D, Quillota, Chile. E-mail: alexander.neaman@ucv.cl

Iron, zinc, and manganese deficiencies are common in crops grown in calcareous soils. It is well known that the total iron concentration in leaves is not a valid index for iron nutritional status of crops in contrast to the total concentrations of other elements. Several methods for determination of extractable iron (or so-called “active iron”) have been proposed. In this study, three methods of iron extraction were tested: 1.5% phenanthroline (pH 3) and 1 N HCl from fresh leaves and 1N HCl from oven-dry leaves.

A 6-year-old avocado orchard (cultivar Hass) grown on a calcareous soil in the proximity of Cabildo was selected for the study. Samples of leaves of different degree of chlorosis were collected in April 2006. The total leaf concentrations of Fe, Mn, and Zn were determined using standard methods.

Manganese concentrations were in sufficient ranges in all leaves. However, zinc was deficient (in the range of 5-15 mg kg^{-1}) in both green and chlorotic leaves, i.e. these zinc concentrations did not produce any color change. Total iron concentrations in chlorotic leaves were similar or even greater than in the green leaves.

Regressions between the extractable iron concentrations in the leaves and the leaf SPAD-color were statistically significant for the phenanthroline method, whereas non-significant for HCl methods. Thus, phenanthroline method was superior over others for diagnosis of iron chlorosis in avocado. Concentration of 6 mg kg^{-1} determined by this method was considered as a critical value for avocado leaves.