

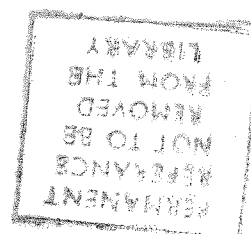
A Thesis

entitled

COMPARATIVE METHODS IN ANALYSIS OF ZINC  
IN TEA PLANTS AND SOILS

Presented by

H. K. P. Abeywardena



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424791

## Abstract

Zinc is an important trace element for the plant growth and its health, and deficiency of this element appears to limit crop production. Zinc deficiencies also affect the plants' response to fertilizers and acute zinc deficiencies did not show any positive response to applied nitrogen. Zinc applications are recommended in tea plantations as a foliar application at a rate of 20 pounds of zinc sulphate per acre per year in four applications. For a soil application of zinc, an understanding of how, zinc applied to soil gets distributed in the soil and plant, is necessary.

Since zinc exists in soils and plants in trace amounts, analysis for zinc demands very sensitive analytical techniques. The reagent, dithizone, gives a pink coloured complex with zinc, and after a proper treatment for the removal of interfering elements, the amount of zinc can be determined colorimetrically. An instrumental method used for the determination of zinc is with atomic absorption spectroscopy. It is a simpler and a time-saving method than the classical dithizone colourimetric method. A comparison of these two methods of analysis, showed that they are statistically comparable.

For the analysis of soil zinc various extractants are used and it is not known which of these extractants give a good

representation of the zinc available to the plant. To check this effect and plant uptake of zinc, an experiment was conducted with tea plants in pots, with different soil applied zinc sulphate levels. Plant uptake of zinc was compared with the applied soil zinc levels, by taking different fractions of the plant. It was observed that young tea leaf obtained a maximum of 28 ppm at 0.64 g of soil applied zinc sulphate and roots obtained a maximum of 757 ppm at 1.01 g of soil applied zinc sulphate, and in stems zinc concentration increased linearly with increased zinc applications, in the range experimented.

The soil zinc fractions extracted increased with increased soil applications of zinc, and the best correlation was obtained between the zinc concentration in stems and 0.1 N HCl extracted zinc concentration.