Short Communication

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RELATIONSHIP BETWEEN CHEMICALLY EXTRACTABLE ZINC AND *L* VALUE IN ACID SOILS

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INTRODUCTION

It is recognized that no exact measure of available Zn in the soils is available. Relative measures as those obtained by the various chemical extractions do serve, however, as indicators of Zn available to plants. The calculated L value (using isotopic dilution technique) might give a more reliable estimate of soil available Zn than can be obtained by conventional soil testing. The present study was conducted to determine the relationship between acid extractable Zn and Zn L values using corn plant.

MATERIALS AND METHODS

Surface soil samples were obtained from different islands of Hawaii (USA) as described previously[1]. Important characteristics of the soils are given elsewhere [2]. Extractable P was determined by modified Trough's method[3]. For 0. 1N HCl extractable Zn, a procedure adopted by Nelson *et.al*[4] was used.

For L-Value, a pot experiment was conducted. Two Kg of soil (ovendry basis) was moistened to a one-third field capacity and spread on a plastic sheet. Zinc solution supplying 10 μg Zn/g soils and Zn^{65} activity of 48 μCi/pot was sprayed on soil. After thorough mixing, the soil was transferred in plastic pots and allowed to equilibrate at field capacity for 14 days. Nitrogen was applied to all the pots at the rate of 200 μg N/g soil.

Four corn (*Zea mays* L) seeds were planted per pot and thinned to 2 plants/pot 4 days after germination. Plants were harvested 30 days after germination, washed with distilled water and dried at 70°. The ground plant material was digested and L value calculated as described by Saeed and Fox[1].

RESULTS AND DISCUSSION

Relationship between acid extractable Zn at different P levels and L values in four different soils of Hawaii are presented in Fig 1.

The calculated L values appear to be related to the values obtained by chemical extraction. In most instances the L values determined for each soil increased as the quantities of Zn extractable increased. For Waialua soil, there was a decrease in extractable Zn with P and similarly lower and almost identical L values were obtained. For

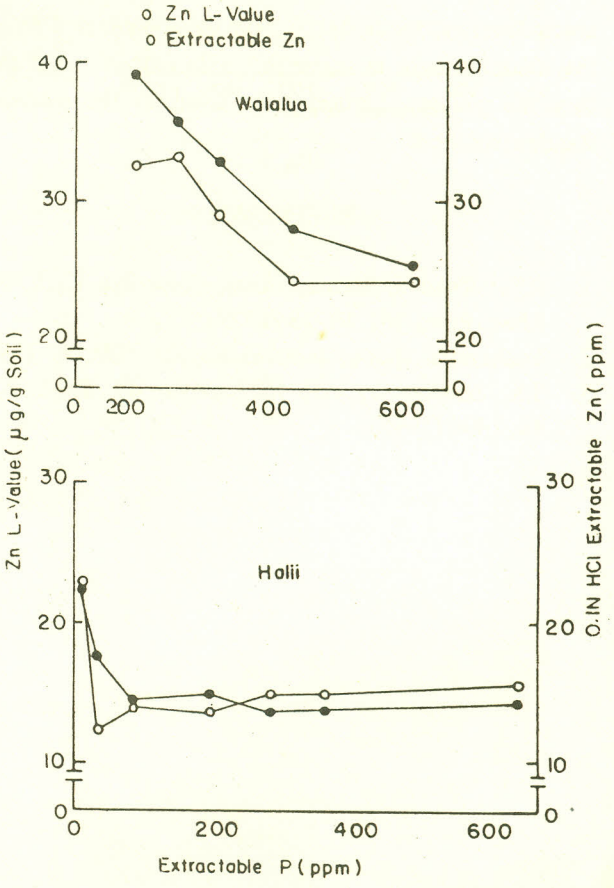

Fig. 1

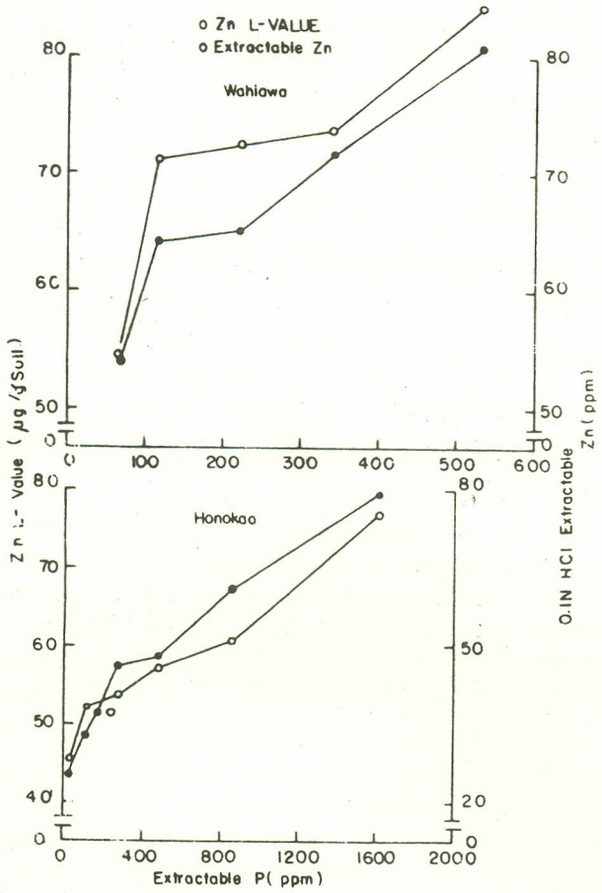

Fig. 2.

Wahiawa and Honokaa soils, Zn L values increased with increasing acid extractable Zn. In case of Halii soil, there was no change in extractable Zn with P fertilization. A similar trend was observed for L values.

Despite the fact that L values reflect plant physiological factors in addition to physico-chemical relations in soils, they have been shown in general similar to acid extraction values and could be taken as good indicator of Zn availability in acid soils. Giordano[5], however, reported that Zn L value is a poor indicator of Zn availability in flooded rice soils. Studies by Tiller[6] also showed poor correlation between L value and chemical extraction of Zn in alkaline soils. Tiller concluded from his studies that the L value measurement is not useful in predicting Zn deficiency in flooded rice soils because of complex reactions, especially in alkaline soils and on root surfaces.

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