SHORT SCIENTIFIC NOTES

A New Indicator for Direct EDTA Titration of Zinc Ions

The present note describes the use of diphenyl carbazide as indicator for the direct EDTA titration of zinc ions. The stock solutions of zinc sulphate, EDTA and indicator were 0·1 M, 0·01 M and 1·0% respectively. Solutions of interfering ions were 0·2 M.

Diphenyl carbazide gives a pink colour with zinc ions. There is a sharp colour change on titration with EDTA from pink to pale yellow at the end point. When an aliquot of Zn^{2+} solution is titrated with EDTA, zinc can be estimated accurately in the pH range 2·0–3·0 with the help of the indicator investigated. Titrations, carried out with different concentrations of the indicator, showed that an addition of 2 drops of 1·0% solution of the indicator gave satisfactory results for 5–10 ml of 0·01 M zinc sulphate solution. The titration could be satisfactorily carried out in the temperature range 10–60° C. At 1·5 mg concentration of zinc, 50 times excess of Na^+, K^+, NH_4^+, Cr^-, NO_3^- SO_4^{2-}, 5 times excess of Ni^{2+}, Co^{2+}, Mg^{2+}, Mn^2 and 2 times excess of Ca^{2+}, Sr^{2+}, Ba^{2+} Ci^{2+} and Cu^{2+} could be tolerated. Similar observations for other ions and indicators have been reported[1-3].

Take 5·0 ml aliquot of 0·01 M zinc sulphate solution, adjust pH 2·0–3·0 using 1–2 ml solution of acelate-HCl buffer of pH 2·0, add 2 drops of 1·0% solution of the indicator and titrate against 0·01 M solution of EDTA to pale yellow colour.

5·0 ml aliquots of 0·01 M zinc sulphate were analysed according to the suggested procedure. The standard deviation was 1·0%.

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A Gravimetric Method for Estimating the Root-Knot Incidence

The root-knot nematode, *Meloidogyne* spp., has a polyphagous nature in attacking almost all the economically important crops. The root-knot formation has a great significance in the disease development and thus, may prove to be an important parameter in estimating the disease incidence. The incidence of the disease caused by this nematode has been rated variously. Smith[1] merely counted the number of galls in the infected plants and prepared an index based on the percentage of galls, to express the disease development. More or less similar methods, based on visual observations, were used to express the severity of disease, by Jones and Nirula[2], Khan *et al.*[3] and Mishra and Prasad[4], without taking into account the dimensions or the mass of the galls, although the severity of the disease depends on the mass rather than the number of galls on the roots.

In the proposed method, the disease incidence is expressed in terms of knot-root ratio, based on the fresh weight of the whole root system of nematode-infected plants and that of the root portions transformed into knots.

Procedure.—The inoculated/infected plants were uprooted and washed thoroughly to remove the adhering soil particles. The water particles, adhering to the roots due to washing, were removed using blotting sheets. The roots were then examined for the presence of root-knots. The whole root system was weighed. The visible root-knots of varying size (from minute to large size) were removed under a stereoscopic dissecting microscope, by cutting the knotted portions. The isolated knotted protions of the roots were weighed. The weight of the infected tissue (knots) per g of root was calculated. The results were expressed as the mean values of randomized replicates, in terms of knot-root ratio.

The present quantitative technique is most simple and exact particularly for root-knot, and further, it yields quick results with the least efforts, as it does not involve any cumbersome measurements of the individual root or knot, nor does it need any histological analysis to find out the different stages of nematode development.

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