INTRODUCTION
Disturbances in iron nutrition are probably the most commonly recognised nutritional disorders causing a visible lack of chlorophyll whose occurrence has been recognised since ancient times (Gris, 1843, 1844). There are various ways in which the iron nutrition of plant may be so affected as to bring about a chlorotic condition. Lime induced chlorosis among them is one of wide occurrence. The visual symptoms of lime induced chlorotic plants are more or less the same as in other types of iron chlorosis. Perhaps due to this similarity it failed to achieve a distinct recognition despite its wide occurrence. The lime induced chlorosis is distinguished from other types of chlorosis by the feature that iron content in tissues is not actually deficient and the malady is developed on soils having high lime content in root zone.

Lime induced chlorosis has received intensive attention during the last three decades. Due to its association with high lime soils, it was earlier thought that this was a case of iron deficiency or unavailability due to high pH buffered by calcium carbonate. But later studies confirmed that iron content of normal and chlorotic plants was essentially the same. Therefore, the deficiency hypothesis was no longer tenable. Ironically the chlorosis of plants at equal or high levels of iron content could be corrected by the use of chelated or soluble iron compounds. Therefore, the only possible conclusion reached at, was that chlorosis resulted from inactivation or immobilization of iron in the chlorotic plants which occur mainly or at least to a greater extent in chlorotic leaves even though iron is not a direct constituent of chlorophyll.
1.1. Economic importance in sugarcane

In India the first investigation on lime induced chlorosis in sugarcane was reported by Srivastava et al. (1966). This type of chlorosis was extensively noticed in the Jaora Sugar Factory Zone and neighboring areas in the Ratlam district in Madhya Pradesh. Such conditions are also observed in Udaipur tract of Rajasthan and other shallow black soils of Maharashtra, Karnataka and Tamil Nadu.

Although plant cane was found to be relatively less affected yet ratoon canes suffer more severely. Chlorosis adversely affects the cane yield and quality, the latter more seriously. Further, the occurrence of disease is not uniform, occupying only irregular patches but the total loss associated is of the order of 15-20%.

1.2. Objective and scope of the investigation

The malady can be rectified by frequent sprays of iron solution but the cure is not of permanent nature. Due to its elusive nature, investigation on the understanding of the bio-chemistry of iron metabolism and its transport is called for.

The ultimate effect created in chlorotic plants due to this malady is the inactivation of iron after it has been absorbed by the plant. Since chlorotic leaves contained essentially the same or more iron than green leaves, this condition could merely be a precipitation of iron in the veins of the leaf as ferric phosphate. Studies with radio-iron may confirm that this type of chlorosis is caused by immobilization of iron in the veins of the leaf or even in the nodal region.

Since iron is involved in the chlorophyll synthesis and some enzymes are activated by its presence, the physiological unavailability
may be put as one of the causes for chlorosis. Some workers have thought that only a fraction of leaf iron is closely related to chlorophyll formation. Oserkowsky (1933) was first to have claimed to extract it with dilute acid and termed as 'active iron'. This 'active iron' might correspond to the iron in the enzyme that is responsible for chlorophyll synthesis.

Attention was directed to the fact that abnormal biochemical content of tissues accompanies chlorosis of only some plant species but not of others on high lime soils. The yellowing of lime induced chlorosis may differ from that produced in consequence of a deficiency of iron. By means of biochemical assay it may be possible to determine the character of disease and to trace its progressive development.

1.3. Plan of work

In the work envisaged here, it will be our endeavour to diagnose the physiological disease (i) through chemical and bio-chemical characterisation of plants; (ii) by tracing out the path of iron movement, distribution and uptake by plants with the use of radio-iron; (iii) by simulation of lime induced chlorosis under pot culture conditions by the use of factors which are suspected to cause chlorosis or aggravate it; and (iv) by exploring the possibility of amelioration of chlorosis with the use of balancing nutrients and other compounds.