ABSTRACT

The method of Spectro-chemical analysis is now widely used for detection and estimation of trace elements in plants and soils. The importance of these trace elements as micro-nutrients and their influence on the growth and disease resistivity of plants is also well recognised. However the method of Spectro-chemical analysis, though powerful, is likely to lead to erroneous results if proper precautions are not taken as regards choice of source of excitation, influence of the presence of other elements side by side with the solicited one etc. This work deals with these problems from the point of view of Physics and the importance of these considerations is brought forth by critically studying the case of manganese estimation in wheat samples obtained from the Govt. Wheat Research Stations, Saugor and Powarkheda (M.P.).

Chapter one deals with the qualitative analysis of these wheat samples. The samples are excited by using a high frequency spark source. The advantages of this source over the commonly used excitation sources like D.C. arc and Condensed spark for qualitative Spectro-chemical analysis is discussed.

Chapter two deals with the basic theory of quantitative Spectro-chemical analysis.

Chapter three describes experiments done to compare different excitation sources as regards accuracy and reproducibility. The results obtained are useful for a proper selection of a source
for quantitative analysis of an element, as the accuracy and reproducibility of the results depend much on the nature of the excitation source used.

Chapter four deals with the experimental work carried out to study the effect of extraneous elements like K, Ca, Mg and P on the intensity of manganese and iron lines. These elements (K, Ca, Mg and P) form a major part of the wheat samples studied. A theory of this effect is also given.

Chapter five deals with the quantitative estimation of manganese in wheat samples. Here it is shown how the manganese content controls the healthy growth as well disease resistivity of wheat plants.