CHAPTER 1

INTRODUCTION
Indian agriculture is primarily based on cereals, grain legumes (pulses) and oilseeds which in turn play a prominent role in the agricultural economy of India. Among these, wheat, moong and mustard are important crops and are consumed daily on a large scale. However, the production of these crops is not keeping pace with their ever-increasing demand day by day due to the population explosion. Under such circumstances, increase in their productivity is highly desirable, as their acreage cannot be increased appreciably.

Crop production has become highly input oriented and the requirement for additional fertilisers has gone up considerably due to the replacement of older varieties with newer high yielding ones. These latter have many desirable qualities, including a shorter life span, and have thus opened up immense possibilities for increasing productivity. However, there has been a proportionate increase in the demand for fertiliser so as to obtain maximum yields. Therefore to make agricultural production not only commercially viable but also attractive, attention has to be paid to economic and judicious use of fertilisers. This would require an insight into the compatibility of different crops chosen in rotation in terms of their ability to utilize various forms of nutrients (Afridi and Samiullah,
1973; Marschner, 1986). Admittedly, emphasis has been given so far only to the application of nitrogen, phosphorus and potassium. Surprisingly, inspite of the realization of its usefulness as an essential mineral nutrient, calcium has not received the attention of the farm scientists, although application of calcium to problem soils either directly by liming and application of gypsum or indirectly in the form of inorganic fertilisers, such as superphosphates is known to increase their fertility. Through cation exchange reactions, calcium is used to replace sodium in sodic soils of all calcium compounds, calcium sulphate (CaSO$_4$.2H$_2$O), i.e. gypsum is considered the best and cheapest source of this purpose (Donahue et al., 1990). It is, therefore, desirable to determine the optimum requirements of various crops for this nutrient (Millikan, 1961, Evans and Sorger, 1966; Samiullah et al., 1983).

Further, it has been established that vitamins as well as their derivatives act as co-factors for various biochemical reactions. If the amount of a vitamin in the tissue is not sufficient, the entire system leading to the normal functioning of an organ will be affected (Schopfer, 1949; Khan, 1989). Thus, an inherent deficiency of one or the other vitamin in a crop plant, may ultimately result in poor economic yield. However, good yield even of such varieties may be ensured by the exogenous supply of the deficient vitamin. In this regard, pre-sowing seed treatment
with pyridoxine has been employed successfully to augment early growth leading to enhanced productivity and quality of a number of crops, including cereals, legumes and oilseeds (Samiullah et al., 1988). It is also noteworthy that the returns from the applied nitrogen and phosphorus proved extra ordinarily attractive if the seeds of the crop received such a treatment (Khan et al., 1987; Samiullah, et al. 1991 and 1992).

With this tested expertise available to the present investigator, it was decided to undertake six field experiments to test the feasibility of the basal application of calcium for enhancing the performance of summer moong, mustard and wheat using seeds soaked in dilute pyridoxine solutions before sowing.

The aims and objects of these field trials were:

1. To determine the optimal requirement of calcium for summer moong after soaking the seeds in aqueous pyridoxine solution at the optimal dilution as established for the crop at Aligarh by Ansari (1986).
2. To establish the optimal requirement of calcium and pyridoxine for mustard.
3. To determine the optimal requirement of calcium and pyridoxine for wheat.