SUMMARY
1. During germination the activities of different phosphate metabolizing enzymes viz., acid phosphatase, acid and alkaline pyrophosphatases have been found to increase in the seeds of *Vigna sinensis* (Linn) Savi. The specific activities of these enzymes are much higher in embryo than that in cotyledon. Again, in the half-seeds all the activities of these enzymes measured in the cotyledons are greater in the case of 'cotyledon with embryo' than in the case of 'cotyledon without embryo'. Phytase, another important enzyme of phosphate metabolism does not change appreciably.

2. The activities of these enzymes are inhibited by some inhibitors of protein synthesis at the transcription and translation levels. These include cycloheximide, ethidium bromide and actinomycin D. The extent of inhibition by ethidium bromide and actinomycin D is less than that by cycloheximide indicating the rise in enzyme activity may be due to the *de novo* synthesis of the enzyme proteins at the translation of the pre-formed mRNA and newly synthesized mRNA.

3. Different plant growth hormones viz., gibberellic acid, indole acetic acid did not show any effect on the development of acid phosphatase activity in the germinating seeds of *V. sinensis*.

4. Orthophosphate - an end product of the reaction catalysed by phosphatase, inhibits the formation of acid phosphatase during germination. This inhibition is perhaps due to the repression of the enzyme protein rather than the inhibition or inactivation of enzyme.
5. At least six isozymes of acid phosphatase are found to exist in the germinating seeds of *V. sinensis*. They are designated as AP-I, AP-II, AP-III, AP-IV, AP-V and AP-VI. Among them AP-IV and AP-V which are present in the dry seeds, disappear within 12 h of imbibition and reappear in between 15 to 24 h of germination. These two are inhibited completely by cycloheximide and only partially by ethidium bromide and actinomycin D.

6. Four of the six isozymes of acid phosphatase viz., AP-I, AP-II, AP-IV and AP-V have been partially purified by heat-treatment ion-exchange chromatography and gel filtration. They have been characterized with respect to optimum pH, optimum temperature, substrate specificity and by the effects of metal ions, inhibitors, heat and detergents. All these phosphatases show pH optima around 5.0 and temperature optima between 50 and 60°C. They are partially inactivated upon incubation at 60°C for 60 min at pH 5.0. The rate of inactivation of these enzymes are greater when incubated at 65°C than that at 60°C. However, at pH 7.0 all these enzymes except AP-V are relatively stable towards heat (60°C for 45 min). In general, these phosphatases exhibit greater substrate specificity towards nucleoside triphosphate rather than sugar phosphate. Fe³⁺, Hg²⁺, Mo⁶⁺ and Zr²⁺ inhibit all these phosphatase activities but Mn²⁺ and Cu²⁺ have some stimulatory effects on AP-II and AP-IV activities. Sodium fluoride, orthophosphate, molybdate and PCMB inhibit all these enzymes but EDTA, alloxan and NEM have no effect on the activities of these phosphatases. Upon treatment with Triton X-100 the activities of AP-I, AP-II and AP-IV are augmented but no effect has been
observed on the activity of AP-V.

7. Pyrophosphatase and phosphatase activities appear to be present in the same enzyme protein as have been suggested from the studies of co-chromatography, optimum pH, optimum temperature, heat inactivation, etc.

8. Kinetic studies of the acid phosphatase isozymes have also been made to determine the values of $K_m$ for some of the substrates, $K_i$ for sodium fluoride, orthophosphate and PCMB. The activation energies for the hydrolysis of p-nitrophenyl phosphate by these enzymes have also been measured.

9. Significance of these findings are also discussed.