AIMS

AND

OBJECTIVES
The transformation of embryonic state to a complete life is a mysterious phenomenon in nature. Though the major aspects of the development from the dormant seed to the growing one has been well documented, still the exact regulatory role in the cell has not been amplified. The transformation of an embryo in the dry seed to a mighty tree is greatly obscure and is a subject of great interest to the biologists long since. The low rate of metabolism in the dry seeds may be due to the lack of water in the dry seeds. But dry seed is an important reservoir of storage material and is capable of playing a functional role in carrying out a large number of biochemical reactions, if the proteins of the seeds are properly hydrated. The hydration of the seeds increases the rate of respiration followed by increased rate of metabolism and energy of activation, leading to the growth of the embryo. The chemical changes which occur are complex in nature. The major metabolic processes associated with seed germination involve in the mobilization of the storage materials in the reserve tissue and their subsequent transfer to and utilization by the developing embryonic axis. This mobilization has been studied in a variety of substances, and is primarily concerned with the various 'N'-containing substances such as proteins and nucleic acids. In the light of these and their important phosphorylated substances in metabolism it seemed desirable to characterize the germination process with respect to the time sequence to change the major phosphorylated substances. Although specific aspects of phosphorus metabolism during germination has been examined such as changes in the phytic acid, nucleic acid, phospholipids and different enzymes involving phosphate metabolism,
etc., there is a paucity of knowledge regarding the detailed characterization of various phosphatases and their possible physiological role during germination.

Seed germination is one phase of the developmental process from fertilized egg cell to mature plant. In this phase a partially differentiated embryo resumes its course of development after a period of quiescence. The whole developmental course of an organism is genetically programmed and environmentally modulated. Each developmental phase exhibits a characteristic pattern of metabolism evidenced by enzyme activities that differ in kind, rate and location. Our current concept is that the kind of enzymes produced by gene action results from external or endogenous signal(s) that turn a particular part of DNA. Once the portion of DNA are turned on, complementary mRNAs are synthesized. That transcribed mRNA at one stage may be translated directly or in succeeding stages to proteins which may become active enzymes or require further activation. The rate of enzyme activities are controlled by the quantity of the active enzyme, substrate(s), cofactor(s), co-enzyme(s), the presence of inhibitor(s) or stimulator(s), the physical and chemical microenvironment including temperature, light and gaseous phase, if involved, pH, hydration, ionic strength, etc., and lastly the effect of the product. Isozymes refer to multiple molecular forms of an enzyme of similar or identical catalytic activities, occurring within the same organism. Genetic variants of an enzyme could be found in varieties of hybrids of one species or among different species and these isozymes often afford good markers for studies of breeding behaviour.
and theoretical inheritance. Particular significance of isozymes in metabolic studies lies in the fact that they are often specific to organelle, organ and to developmental stage. The specificities reflect the result of genetic-metabolic or genetic-environmental interplay. Thus, a study of different isozymes provides clues about their functional requirement and magnitude, from which their role in metabolic activity and development can be discovered.

The present investigation viz., biochemical studies during germination of seeds will be mainly concerned with the following:

(i) the studies of the changes in the activities of different enzymes involved in phosphate metabolism viz. acid phosphatase (EC 3.1.3.2), acid and alkaline pyrophosphatase (EC 3.6.1.1), phytase (EC 3.1.3.26), etc. in the seeds of *Vigna sinensis* (Linn) Savi during germination,

(ii) characterization of the different isozymes of acid phosphatase (which play an important role in plant) under various stages of germination,

(iii) isolation, purification and characterization of the different acid phosphatase isozymes from the germinating seeds.