CHAPTER I
INTRODUCTION AND IMPORTANCE

The physiological function of mammary gland is to pool and convert the fluid "blood" into milk which is a characteristic post-partum secretion by the mammary gland. Such secretion can be looked upon as a resultant outcome of myriad and specific biochemical events catalysed by enzymes.

Milk is a repository of enzymes. Apparently because of their origin from the mammary tissue, they gain entrance to the milk accidently or unavoidably during the secretary process. About 22 enzymes have either been purified, isolated or definitely identified in the bovine milk. Their plethoral omnipresence in such a biological fluid had attracted several scientists to study their characteristics for establishing the physiological, nutritional or technological role in the dairy industry.

Enzymes in milk have been extensively utilized as an yard-stick for evaluating a variety of biological events operative in milk or synthesis of milk constituents. These specific enzyme-catalysed operations in milk or its synthesis can be delineated as follows:

(a) Correlation with the existence of pathogens: Because of the heat sensitivity of enzymes, the presence of certain enzymes in milk is of great importance in relation to heat treatments of milk. For example, alkaline phosphatase activity in milk has a time-honoured check for the degree of pasteurization. The thermal death point
Micobacterium tuberculosis and inactivation of the enzyme alkaline phosphatase coincide with each other, hence the activity of latter serves as an index for the presence of former in milk.

(b) Correlation with fat spoilage: Many of the enzymes native in milk, act on the substrate present in milk itself. For example, lipase which produces hydrolytic rancidity of butter fat and the milk products containing fat.

c) Correlation with udder diseases: Increase in the level of esterase and catalase are the consequences of udder diseases and some other physiological disorders. Leucocyte count of milk has a correlation with the level of catalase in milk.

d) Correlation with flavour defects: Regarding the technological role of xanthine oxidase, there exists report concerning the role in the oxidative degradation of dairy products resulting flavour defects.

e) Correlation with bacterial action: Expected role of lysozyme is related to have antibacterial or immunological significance and can be associated with the keeping quality of milk.

(f) Correlation with stability of fat emulsion: It is suggested that ribonuclease as it is associated with the microsomal components of the fat globule membrane, may influence the stability of fat emulsion.

g) Correlation with the phosphorus balance of milk: Dephosphorylation of casein by alkaline phosphatase has
suggested a special precaution to obtain casein preparations of maximum and constant phosphorus content.

(h) Correlation with the synthesis of lactose: Lactose synthetase resulting through the union of galactosyl transferase and $\beta$-lactalbumin is an established biosynthetic step in the actual or complete milk formulation in the mammary gland.

(i) Correlation with soluble and micellar casein: Lipases in milk have been suggested to be involved in maintaining the equilibrium between micellar and soluble casein fractions.

Owing to the limited number of investigators in this field legitimate attention on milk enzymes has not been paid although it poses still a challenging problem in relation to its role towards the processing of milk. Further more most of the contributions in this avenue of dairy research are based on the results with enzymes from cow's milk.

The foregoing preamble justifies a thorough investigation into the repository of enzymes of buffalo milk; firstly because of the existing paucity of such data. Secondly, the accumulated knowledge revealing the differential behaviour of buffalo milk from that of cow milk in relation to its nature of proteins, further activates the temptation of undertaking an extensive comparative biochemical assessment of these biocatalysts residing in milk. Such an evaluation is likely to entail new data on buffalo milk enzymes and will ultimately provide technical know-how in relation to processing of buffalo milk. In the present pursuit, efforts have been directed towards the purification and characterization of buffalo milk enzymes with particular reference to alkaline phosphatase.