CHAPTER I

INTRODUCTION AND AIM

It has been known that the genetic potential for milk of most indigenous cattle in the tropics is less than dairying in temperate country. Therefore, the way to improve the dairy industry in Thailand, crossbreeding has been exploited as an efficient tool of blending the adaptability of tropical cattle with the high milking potentials of exotic breeds for increase in milk production. However, the quantity of milk production is not only a problem in dairy industry in Thailand but the quality and physicochemical properties of milk are also considered. The quality of milk generally involve many factors such as breed, age, stage of lactation, season, feeding, milking interval, disease and individual cow (Sharaby, 1988). Although Thai dairy industry use crossbred Holstein cattle for promote this business. The problem of the quality relation to physicochemical properties of milk from crossbred animal involving basic test of milk collecting center has not been clarified. The quality and physicochemical properties of milk govern many of the complex properties of milk and its industrial uses (Adane, et.al,1996). For the basic components of milk, protein is the main constituent involving the stability of milk (Bachmann,1990). The stability of milk protein depends on the ability of the casein remaining in the colloidal suspension when milk is subjected to heat or other modified influences (White and Davies, 1960).

It is known that milk protein compose of two major fractions, casein and whey protein. During lactating period, mammary gland synthesizes and secretes large amounts of phosphoproteins that mainly are associated with the casein fraction of milk (Bingham and Farrell, 1977). The mixture of four

phosphoproteins in casein are α_{s1}, α_{s2}, β and κ-casein which involve in the stability and physicochemical properties of milk (Davies and Law, 1980).

Inorganic phosphorus can be phosphorylated into protein. Each phosphoprotein differently require inorganic phosphorus during forming to casein micelle (Lyster, 1972). It has been shown that high concentration of inorganic phosphorus in normal milk cause of milk precipitation (McMahon and Brown, 1984). There is some disagreement as to the stability of milk increase during adding P_i (Abbassy and Wahba, 1986). There is also doubt as to no effect of P_i on stability of milk (Halt, Davies and White, 1986).

Varieties of method are used to determine the stability of milk including using rennet and heating the milk. Another method which has been widely used for many years is ethanol stability (White and Davies, 1960). The positive result by ethanol test is determined by the coagulation of milk. The milk coagulation is formed by the ethanol solution attaching casein and denature casein through calcium and calcium phosphate bridges (Horne and Parker,1981c). In Thailand, most of milk collecting center accept the stability test by using 75% EtOH. However, this test is claimed that there are some weakness which each laboratory needs to be aware. It is found that there are many factors which can affect the result of this test such as stage of lactation (Davies and Whites, 1958), ionic composition in milk particularly Ca ions and P_i (Donnelly and Horne,1986 ; Horne and Parker,1981a ; Horne,1987 ; Bachmann,1990), milk protein (Horne and Parker,1982), milk pH (Horne and Parker,1981b ; Bachmann,1990) and the strength of ethanol (Berg, 1988). Few data are available concerning the utilization of inorganic phosphorus for milk synthesis in the udder of crossbred cattle.

The objective of the present experiment was therefore to study the effect of inorganic phosphorus on stability and physicochemical properties of milk whether its effect occurred intracellular or extracellular of the mammary gland of crossbred Holstein Friesians.