CHAPTER I
INTRODUCTION

Dairying is a vital source of income for millions of rural families and has assumed the most important role in providing employment and income generating opportunities.

Cattle are mostly raised as dairy animals for milk and other dairy products in India. Gir is a famous high yielding milk cattle breed of India. The native tract of the breed is Gir hills and forests of Kathiawar including Junagadh, Bhavnagar, amreli, and Rajkot districts of Gujarat.

In dairy farming, among varied diseases, production diseases are of great concern to dairy producers worldwide. Ketosis is a common metabolic disease of high yielding dairy cows, mostly in early lactation and rarely in late pregnancy which is characterized by increased levels of ketone bodies in blood, urine and milk. Reduced feed intake coupled with increased energy requirement for lactation results in Negative Energy Balance (NEB) leading to significant increase in non-esterified fatty acid (NEFA) and ketone bodies concentration in serum (White, 2015). Ketosis may have a clinical or subclinical presentation in dairy cows.

Clinical Ketosis (CK) is defined as high serum ketone body concentration (> 2.9 mM) with observed clinical signs like anorexia, depression, pica, abnormal licking, in-coordination with abnormal gait, bellowing and aggression.

Subclinical ketosis (SCK) is defined by a higher level of circulating ketone bodies (1.2-2.9 mM) without any marked clinical signs but it is mostly associated with lesser milk yield and reduced reproductive performance. Animals with subclinical ketosis also have higher risk for clinical ketosis and other secondary diseases like displaced abomasum, mastitis, milk fever, hypomagnesaemia and impaired reproductive performance (Leblanc, 2010).

Clinical ketosis (3% to 15%) occurs less frequently than subclinical ketosis (15% to 60%) in a herd (McArt et al., 2011). Analysis of the β-Hydroxybutyric acid (BHBA) concentration in blood is generally considered as the reference test for ketosis and is often used to monitor the herd prevalence of the disorder in early lactating cows (Van Knegsel et al., 2012).
About 50 per cent of all lactating cows go through a stage of subclinical ketosis in their early lactation (Emery *et al*., 1964). High milk yielding cows are at an increased risk of developing subclinical ketosis (Herdt *et al*., 1981) and 97% of cows experience at least one episode of subclinical ketosis during 3rd - 5th week postpartum (Asl *et al*., 2011).

Among the method available to test ketosis, most sensitive and specific is BHBA concentration in the blood hence it is considered as “gold standard”. Ketometer’s test and strips have been developed to detect BHBA and acetoacetate in serum and urine, respectively.

High incidence of ketosis both in clinical and subclinical form causes economic loss to the dairy farmers due to loss of milk production as well as sharp drop of milk production and failure of affected animals to return to normal production after recovery (Radostits *et al*., 2000). Though awareness of the condition is increasing, subclinical ketosis (SCK) in dairy cows is still an underestimated and costly disease in terms of economics. Therefore, early detection of SCK and initiation of counter measures are more important for preventing complications. Published work on various aspects of subclinical ketosis in cows of India is limited. Hence, the present study was planned with the following objectives:

1. To detect ketone bodies in serum, milk and urine of Gir cattle during early lactation.
2. To study association of ketosis with haematological, biochemical and antioxidant parameters.
3. To standardize a cost effective and sensitive method for detection of ketosis in Gir cattle.