CHAPTER I  INTRODUCTION

Trace Components in Milk Fat and Other Dairy Products
The composition of milkfat is very complex. Though it is composed of mainly triglycerides, there are a number of other compounds belonging to the classes such as carbonyls, alcohols, glyceryl ethers, phenols and lactones which are present in trace quantities. The presence and quantity of these trace compounds are the determining factors in the quality of milk and milk products. The contribution of these compounds in various fields are well known, e.g., carbonyls, alcohols, fatty acids, phenols and lactones are shown to play a significant role in the flavour of dairy products whereas compounds like glyceryl ethers are of biological importance in stimulating growth and also as therapeutic agents. These compounds may be naturally present in milk or produced during processing and storage of dairy products.

Carbonyl compounds are the most important among the flavour compounds encountered in milk and milk products. Among the carbonyls, the monocarbonyls consisting of methyl ketones, alkanals, alk-2-enals and alk-2,4-dienals are of considerable importance. They are extremely flavourful and can be tasted at very low concentrations. The flavour of the dairy products depends not only on the nature and quantities of these compounds but also on the particular product in question. For example the methyl ketones which are responsible for the good flavour of cheese and butter are shown to contribute to the off-flavour in stored evaporated milk when their concentrations exceed the optimum levels. Similarly the aldehydes though present in fresh milk and milk products, when their concentration
exceeds the optimum levels during storage impart off-flavour to these products. Each type of off-flavour is attributable to a particular group of carbonyl compounds depending upon their quantity and quality. For example C7 - C10 alkanals possess oily tallowy odour; C7 - C11 alk-2-enals have painty odour and nutmeg spicy odour is due to C5, C6, C8 alkanal and alk-3-enals. The total weight of carbonyl compounds is ten times greater in the tallowy and 100 times greater in the painty odoured butter fat than in fishy flavoured butterfat. These aldehydes are mainly the autooxidative products of unsaturated fatty acids in milk and milk products. The oxidation of these fatty acids are accelerated by the action of metals like copper and iron, heat, sunlight etc. Under ordinary conditions of processing it is natural to expect the effect of all these factors on milk.

Alcohols are also considered important in the flavour of many fermented dairy products. They are also shown to be the secondary oxidation products of milk lipids. So, the study of the nature and quality of carbonyl compounds and alcohols in milk and milk products may enable us to know the flavour potential as well as the susceptibility of these to off-flavour development.

Glyceryl ethers are of pharmacological and therapeutic importance in humans and animals. They are shown to stimulate growth. Their usefulness in wound healing and also the beneficial effect on cancer patients treated with radiation are well established. Though they are extensively studied in body tissues
only very little research has been made in respect of milk and milk products. Though the above mentioned compounds are present in trace quantities, their isolation, separation and identification have been made possible by the advent of column, thin-layer and gas-liquid chromatographic techniques.

These trace components of milk fat have been studied extensively in cow milk fat while the information regarding these components in buffalo milk fat is meagre. It is a well established fact that buffalo milk shows considerable compositional differences when compared with that of cow milk. Further buffalo, being the major source of milk in India, a knowledge with respect to the qualitative and quantitative aspects of these trace components in buffalo milk fat besides being of fundamental value would help in the understanding of technological aspects and better utilization of buffalo milk and its products.

In the present investigation, besides buffalo milk and its products, cow milk and its products have also been studied in order to have a comparative data on the trace components of milkfat and other dairy products of these two species maintained under identical conditions of feeding and management practices.