INTRODUCTION
A large number of nematodes parasitize on animals of veterinary importance. They cause colossal losses to our veterinary wealth and dairy and poultry products. Besides, they also pose a threat to public health of community. *Trichuris globulosa* (v. Linstow), (Family : Trichuridae), a nematode inhabiting the large intestine of sheep and goats, is a structurally atypical adenophorean nematode possessing poorly developed oesophagus which is modified into an elongated thinly tapering series of cells collectively called the 'stichosome'. The oesophagus is found deeply embedded in the tissue of the host. Heavy infection of the nematode is one of the greatest setbacks to the economy of veterinary. For developing preventive strategies it, therefore, becomes imperative to study the biology and physiology of this parasite.

Parasitic chemotherapy has attracted considerable attention over the past two decades and there exist a number of published accounts of novel drug development, their mode of action and field and laboratory trials. Major reviews on the subject are those by Mansour (1979), *van den Bossche* (1985), Campbell (1986), plus many chapters in the recent books "Chemotherapy of Parasitic Diseases" (Campbell and Rew, 1986), "Chemotherapy of GastroIntestinal Helminths" (Van den Bossche et al., 1985) and the volume brought out as a result of a symposium of 'British Society for Parasitologists' devoted entirely to the
chemotherapy of parasites (Denham, 1985). Campbell (1986) speculated that drugs would remain an essential component of our armamentarium against parasites until the end of the present century.

There are two main reasons for carrying out fundamental research on the biochemistry of parasitic nematodes. Firstly, it has great practical importance through vaccine production and secondly it is useful in chemotherapy. A study of the structure and interaction of living system of parasites is, therefore, necessary for providing a better understanding of their functions.

Chemotherapeutic agents exert their effects on parasitic organisms by interfering with physiological or biochemical processes (Saz and Bueding, 1966) and a major goal in anthelmintic research is the rational development of drugs that interfere with essential processes unique to the parasite. Many anthelmintic drugs have been shown to inhibit or in some way alter unique but normal biological processes of parasites (Malkin and Camacho, 1972; Yorke and Turton, 1974; Colles et al., 1975; Hilman and Semb, 1975; Kaur and Sood, 1986). In spite of the progress made, there are many aspects of anthelmintic action which are still incompletely understood. Their study may lead to a better understanding of the mode of action of a given compound and also of the functional significance of a biochemical
reaction or physiological responses for the organisms affected by the chemotherapeutic agents. An attempt has been made in this thesis to study the effect of benzimidazole group of drugs, viz. thiabendazole (2-(4-thiazolyl)-1H-benzimidazole) and fenbendazole (methyl 5-phenylthio-1H-benzimidazole-2-yl-carbamate) on the carbohydrate and amino acid metabolism. Thiabendazole is reported to possess high degree of helminthocidal activity against wide range of helminths infecting the gastrointestinal tracts of domestic animals (Brown et al., 1961; Prichard, 1970). Fenbendazole was first introduced for the treatment of round worm infection as a result of research carried out in Belgium (Brugman et al., 1971).

Each organism must be examined as a biochemical entity before any reasonable understanding of helminth metabolism can be attained (Saz, 1969). Although it is true that some metabolic pathways are widely utilized, individual helminths often surprise us by the extent to which they differ from what is considered the norm. The development of helminth biochemistry has been less fortunate than its mammalian counterpart. In the 1920's and 30's the basic framework of mammalian biochemistry was established and now the emphasis has changed to the task of filling in the detail. By comparison, little work was done on helminth metabolism in the corresponding period and consequently the subject is nowhere near such firm foundation. Helminth
biochemistry has not only been relatively late in attracting serious study but it is a particularly difficult subject on which to work. It is always a matter of concern for biochemists to ensure the experimental conditions, close to the living system, but when working with helminths this problem is almost insurmountable.

Knowledge of biochemistry is also important for the understanding of the complex association involved in the host-parasite relationship. Parasitologists have, therefore, started exploring the nature of biochemical pathways. Studies on the metabolism in helminth parasites have been centered mostly around the processes in which carbohydrates play a major role; consequently knowledge on the metabolism of other compounds, such as amino acids and lipids is meagre (Ward, 1982).

There is extensive carbohydrate metabolism on which the parasitic nematodes are assumed to depend almost entirely for energy supply. However, the metabolism of amino acids and proteins are also important during growth, moulting and egg production. The information available on enzymes of helminths is limited in contrast to extensive studies of mammalian, yeast and bacterial enzymes. In addition to contributing to the understanding of parasitic metabolism, comparative studies of
enzymatic analysis may lead to the discovery of new specific chemotherapeutic agents (Saz and Bueding, 1966).

Studies on different nematodes have clearly demonstrated that a few amino acids are catabolised at appreciable rates (Singh et al., 1983a,b; Singh and Srivastava, 1983; Singh et al., 1987). With a view to develop a more generalized picture, investigations on the metabolism of glucose, incorporation of aspartic acid, alanine and leucine into different macromolecular fractions of adult *T. globulosa* were seen using radioactive precursors *in vitro*. Along with these studies, effect of anthelmintics on macromolecular synthesis in adult *T. globulosa* was also examined.

It has become increasingly apparent that parasitic helminths possess specific systems for the mediated uptake of organic solutes from the ambient medium. Many published reviews dealing with transport phenomena in mammalian and bacterial systems (Oxender, 1972) have ignored the literature dealing with transport in parasitic helminths; the processes and mechanisms are strikingly similar. Although several books and review articles dealing solely, or in part, with nutritional mechanisms of parasitic helminths have been published (Read and Simmons, 1953; Read, 1966, 1968, 1970; Smyth, 1966, 1969; Von Brand, 1952, 1973; Lee, 1965; Pappas and Read, 1975), these
contributions included quite limited considerations of transport phenomena in parasitic nematodes. Nematodes typically possess a complete digestive tract and have, therefore, two potential absorptive surfaces. There are certain experimental data available which clearly indicate that the cuticle of most nematodes is readily permeable to metabolically important compounds (Weatherly et al., 1963; Roy et al., 1983). Studies on the mode of transport of low molecular weight nutrients, viz. glucose, aspartic acid, alanine and leucine, their kinetic characterization, inhibition by anthelmintics and the effect of possible compounds that inhibit the uptake have been carried out using radiolabelled D-U-\(^{14}\)C-glucose, L-U-\(^{14}\)C-aspartic acid, L-U-\(^{14}\)C-alanine and L-U-\(^{14}\)C-leucine. Studies on dependence of glucose and amino acid transport on Na\(^{+}\) have been made in the present work. Phosphatases are known to play important role at the transporting surfaces (Lumsden, 1975; Pappas and Read, 1975), in extracellular digestion and phosphorylation of nutrients transported, secreted and excreted (Maki and Yanagisawa, 1980a). Due to their presence at the absorptive surfaces, phosphatases react with substances in the external milieu (Pappas and Read, 1975). Anthelmintics during their absorption may alter the enzyme activity and may also modify the normal metabolism of the absorptive surfaces. Effect of anthelmintics on phosphatases has also been studied at different substrate concentrations in adult T. globulosa.
Studies on the glycolytic enzymes, Kreb’s cycle and other NAD- and NADP- dependent enzymes, phosphatase and transaminases, their kinetic characterization and subsequent inhibition by benzimidazole drugs have been carried out. Studies on histology and histochemistry of carbohydrates, proteins and various enzymes have also been carried out to extend the knowledge of localization of these molecules.

It is hoped that present study would contribute further in our understanding of carbohydrate and amino acid metabolism of nematodes. Exploitation of chemotherapeutic agents, which may inhibit carbohydrate and amino acid metabolism, would result in non-availability of carbohydrates and amino acids for energy requirement and structural purposes, thus checking the propagation of the species.