ABSTRACT

The present Thesis entitled "Studies on Lipids" contains six chapters.

Chapter - I presents an introduction about the work with particular reference to definition, distribution, types, functions and structures of fats. The current trend of work in the field, the scope and objective of the present study along with a brief account of the work done by others has been given.

Chapter - II gives a brief account of the methods used in the study of the test materials. The details include: Material identification, extraction, separation and composition determination using Chromatographic and Spectroscopic methods. Microbiological and Nutritional evaluation have been also described.

Chapter - III incorporates studies on lipids from some aquatic sources.

Part (A) deals with studies on Labeo rohita lipids. The fish filet fatty oil component profile has been worked out. The experiments include GLC of the methyl ester contents of the unheated fish oil and that of the enriched EPA fraction (enrichment by urea complexation), heating the oil to higher temperature, enrichment of EPA fraction therein. The subsequent methyl ester (heated oil
and EPA fraction) contents show formation of artifacts (resulting from heat treatment) in the EPA region (as shown by GLC). The % digestibility of the deteriorated EPA has been found to be low.

A branched chain, fatty acid has been identified from the non-urea complex fraction.

Part (B) involves lipid profile study of freshwater alga - Rhizoclonium hieroglyphicum. The extractive after removal of colouring matter, has been extracted for lipid content. The lipid yield has been found to be low (0.83%). HPLC has been used to separate the different lipid classes. The phospholipid fraction after enrichment, derivatization and working up, has been found to contain an unusual (12 methyl 5 octadecenoic) acid.

Chapter IV Contains studies involving seed fats.
Part (A) deals with investigations on a dimer from Balanites aegyptiaca fatty oil. After knowing the fatty acid profile, the composition of the dimer - formed during thermal oxidation of the fatty oil, has been determined. The GLC pattern of the sample indicates it to be dehydro-methyl linoleate dimer. For further confirmation, Mass spectrometry was done. This analysis gave evidence for the presence of dihydroxy dimer of the dehydrodimer of methyl linoleate. The dimerised oil showed lesser digestibility in rats.
Part (B) deals with Pyrolysis of *Buchanania lanzan* seed oil. Possibility of fuel formation from the oil has been tried. As a result of cracking, the sample produced alkanes of carbon numbers up to 20.

Chapter V has been devoted to the studies on a non-traditional seed oil.

Part (A) deals with the analysis of *Syzygium cumini* seed oil. Apart from stearic oleic and linoleic acids, an unusual trienoic (eleostearic) acid has been identified. The identity of the acid has been confirmed by Chromatographic and Spectroscopic methods.

Part (B) deals with Studies on growth of some plant pathogenic fungi and human pathogenic bacteria in presence of *Syzygium cumini* seed oil. Extractable amount of the added oil and identified fatty acids have been reported.

Chapter VI includes Miscellaneous studies on lipids.

Part (A) reports detection of Eicosapentaenoic acid (EPA) from a fungus - *Rhizopus oryzae* (lipid yield 0.25%). The role of EPA in checking blood Cholesterol is known and its presence in a fungus is rare. After enrichment, the fungus could be taken as an alternative to the limited sources of this acid.
Part (B) contains studies on Calcium ion uptake by a synthetic lipid system. Transformation of lipid bilayers to multilayers has been investigated using a fatty acid-soap-water combination.

Part (C) deals with separation of a triglyceride, sterol and amide in a mixture and individually using TLC.

**Summary** The findings have been summarised at the end of the Thesis.