In recent decades, biotechnology involving the enzyme catalysed reactions have indicated importance in the processing of lipids like fats and oils, phospholipids and other lipids. Involvement of enzyme in catalysing the reactions of lipids either in altering their composition or properties or to produce special type of products is advantageous over the chemical one due to its specificity and mildness. The lipolytic enzymes such as lipases and phospholipases can biocatalyse the modification of fats and their derivatives, either to replace existing methods with milder, more natural and hopefully cheaper techniques or to provide novel products not easily produced by usual chemical processes.

Depending upon the molecular nature, a lipid can be classified as 'Polar' and 'Non-Polar' lipid. When the hydroxyl groups of the glyceridic molecule are esterified with non-polar fatty acid molecules, then it is known as neutral or non-polar lipid, such as triglycerides which are more generally and extensively known to us in the name of fats and oils of commerce and used by us as materials of our daily consumption. On the other hand, when one of the three hydroxyl groups of the glycerine molecule is esterified with any polar molecule, then it is known as polar lipid, e.g. phospholipid, glycolipid etc.
The well-known polar lipid component of fats and oils is phospholipid. Phospholipid is synonymous with lecithin, and is isolated in various grades from different vegetable oils: soybean, corn, ricebran, sunflower, safflower, cottonseed, canola and egg yolk. They are essential constituents of bio-membranes also. Phospholipids have distinct surface active properties and viscosity characteristics due to their unique molecular structure and are therefore, important raw material for food, industrial, pharmaceutical and cosmetic applications. Lecithins have been utilized as one of five emulsifiers permitted in the food industry. Phospholipids also find applications in medicinal and pharmaceutical fields. Liposomes, made of various kinds of phospholipids, are expected to be good drug delivery systems.

The world consumption of lecithins is estimated as 100,000 tons per year, of which more than half is applied as modified lecithins. This shows the importance of developing lecithins with tailor-made performances, enabling the production of optimal end products with the help of these additives.

In contrast to normal trade lecithin, which complies with regular trade specifications and is produced straight after the degumming process, special lecithins are defined as products which have been processed in such a way that a specific surface activity has been achieved.

There are several ways of modification of phospholipid—physical, chemical and enzymatic. The physical modifications consist of acetone-extraction of neutral lipids from oil-phospholipid mixture, alcohol fractionation of phospholipid to separate...
the different compositions of phospholipids and spray drying of phospholipids to get dry, granular phospholipid powder.

Chemical modification of lecithin includes non-specific hydrolysis by acid/alkali, acetylation and hydroxylation.

Finally, the use of enzymes constitutes a current commercial practice designed to produce unique phospholipids. With the help of specific enzymes, partially hydrolysed phospholipids, phospholipid with specific fatty acid compositions and mixture of surfactants starting from phospholipid, can be obtained. Enzymatic synthesis methods, which are characterised by mild reaction conditions and high selectivity, can be expected, will be of great importance in the modification of phospholipids.

The disadvantages of the chemical catalysts that they react on the phosphate bond of phospholipid molecules on continuation of reaction and due to high temperature involvement, they often produce undesirable dark coloured products, impart the usual preferences to the bio-chemical modifications of phospholipids as these products are to be used in human food or medicinal purposes.

The natural substrate for lipases are triacylglycerol (TG), but some of them have also been used to modify the phospholipid. Few works have already been done, but extensive study have yet not made.

Neutral lipids, obtained mainly from the vegetable sources, are of two types — edible and non-edible. Castor oil and linseed
oil are the major non-edible oils of India, and it so happens that India is the second largest producer of castor oil and much importance has been given to the various industrial utilisation of castor oil by developing appropriate process technologies. Castor oil is to be unique nature in containing very high proportion of 12-hydroxy oleic acid, i.e., ricinoleic acid and extensively used in paint industries, and has also been examined in details in producing surface active molecules, perfumery chemicals and oleochemicals by conventional chemical reactions. The possibilities of carrying out reactions of hydroxy acid with the aid of microbial lipases are receiving much attention. In fact, biotechnological transformations of castor oil or its fatty acids have been very meagerly studied in comparison with the chemical ones. The microbial lipase catalyzed alcoholysis and esterification reactions appear to be an interesting study for castor oil or its fatty acids in preparing new kinds of ester derivatives which may have different properties and applications.

Similarly, linseed oil contains a very high amount of n-3 poly unsaturated fatty acid i.e., α-linolenic acid which has unique drying property and therefore is extensively used in the surface coating industry. Production of pure α-linolenic acid from linseed oil enable to use it directly as a drying oil fatty acid.

The present study, therefore, aims at (A) modification of phospholipids by hydrolysis and transesterification (alcoholysis including glycerolysis, ester-ester interchange) reactions using microbial lipases for better utilisations, and (B) preparation of pure ricinoleic acid and linolenic acid from castor oil and
linseed oil, long chain fatty alcohol and poly ethylene glycol ester derivatives of ricinoleic acid as occurring in castor oil, preparation of long chain alcohol ester of 12-hydroxy stearic acid obtained from hydrogenated castor oil, and preparation of some interesterified products of castor oil with sal (stearic rich), palm stearin (palmitic rich) and coconut stearin (lauric rich) with the help of microbial lipase technology and evaluation of some physical properties of these products.