OBJECTS
OF
THE WORK
The present thesis incorporates work carried out on investigations and chemical modifications of some minor seed oils and by-products of oil processing with a view to explore new avenues for their end uses. The minor seed oils used for the purpose of study are Karanja oil and Rice bran oil. The by-products of oil processing used for the purpose of study are Oil recovered from spent bleaching earth (ORSBE), Acid oil (AO) and Deoiled cakes (DOC) of soybean, rapeseed and castor.

The study conducted on physical and chemical modifications of some minor seed oils and by-products of oil processing are aimed at their proposed utilization in liquid detergents, biodegradable plastic sheets, wood adhesives and new oleo chemicals utilisable in pharmaceutical industries.

There is a compelling need to target minor seed oils and by-products of oil processing for their up-gradation, utilization and focus experimental, research and developmental activities for discovering newer areas of utilization; especially with a view to use them as replacements for traditional oils so that their scarcity does not necessitate imports or imports if at all compulsory are restricted to minimum. Therefore the minor seed oils and by-products of oil processing selected for the study especially with reference to the difficulties involved in their processing, physical and chemical characteristics, fatty acid composition, their objectionable non-lipid components and their potential availability find place for discussion in chapter – 1.

Chapter – 2 covers some new alkyd resin polymer synthesized from Oil recovered from spent bleaching earth (ORSBE) and Acid oil. The synthesized polymeric product was then used with sodium lauryl sulphate as mixed active matter in liquid detergent formulation with a view to replace the conventional active matter, linear alkyl benzene sulphonate (LABS). The prepared liquid detergents were analyzed for surface tension, detergency and foaming power and
compared with commercial liquid detergent sample. All the liquid detergent compositions exhibited comparable performance to commercial one with respect to detergency and surface tension whereas foaming power decreased with increase in amount of polymer in the formulation. Satisfactory results were found even for low concentration (0.5%) of liquid detergents. The proposed compositions can be easily prepared in existing alkyd resin manufacturing plants with little modification.

Chapter – 3 (A) highlights, Proteins isolated from deoiled cakes (DOC) of soybean, castor and rapeseed. The isolated proteins were then blended with LDPE in different weight ratios, using PEG_{400} as a plasticizer. The morphology of the blends was studied using a scanning electron microscope (SEM). Homogeneous blends were obtained and analyzed for various mechanical properties (tensile strength, impact strength, hardness) and percent elongation, and compared with properties of plastic sheets prepared from mixture of pure proteins isolated from DOC of soybean, castor and rapeseed. Results revealed that protein composition and amount of LDPE in mixed proteins – LDPE blend, considerably affected the mechanical properties of the plastic compositions.

Chapter – 3 (B) covers investigation on biodegradability of plastic sheets made of mixed proteins (Soybean, castor and rapeseed) and mixed proteins – LDPE blends. The biodegradable plastic sheets prepared from mixed proteins isolated from soybean, castor and rapeseed DOC and the same mixed proteins – LDPE blends were subjected to microbial degradation using *Pseudomonas aeruginosa*. Results showed that plastic sheets prepared from mixed proteins and mixed proteins – LDPE blends supported the growth of *P. aeruginosa* and hence biodegradability.

Chapter – 4 (A) reports, fatty Schiff bases namely 2-alkyl-N-benzylidenehydrazinecarbothioamide,
2-alkyl-N-(furan-2-ylmethylene) hydrazinecarbothioamide,

2-alkyl-N-(4-hydroxybenzylidene) hydrazinecarbothioamide,

2-alkyl-N-(4-hydroxy-3-methoxybenzylidene) hydrazinecarbothioamide of fatty acid hydrazides made from Oil Recovered from Spent Bleaching Earth (ORSBE) and Acid oil (AO). These newly synthesized Schiff bases were characterized on the basis of FT-IR, elemental analysis and evaluated for biological performance. Schiff bases exhibited mild antibacterial activities against certain micro-organisms, when compared with streptomycin used as standard antibacterial agent and imidil used as a standard antifungal agent.

Chapter – 4 (B) describes rapid and efficient solvent free synthesis of 3, 5, 6-trisubstituted-1, 2, 4-triazines from chemically synthesized fatty hydrazides made from AO and ORSBE under microwave irradiation, using silica gel as an inorganic solid support. The structural features of the synthesized hydrazides and triazines were characterized by FT-IR and elemental analysis. The newly synthesized triazines exhibited mild anti-microbial activity when compared with standard.

Chapter – 5 emphasises eco friendly wood adhesive formulated using tannin and N, N-Bis (2-hydroxy ethyl) fatty amide (HEFA) of minor seed oils (Karanja and Rice bran). The natural tannin adhesive can replace formaldehyde-based resin systems in order to reduce formaldehyde and volatile organic compound (VOC) emissions from the adhesives used for ply woods. Performance properties of the adhesives viz. tensile strength, impact strength and chemical resistance were measured after application on wood specimens. N, N-Bis (2-hydroxy ethyl) fatty amide (HEFA) of minor seed oils were mixed as a cross linker, to pure tannin based adhesive. This increased tensile strength, impact strength and chemical resistance of wood specimens joined by tannin as an
adhesive. The results revealed that eco friendly adhesive system with improved performance characteristics for wood can be successfully formulated using tannin and HEFA.