## List of Figures

<table>
<thead>
<tr>
<th>Title</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Triglyceride Molecule, the Major component of Vegetable Oils</td>
<td>3</td>
</tr>
<tr>
<td>1.2 Reactive Positions in Triglycerides</td>
<td>5</td>
</tr>
<tr>
<td>1.3 Chemical Structures of acids Ricinoleic and Vernolic</td>
<td>12</td>
</tr>
<tr>
<td>1.4 Chemical Structure of Polyols</td>
<td>20</td>
</tr>
<tr>
<td>1.5 Chemical Structures of Maleinized Hydroxymethylated and Hydroxylated Triglycerides</td>
<td>20</td>
</tr>
<tr>
<td>1.6 Chemical Structures of Castor Oil modified with Acryloyl Chloride, 3-isopropenyl-α,α’-dimethylbenzylisocyanate, and Epichlorohydrin</td>
<td>27</td>
</tr>
<tr>
<td>1.7 Chemical Structures of castor oil monoglyceride, castor oil pentaerythritol Glyceride and castor oil BA propoxylate maleates</td>
<td>34</td>
</tr>
<tr>
<td>3.1 Representative Triglyceride found in Linseed oil</td>
<td>63</td>
</tr>
<tr>
<td>3.2 FT-IR Spectrum of Linseed oil</td>
<td>66</td>
</tr>
<tr>
<td>3.3 FT-IR Spectrum of Linseed oil Monoglyceride</td>
<td>67</td>
</tr>
<tr>
<td>3.4 FT-IR Spectrum of Linseed oil Monoglyceride Cyclohexane Dicarboxylate resin</td>
<td>67</td>
</tr>
<tr>
<td>3.5 $^1$H NMR Spectrum of Linseed oil</td>
<td>68</td>
</tr>
<tr>
<td>3.6 $^1$H NMR Spectrum of Linseed oil Monoglyceride</td>
<td>68</td>
</tr>
<tr>
<td>3.7 $^1$H NMR Spectrum of Linseed oil Monoglyceride Cyclohexane Dicarboxylate Resin</td>
<td>69</td>
</tr>
<tr>
<td>3.8 TG-DTA curve of Linseed oil Monoglyceride Cyclohexane Dicarboxylate – Methyl acrylate (LINMGMA) Copolymer</td>
<td>71</td>
</tr>
</tbody>
</table>
3.9 TG-DTA curve of Linseed oil Monoglyceride Cyclohexane Dicarboxylate – 72
Methyl methacrylate (LINMGMMA) Copolymer

3.10 TG-DTA curve of Linseed oil Monoglyceride Cyclohexane Dicarboxylate – 72
Vinyl acetate (LINMGVA) Copolymer

3.11 TG-DTA curve of Linseed oil Monoglyceride Cyclohexane Dicarboxylate – 73
Vinyl pyrrolidone (LINMGVP) Copolymer

3.12 Swelling of LINMGMA in Various Solvents 77

3.13 Swelling of LINMGMMA in Various Solvents 78

3.14 Swelling of LINMGVA in Various Solvents 78

3.15 Swelling of LINMGVP in Various Solvents 79

3.16 Chemical Resistance of Polymers in Various chemicals 82

4.1 Representative Triglyceride found in Sesame oil 86

4.2 FT-IR Spectrum of Sesame oil 88

4.3 FT-IR Spectrum of Sesame oil Monoglyceride 89

4.4 FT-IR Spectrum of Sesame oil Monoglyceride Cyclohexane Dicarboxylate resin 89

4.5 H₁ NMR Spectrum of Sesame oil 90

4.6 H₁ NMR Spectrum of Sesame oil Monoglyceride 91

4.7 H₁ NMR Spectrum of Sesame oil Monoglyceride Cyclohexane Dicarboxylate Resin 91

4.8 TG-DTA curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – 94
Methyl acrylate (SESMSGMA) Copolymer

4.9 TG-DTA curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – 94
Methyl methacrylate (SESMSGMMA) Copolymer

4.10 TG-DTA curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – 95
Vinyl acetate (SESMSGVA) Copolymer
4.11 TG-DTA curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – N-vinyl-2-pyrrolidone (SESMGVP) Copolymer

4.12 TG-DTG curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Methyl acrylate (SESMGMA) Copolymer

4.13 TG-DTG curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Methyl methacrylate (SESMGMMA) Copolymer

4.14 TG-DTG curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Vinyl acetate (SESMGVA) Copolymer

4.15 DTG curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – N-vinyl-2-pyrrolidone (SESMGVP) Copolymer

4.16 Swelling of SESMGMA in Various Solvents

4.17 Swelling of SESGMMA in Various Solvents

4.18 Swelling of SESMGVA in Various Solvents

4.19 Swelling of SESMGVP in Various Solvents

4.20 Chemical Resistance of Polymers in various chemicals

5.1 Formation of IPN

5.2 Classification of IPN

5.3 Structures of a Semi-IPN and an IPN

5.4 TG-DTA curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Methyl acrylate (IPNMGMA) Copolymer

5.5 TG-DTA curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Methyl methacrylate (IPNMGMMA) Copolymer

5.6 TG-DTA curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Vinyl acetate (IPNMGVA) Copolymer
5.7 TG-DTA curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – N-vinyl-2-pyrrolidone (IPNMGVP) Copolymer
5.8 TG-DTG curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Methyl acrylate (IPNMGMA) Copolymer
5.9 TG-DTG curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Methyl methacrylate (IPNMGMA) Copolymer
5.10 TG-DTG curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – Vinyl acetate (IPNMGVA) Copolymer
5.11 TG-DTG curve of IPN of Linseed oil and Sesame oil Monoglyceride Cyclohexane Dicarboxylate – N-vinyl-2-pyrrolidone (IPNMGVP) Copolymer
5.12 DSC curve of IPNMGMA
5.13 DSC curve of IPNMGMA
5.14 DSC curve of SESMGMA
5.15 DSC curve of LINMGMA
6.1 TG-DTA curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMA) Copolymer with Sisal Fiber
6.2 TG-DTA curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMA) Copolymer with Coconut Fiber
6.3 TG-DTA curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMA) Copolymer with Wood Flour
6.4 TG-DTA curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMA) Copolymer with Wheat Flour
6.5 TG-DTG curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMA) Copolymer with Sisal Fiber
6.6 TG-DTG curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMMA) Copolymer with Coconut Fiber

6.7 TG-DTG curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMMA) Copolymer with Wood Fiber

6.8 TG-DTG curve of Polymer from Linseed oil – Methyl methacrylate (LINMGMMA) Copolymer with Wheat Fiber

6.9 TG-DTA curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Sisal Fiber

6.10 TG-DTA curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Coconut Fiber

6.11 TG-DTA curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Wood Flour

6.12 TG-DTA curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Wheat Flour

6.13 TG-DTG curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Sisal Fiber

6.14 TG-DTG curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Coconut Fiber

6.15 TG-DTG curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Wood Flour

6.16 TG-DTG curve of Polymer from Sesame oil – Methyl acrylate (SESMGMA) Copolymer with Wheat Flour

6.17 DSC curve of LINMGMMA with Wood Flour

6.18 DSC curve of SESMGMA with Coconut Fiber

6.19 Variation of Tensile Strength with Percentage of Filler
7.1 Percentage of Biodegradation of Various Polymer samples from Linseed oil 168
7.2 Percentage of Biodegradation of Various Polymer samples from Sesame oil 168
7.3 SEM image of LINMGMA before and after Degradation with Different Magnification 170
7.4 SEM image of LINMGMMA before and after Degradation with Different Magnification 171
7.5 SEM image of LINMGVA before and after Degradation with Different Magnification 172
7.6 SEM image of LINMGVP before and after Degradation with Different Magnification 173
7.7 SEM image of SESMGMA before and after Degradation with Different Magnification 174
7.8 SEM image of SESMGMMA before and after Degradation with Different Magnification 175
7.9 SEM image of SESMGVA before and after Degradation with Different Magnification 176
7.10 SEM image of SESMGVP before and after Degradation with Different Magnification 177
7.11 IR spectrum of LINMGMA before and after Photo irradiation 184
7.12 IR spectrum of LINMGMMA before and after Photo irradiation 185
7.13 IR spectrum of LINMGVA before and after Photo irradiation 186
7.14 IR spectrum of LINMGVP before and after Photo irradiation 187
7.15 IR spectrum of SESMGMA before and after Photo irradiation 188
7.16 IR spectrum of SESMGMMA before and after Photo irradiation 189
7.17 IR spectrum of SESMGVA before and after Photo irradiation 190
7.18 IR spectrum of SESMGVP before and after Photo irradiation 191
7.19 TG-DTA curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – 193
Methyl methacrylate (SESMGMMA) Copolymer after Irradiation (direct sun light).
7.20 TG-DTA curve of Sesame oil Monoglyceride Cyclohexane Dicarboxylate – 193
Methyl methacrylate (SESMGMMA) Copolymer after Irradiation (UV light)
7.21 Comparison of Photo degradation of Polymer samples from Linseed oil 195
in Dry and Wet condition
7.22 Comparison of Photo degradation of Polymer samples from Sesame oil 196
in Dry and Wet condition
7.23 Comparison of Photo and Biodegradation of Polymer samples from Linseed oil 197
in Dry condition
7.24 Comparison of Photo and Biodegradation of Polymer samples from Linseed oil 197
in Wet condition
7.25 Comparison of Photo and Biodegradation of Polymer samples from Sesame oil 198
in Dry condition
7.26 Comparison of Photo and Biodegradation of Polymer samples from Sesame oil 198
in Wet condition