# List of Figures

## Chapter I: Introduction

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Classification of lipid based on structure</td>
<td>3</td>
</tr>
<tr>
<td>1.2</td>
<td>Structure of Triacylglyceride (Neutral lipid molecule)</td>
<td>4</td>
</tr>
<tr>
<td>1.3</td>
<td>Structure of fatty acid</td>
<td>5</td>
</tr>
<tr>
<td>1.4</td>
<td>Absorption and transport of fatty acid in intestine</td>
<td>10</td>
</tr>
<tr>
<td>1.5</td>
<td>Pathway of fatty acid synthesis</td>
<td>11</td>
</tr>
<tr>
<td>1.6</td>
<td>de novo fatty acid synthesis</td>
<td>12</td>
</tr>
<tr>
<td>1.7</td>
<td>β-oxidation of fatty acid</td>
<td>15</td>
</tr>
<tr>
<td>1.8</td>
<td>Biosynthesis pathway of eicosanoids</td>
<td>17</td>
</tr>
<tr>
<td>1.9</td>
<td>n-6/n-3 fatty acid metabolism</td>
<td>22</td>
</tr>
<tr>
<td>1.10</td>
<td>Garden cress plant</td>
<td>39</td>
</tr>
<tr>
<td>1.11</td>
<td>Garden cress Seeds</td>
<td>39</td>
</tr>
<tr>
<td>1.12</td>
<td>Garden cress sweet balls (Aliv laddu)</td>
<td>41</td>
</tr>
</tbody>
</table>

## Chapter II: Section-A

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Detection of alkaloids Sanguinarine and Dihydro-sangunarine</td>
<td>56</td>
</tr>
<tr>
<td>2.2</td>
<td>FTIR Spectra (4000 to 500 cm⁻¹) of MO, GCO and Flaxseed oils</td>
<td>58</td>
</tr>
<tr>
<td>2.3</td>
<td>GC-MS chromatogram of Garden cress oil.</td>
<td>59</td>
</tr>
<tr>
<td>2.4</td>
<td>GC-MS fragmentation pattern of GCO fatty acid methyl esters</td>
<td>59</td>
</tr>
<tr>
<td>2.5</td>
<td>HPLC chromatogram of tocopherols of Garden cress oil.</td>
<td>64</td>
</tr>
<tr>
<td>2.6</td>
<td>HPLC Phenolics profile A: Garden cress oil B. Standard Phenolics profile</td>
<td>66</td>
</tr>
<tr>
<td>2.7</td>
<td>DPPH Radical scavenging activity of GCO</td>
<td>68</td>
</tr>
<tr>
<td>2.8</td>
<td>Peroxide levels (PV) in GCO, MO and FLAX and antioxidant stripped oil at accelerated storage condition</td>
<td>70</td>
</tr>
<tr>
<td>2.9</td>
<td>P-anisidine levels (P-AV) in GCO, MO and Flaxseed oil antioxidant stripped oil at accelerated storage condition</td>
<td>71</td>
</tr>
<tr>
<td>2.10</td>
<td>Change in the Conjugated dienes levels (CD) in GCO, MO and FLAX and antioxidant stripped oil at accelerated storage condition</td>
<td>72</td>
</tr>
<tr>
<td>2.11</td>
<td>Change in the Conjugated trienes levels (CT) in GCO, MO and FLAX and antioxidant stripped oil at accelerated storage condition</td>
<td>72</td>
</tr>
</tbody>
</table>

## Chapter II: Section-B

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.13</td>
<td>HPLC chromatogram of GCO+RBO blended oil.</td>
<td>89</td>
</tr>
<tr>
<td>2.14</td>
<td>HPLC chromatogram of lignans (Sesamin and Sesamolin) profile of GCO+SESO blended oils</td>
<td>89</td>
</tr>
<tr>
<td>2.15</td>
<td>DPPH radical scavenging activity GCO and blended oils</td>
<td>91</td>
</tr>
<tr>
<td>2.16</td>
<td>Accelerated oxidative stability for GCO and its blended oil at 60°C</td>
<td>92</td>
</tr>
</tbody>
</table>

## Chapter III: Section-A

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Histopathology of rats fed GCO and its blended oil</td>
<td>109</td>
</tr>
</tbody>
</table>
### CHAPTER III: Section-B

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>Effect of GCO and its blended oil on Cholesterol LDL-C and HDL-C levels in serum</td>
<td>130</td>
</tr>
<tr>
<td>3.3</td>
<td>Effect of GCO and its blended oil on TAG and Phospholipids levels in serum</td>
<td>131</td>
</tr>
<tr>
<td>3.4</td>
<td>Liver lipid profile (mg/g)</td>
<td>132</td>
</tr>
<tr>
<td>3.5</td>
<td>Fatty acid synthase activity of liver (μmoles/mg of protein)</td>
<td>133</td>
</tr>
<tr>
<td>3.6</td>
<td>Peroxisomal acyl-CoA oxidase activity of liver</td>
<td>134</td>
</tr>
</tbody>
</table>

### Chapter III: Section-C

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7</td>
<td>DPPH radical scavenging activity (IC50 value) of oil</td>
<td>151</td>
</tr>
<tr>
<td>3.8</td>
<td>Effect of GCO and blended oils on GCO and its blended oils on serum lipid peroxides (nmoles of MDA/dL)</td>
<td>152</td>
</tr>
<tr>
<td>3.9</td>
<td>Effect of GCO and blended oil on liver lipid peroxides</td>
<td>153</td>
</tr>
<tr>
<td>3.10</td>
<td>Effect of GCO and blended oils on serum tocopherols</td>
<td>154</td>
</tr>
<tr>
<td>3.11</td>
<td>Effect of GCO and blended oils on liver tocopherols</td>
<td>154</td>
</tr>
<tr>
<td>3.12</td>
<td>Effect of GCO and its blended oil diet on liver glutathione (GSH) levels</td>
<td>156</td>
</tr>
<tr>
<td>3.13</td>
<td>Serum TXB₂ levels of rat fed GCO and its blended oils</td>
<td>159</td>
</tr>
<tr>
<td>3.14</td>
<td>Serum 6-keto PGF₁α levels of rat fed GCO and its blended oils</td>
<td>160</td>
</tr>
<tr>
<td>3.15</td>
<td>Effect of feeding of GCO, SFO and SFO+GCO on ADP induced platelet aggregation</td>
<td>161</td>
</tr>
<tr>
<td>3.16</td>
<td>Effect of feeding of RBO, SESO, SESO+GCO and SESO+GCO on ADP induced platelet aggregation</td>
<td>161</td>
</tr>
</tbody>
</table>

### CHAPTER IV: Section-A

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Structure of microcapsule</td>
<td>170</td>
</tr>
<tr>
<td>4.2</td>
<td>Microcapsule Structure showing 1) single core 2) multiple pore</td>
<td>170</td>
</tr>
<tr>
<td>4.3</td>
<td>Generalized process for production of spray-dried microencapsulated omega-3 oil powder with optional secondary coating.</td>
<td>174</td>
</tr>
<tr>
<td>4.4</td>
<td>Schematics of a fluid-bed coater. (a) Top spray; (b) bottom spray; (c) tangential spray</td>
<td>176</td>
</tr>
<tr>
<td>4.5</td>
<td>Schematic presentation of the Co-extrusion process</td>
<td>177</td>
</tr>
<tr>
<td>4.6</td>
<td>Schematic representation of a laboratory scale SFL process using liquid nitrogen as cryogen</td>
<td>179</td>
</tr>
<tr>
<td>4.7</td>
<td>Flow Diagram of Spray drying process</td>
<td>180</td>
</tr>
<tr>
<td>4.8</td>
<td>Chemical structure of the three main types of cyclodextrin</td>
<td>184</td>
</tr>
<tr>
<td>4.9</td>
<td>Microencapsulation by rapid expansion of expansion of supercritical solutions</td>
<td>185</td>
</tr>
<tr>
<td>4.10</td>
<td>Gelation and Particle Formation</td>
<td>189</td>
</tr>
<tr>
<td>4.11</td>
<td>Flow sheet of the microencapsulation process</td>
<td>191</td>
</tr>
<tr>
<td>4.12</td>
<td>Shape parameters (A) feret diameter   (B) martin radius</td>
<td>195</td>
</tr>
<tr>
<td>4.13</td>
<td>Total oil content of microencapsulated powder of GCO with different oil/wall material ratio</td>
<td>198</td>
</tr>
<tr>
<td>4.14</td>
<td>Particle size distribution of GCO microencapsulated powder of different wall material of 0.4 oil/wall material ratio</td>
<td>200</td>
</tr>
<tr>
<td>4.15</td>
<td>Particle size spray dried powder (0.4 oil/wall material ratio)</td>
<td>201</td>
</tr>
<tr>
<td>4.16</td>
<td>Scanning electron micrograph of spray dried powder (0.4</td>
<td></td>
</tr>
<tr>
<td>Table 4.17</td>
<td>Peroxide value of microencapsulated spray dried powder of 0.4 oil/wall material ratio stored at 60°C</td>
<td>202</td>
</tr>
<tr>
<td>Table 4.18</td>
<td>P-Anisidine value of microencapsulated spray dried powder of 0.4 oil/wall material ratio stored at 60°C.</td>
<td>203</td>
</tr>
<tr>
<td><strong>CHAPTER IV: Section-B</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.19</td>
<td>Photograph of biscuits supplemented with GCO and encapsulated GCO</td>
<td>222</td>
</tr>
<tr>
<td>4.20</td>
<td>Effect of RH on moisture content and lipid oxidation in biscuits supplemented with GCO and MGCO</td>
<td>224</td>
</tr>
<tr>
<td>4.21</td>
<td>Effect of relative humidity on ALA content of biscuits</td>
<td>225</td>
</tr>
<tr>
<td>4.22</td>
<td>Fatty acid profile of control biscuits stored at 65%RH/27°C (0 &amp; 150 days)</td>
<td>228</td>
</tr>
<tr>
<td>4.23</td>
<td>Fatty acid profile of GCO biscuits stored at 65%RH/27°C (0 &amp; 150 days)</td>
<td>229</td>
</tr>
<tr>
<td>4.24</td>
<td>Fatty acid profile of MGCO biscuits stored at 65%RH/27°C (0 &amp; 150 days)</td>
<td>229</td>
</tr>
</tbody>
</table>