## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.3</td>
<td>Enzymatic reaction of a lipase catalyzing hydrolysis or synthesis of a triacylglycerol substrate.</td>
<td>12</td>
</tr>
<tr>
<td>2.1.3.2</td>
<td>Detailed mechanism of hydrolysis of an ester bond by a lipase</td>
<td>17</td>
</tr>
<tr>
<td>2.1.3.4</td>
<td>Industrially important reactions catalyzed by a lipase</td>
<td>21</td>
</tr>
<tr>
<td>4.1.1:</td>
<td>Screening of thermostable Lipase producing microorganism</td>
<td>73</td>
</tr>
<tr>
<td>4.1.3.1:</td>
<td>Electron micrograph</td>
<td>75</td>
</tr>
<tr>
<td>4.1.3.2:</td>
<td><em>Bacillus</em> J33 - A on tributyrin agar plate</td>
<td>76</td>
</tr>
<tr>
<td>4.2.1</td>
<td>Growth Curve of <em>Bacillus</em> sp J 33-A in nutrient broth</td>
<td>78</td>
</tr>
<tr>
<td>4.2.2:</td>
<td>Temperature Stability of <em>Bacillus</em> J-33A Crude Lipase</td>
<td>79</td>
</tr>
<tr>
<td>4.2.3.1.2</td>
<td>Effect of Different Nitrogen Sources on Lipase Production by <em>Bacillus</em> sp J 33-A</td>
<td>82</td>
</tr>
<tr>
<td>4.2.3.1.3:</td>
<td>Effect of Carbon Sources on Lipase Production by <em>Bacillus</em> sp J 33-A</td>
<td>83</td>
</tr>
</tbody>
</table>
4.2.3.1.4: Effect of Oil Sources and Additives on Lipase Production by *Bacillus* sp J 33-A

4.2.3.1.5: Effect of Different Concentration of Starch on Lipase Production of *Bacillus* J 33-A

4.2.3.2.1 Growth and Lipase production of *Bacillus* sp J 33-A at different pH

4.2.3.2.2 Growth and Lipase production of *Bacillus* sp J 33-A at different temperature

4.2.3.2.3 Effect of Different Concentration of Inoculum on Lipase Production of *Bacillus* J 33-A

4.2.3.3: Effect of Different media on Lipase production of *Bacillus* J 33-A

4.2.3.3.3: Effect of Incubation time on lipase production using wheat bran and nutrient broth media

4.2.3.3.4: *Bacillus* J33 – A on wheat bran

4.2.3.3.5 Effect of Incubation time on the production of crude lipases by *Bacillus* J33 and *Bacillus* J33-A

4.2.3.3.6: Solid State Cultivation of Lipase of *Bacillus* J 33-A on wheat bran

4.3.1.2: Elution pattern of peak I & II Lipase by ethylene glycol on Phenyl - Sepharose CL-4B
4.3.1.3.A: Purification of Peak I lipase by Sepharose-6B Column Chromatography

4.3.1.3.B: Purification of Peak II lipase by Sepharose-6B Column Chromatography

4.3.1.4.A: Q-Sepharose column chromatography of peak I Lipase

4.3.1.4.B: Q-Sepharose column chromatography of peak II Lipase

4.3.2.1.A: SDS-PAGE analysis of peak I lipase

4.3.2.1.B: Determination of M. W. of peak I Lipase by SDS-PAGE

4.3.2.1.C: SDS-PAGE Analysis of peak II lipase

4.3.2.1.D: Determination of M. W. of peak II Lipase by SDS-PAGE

4.3.2.2: Non-Denaturing gel of peak I and II lipase.

4.3.2.3: Zymography of peak I and II lipase.

4.3.2.4: Esterase staining of peak I and II lipase.

4.4.1: Determination of M. W. of peak I & II Lipase by Sephadex G:200 column chromatography

4.4.2: pH Optima of Peak I and II Lipase of *Bacillus* J 33-A

4.4.3: pH Stability of Peak I and II Lipase of *Bacillus* J 33-A
4.4.4: Temperature Optima of Peak I and II Lipase of Bacillus J33-A

4.4.5: Temperature Stability of Peak I and II Lipase of Bacillus J33-A

4.4.6.A: Half Life of Peak I Lipase

4.4.6.B: Half Life of Peak II Lipase

4.4.7.A: Shelf Life of Peak I Lipase

4.4.7.B: Shelf Life of Peak II Lipase

4.4.8.A: Effect of substrate concentration on peak I Lipase

4.4.8.B: Effect of substrate concentration on peak II Lipase

4.4.15: Thin layer chromatography

4.5.1 Ouchterlony double immuno diffusion

4.5.2: Dot Blot

4.5.4: Western Blot