## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CERTIFICATES</td>
<td></td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td></td>
</tr>
</tbody>
</table>

### CHAPTER 1: INTRODUCTION............ 1-31

1.1: History and Principles of Photocatalysis.......................... 1
1.2: Advanced oxidation processes (AOPs) ......................... 5
1.3: BiOCl, the photocatalyst and selected dyes under investigation..... 13
1.4: Environmental impacts of present research work.................. 25
1.5: Kinetic studies of photocatalytic degradation of dyes............. 26

### CHAPTER 2: LITERATURE REVIEW ............. 32-54

### CHAPTER 3: METHODOLOGY............ 55-73

3.1: Synthesis and characterization of BiOCl .................... 56
3.2: Characterization techniques......................... 57
3.3: Equipment implementation & control conditions experiments......... 64
3.4: Methods for identification of mineralized product.......... 66

### CHAPTER 4: RESULTS AND DISCUSSION............ 74-211

4.1: Analysis and Characterization of BiOCl catalyst ............. 74
4.2: Effect of metal-ion doping on structural, photophysical and photocatalytic properties of BiOCl............. 77
4.3: Effects of various experimental parameters on the degradation rate of following
selected dyes:

4.3(A): Malachite Green (MG) .......... 86 - 111
4.3(B): Nile Blue (NB) ............ 112 - 136
4.3(C): Methylene Blue (MB) ...... 137 - 160
4.3(D): Methylene Green (MG) ...... 161 - 184
4.3(E): Neutral Red (NR)....... 185 - 211

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS........... 212 - 215

LIST OF PUBLICATIONS

CONFERENCES AND WORKSHOPS