

# **TABLE OF CONTENTS**

		<b>Page No</b>
<b>List of Figures</b>		<b>i-iv</b>
<b>List of Tables</b>		<b>v</b>
<b>Preface</b>		<b>vi-vii</b>
<b>CHAPTER 1</b>		<b>1-34</b>
<b>Introduction and Literature Review</b>		<b>1-34</b>
<b>1.1</b>	<b>Sensors</b>	<b>1</b>
<b>1.2</b>	<b>Features of Sensors</b>	<b>3-4</b>
<b>1.3</b>	<b>Generations of Electrochemical Biosensors</b>	<b>5-6</b>
<b>1.4</b>	<b>Classification of Sensors based on detection mode (Transducers)</b>	<b>7</b>
<b>1.4.1</b>	<b>Electrochemical sensor</b>	<b>8-13</b>
	<b>1.4.1.1</b> <i>Potentiometric Sensor</i>	
	<b>1.4.1.2</b> <i>Voltammetric Sensors</i>	
	<b>1.4.1.3</b> <i>Amperometric Sensors</i>	
	<b>1.4.1.4</b> <i>Impedimetric Sensors</i>	
<b>1.4.2</b>	<b>Optical Sensors</b>	<b>14</b>
<b>1.4.3</b>	<b>Florescence Sensors</b>	<b>14</b>
<b>1.4.4</b>	<b>Adsorption Sensors</b>	<b>15</b>
<b>1.4.5</b>	<b>Reflection Sensors</b>	<b>15</b>
<b>1.4.6</b>	<b>Mass sensitive Sensors</b>	<b>16</b>
<b>1.4.7</b>	<b>Surface Plasmon Resonance Sensors</b>	<b>16</b>

<b>1.4.8</b>	<b>Chemiluminiscence Sensors</b>	<b>16</b>
<b>1.4.9</b>	<b>Thermal sensors</b>	<b>16</b>
<b>1.4.10</b>	<b>Pressure sensors</b>	<b>16</b>
<b>1.5</b>	<b>Classification of Biosensor based on recognition layer</b>	<b>17-22</b>
	<i>1.5.1</i> Enzyme as recognition layer	
	<i>1.5.2</i> <i>Immunosensor</i>	
	<i>1.5.3</i> <i>Antibodies</i>	
	<i>1.5.4</i> <i>DNA Sensor</i>	
	<i>1.5.5</i> <i>Microbial Sensor</i>	
<b>1.6</b>	<b>Matrices and immobilization of molecules in biosensors</b>	<b>23-26</b>
<b>1.6.1</b>	<i>Physical Adsorption</i>	
<b>1.6.2</b>	<i>Chemical Adsorption</i>	
	<i>1.6.2.1</i> <i>Covalent bonding</i>	
	<i>1.6.2.2</i> <i>Crosslinking</i>	
	<i>1.6.2.3</i> <i>Self-Assembling Monolayers (SAMs)</i>	
	<i>1.6.2.4</i> <i>Co-Modification with Electrode Matrix</i>	
<b>1.7</b>	<b>Applications of Biosensors</b>	<b>27-29</b>
<b>1.8</b>	<b>Scope of work</b>	<b>30-33</b>
	<i>1.8.1</i> <i>Need of stable sensing platforms</i>	
	<i>1.8.2</i> <i>Need of ease in immobilization techniques</i>	
	<i>1.8.3</i> <i>Need of detection of food and water borne pathogens</i>	
	<i>1.8.4</i> <i>Need of low cost miniaturized sensor probes</i>	
<b>1.9</b>	<b>Objectives</b>	<b>34</b>

<b>CHAPTER 2</b>		
<b>Conducting polymers for sensing of <i>Listeria monocytogenes</i></b>		<b>35–53</b>
<b>2.1</b>	<b>Introduction</b>	<b>35-38</b>
<b>2.2</b>	<b>Experimental</b>	<b>39-44</b>
<b>2.3</b>	<b>Results and discussion</b>	<b>45-52</b>
<b>2.4</b>	<b>Conclusion</b>	<b>53</b>
<b>CHAPTER 3</b>		<b>54-70</b>
<b>Nanomaterials for sensing of <i>Listeria monocytogenes</i></b>		
<b>3.1</b>	<b>Introduction</b>	<b>54-56</b>
<b>3.2</b>	<b>Experimental</b>	<b>57-60</b>
<b>3.3</b>	<b>Results and Discussion</b>	<b>61-68</b>
<b>3.4</b>	<b>Conclusion</b>	<b>69-70</b>
<b>CHAPTER 4</b>		
<b>Nanomaterials based sensing of <i>Escherischia coli</i></b>		<b>71–90</b>
<b>4.1</b>	<b>Introduction</b>	<b>71-73</b>
<b>4.2</b>	<b>Experimental</b>	<b>7-81</b>
<b>4.3</b>	<b>Results and Discussion</b>	<b>82-89</b>
<b>4.4</b>	<b>Conclusion</b>	<b>90</b>
<b>CHAPTER 5</b>		
<b>Summary &amp; Future Scope</b>		<b>91-93</b>
<b>REFERENCES</b>		<b>94-109</b>