List of Tables

<table>
<thead>
<tr>
<th>Table No</th>
<th>Table Captions</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table- 2.1:</td>
<td>Different potent xenobiotic compounds (Bennet et al 2002)</td>
<td>21</td>
</tr>
<tr>
<td>Table 3.1:</td>
<td>Composition of Isolation Medium</td>
<td>29</td>
</tr>
<tr>
<td>Table 3.2:</td>
<td>Low Sugar-Water Medium for long term Storage</td>
<td>29</td>
</tr>
<tr>
<td>Table 3.3:</td>
<td>List of media used for screening lignolytic enzyme activity in LDFs</td>
<td>30</td>
</tr>
<tr>
<td>Table 3.4:</td>
<td>Different parameters studied in order to optimize the condition for activation of laccase in HNHC medium</td>
<td>32</td>
</tr>
<tr>
<td>Table 3.5:</td>
<td>Details of different dyes used in the study</td>
<td>33-34</td>
</tr>
<tr>
<td>Table- 4.1:</td>
<td>Month wise availability of different species of LDFs</td>
<td>42-43</td>
</tr>
<tr>
<td>Table 4.2:</td>
<td>Present-absent data of LDFs in three Forests</td>
<td>47</td>
</tr>
<tr>
<td>Table 4.3:</td>
<td>Total vs. present fungal families in different forests</td>
<td>49</td>
</tr>
<tr>
<td>Table 4.4:</td>
<td>Plot-wise data of different species of LDFs in Bethuadahari Wildlife Sanctuary</td>
<td>50-51</td>
</tr>
<tr>
<td>Table 4.5:</td>
<td>Frequency of different LDFs in Bethuadahari Wildlife Sanctuary</td>
<td>52</td>
</tr>
<tr>
<td>Table 4.6:</td>
<td>Diversity indices of different plots in Bethuadahari Wildlife Sanctuary</td>
<td>53</td>
</tr>
<tr>
<td>Table 4.7:</td>
<td>Plot wise data of different LDF species in Ranaghat Forest</td>
<td>55</td>
</tr>
<tr>
<td>Table 4.8:</td>
<td>Frequency percentage of different LDF species in Ranaghat Forest</td>
<td>56</td>
</tr>
<tr>
<td>Table 4.9:</td>
<td>Diversity Indices range of different plots in Ranaghat Forest</td>
<td>57</td>
</tr>
<tr>
<td>Table 4.10:</td>
<td>Plot wise data of different LDF species Zafarnagar Forest</td>
<td>58-59</td>
</tr>
<tr>
<td>Table 4.11:</td>
<td>Frequency percentage of different LDFs in Zafarnagar Forest</td>
<td>59</td>
</tr>
<tr>
<td>Table 4.12:</td>
<td>Diversity Indices in different plots of Zafarnagar Forest</td>
<td>60</td>
</tr>
<tr>
<td>Table 4.13:</td>
<td>Comparative frequency of different species in three forests</td>
<td>63</td>
</tr>
<tr>
<td>Table 4.14:</td>
<td>List of Fungal Isolates</td>
<td>64-65</td>
</tr>
<tr>
<td>Table 4.15:</td>
<td>Presence or absence of laccase activity of LDF isolates in different growth Media</td>
<td>84</td>
</tr>
<tr>
<td>Table 4.16:</td>
<td>Laccase activity of LDF isolates in different growth media after 14 days</td>
<td>85</td>
</tr>
<tr>
<td>Table 4.17:</td>
<td>Presence and absence of Manganese peroxidase Activity of LDF isolates in Different growth Media</td>
<td>86</td>
</tr>
<tr>
<td>Table 4.18:</td>
<td>Manganese peroxidase activity of LDF isolates in different growth media after 14 days</td>
<td>87</td>
</tr>
<tr>
<td>Table 4.19:</td>
<td>Grouping of LDF isolates on the basis of laccase activity at 14d in HNHC medium</td>
<td>88</td>
</tr>
<tr>
<td>Table 4.20:</td>
<td>Effect of temperature on laccase activity of <em>P. elegans</em></td>
<td>89</td>
</tr>
<tr>
<td>Table 4.21:</td>
<td>Effect of pH on laccase activity of <em>P. elegans</em> at 30°C</td>
<td>89</td>
</tr>
<tr>
<td>Table 4.22:</td>
<td>Effect of different concentrations of VA on laccase activity of <em>P. elegans</em> at 30°C and pH 6.5</td>
<td>89</td>
</tr>
<tr>
<td>Table 4.23:</td>
<td>Laccase activity of <em>S. commune</em> at different temperature</td>
<td>93</td>
</tr>
<tr>
<td>Table 4.24:</td>
<td>Laccase activity of <em>S. commune</em> at different pH at 30°C</td>
<td>93</td>
</tr>
<tr>
<td>Table 4.25:</td>
<td>Laccase activity of <em>S. commune</em> at different concentrations of VA at 30°C and pH 4.5</td>
<td>93</td>
</tr>
<tr>
<td>Table 4.26:</td>
<td>Laccase activity of <em>Schizophyllum</em> sp. at different temperature</td>
<td>96</td>
</tr>
<tr>
<td>Table 4.27:</td>
<td>Laccase activity of <em>Schizophyllum</em> sp. at different pH at 30°C</td>
<td>96</td>
</tr>
<tr>
<td>Table 4.28:</td>
<td>Laccase activity of <em>Schizophyllum</em> sp. at different concentrations of VA at 30°C and pH 5.5</td>
<td>96</td>
</tr>
<tr>
<td>Table 4.29:</td>
<td>Effect of different temperature on laccase of <em>H. lixii</em></td>
<td>98</td>
</tr>
<tr>
<td>Table 4.30:</td>
<td>Effect of different pH on laccase of <em>H. lixii</em> at 30°C</td>
<td>98</td>
</tr>
<tr>
<td>Table 4.31:</td>
<td>Effect of VA concentrations on laccase of <em>H. lixii</em> at 30°C and pH 4.5</td>
<td>98</td>
</tr>
<tr>
<td>Table 4.32:</td>
<td>Optimum conditions of laccase activity in different species</td>
<td>100</td>
</tr>
<tr>
<td>Table 4.33:</td>
<td>Decolourization percentage of different dyes (0.1%) at different days of incubation by <em>P. elegans</em></td>
<td>102</td>
</tr>
<tr>
<td>Table 4.34:</td>
<td>Decolourization percentage of different dyes at different days (0.25%) of incubation by <em>P. elegans</em></td>
<td>103</td>
</tr>
<tr>
<td>Table 4.35:</td>
<td>Decolourization percentage of different dyes at different days (0.5%) of incubation by <em>P. elegans</em></td>
<td>104</td>
</tr>
<tr>
<td>Table 4.36:</td>
<td>Decolourization percentage of different dyes at different days (0.1%) of incubation by <em>S. commune</em></td>
<td>106</td>
</tr>
<tr>
<td>Table 4.37:</td>
<td>Decolourization percentage of different dyes at different days (0.25%) of incubation by <em>S. commune</em></td>
<td>107</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>4.38</td>
<td>Decolourization percentage of different dyes at different days (0.5%) of incubation by <em>S. commune</em></td>
<td>108</td>
</tr>
<tr>
<td>4.39</td>
<td>Decolourization percentage of different dyes at different days (0.1%) of incubation by <em>Schizophyllum</em> <em>sp</em></td>
<td>110</td>
</tr>
<tr>
<td>4.40</td>
<td>Decolourization percentage of different dyes at different days (0.25%) of incubation by <em>Schizophyllum</em> <em>sp</em></td>
<td>111</td>
</tr>
<tr>
<td>4.41</td>
<td>Decolourization percentage of different dyes at different days (0.5%) of incubation by <em>Schizophyllum</em> <em>sp</em></td>
<td>112</td>
</tr>
<tr>
<td>4.42</td>
<td>Decolourization percentage of different dyes at different days (0.1%) of incubation by <em>H. lixii</em></td>
<td>114</td>
</tr>
<tr>
<td>4.43</td>
<td>Decolourization percentage of different dyes at different days (0.25%) of incubation by <em>H. lixii</em></td>
<td>115</td>
</tr>
<tr>
<td>4.44</td>
<td>Decolourization percentage of different dyes at different days (0.5%) of incubation by <em>H. lixii</em></td>
<td>116</td>
</tr>
<tr>
<td>4.45</td>
<td>Selected reference sequences in <em>P. elegans</em></td>
<td>122-123</td>
</tr>
<tr>
<td>4.46</td>
<td>Selected reference sequences in <em>S. commune</em></td>
<td>126-128</td>
</tr>
<tr>
<td>4.47</td>
<td>Reference Sequences Selected for <em>Schizophyllum</em> <em>sp</em></td>
<td>131-132</td>
</tr>
<tr>
<td>4.48</td>
<td>NCBI blast result showing first 10 matches with <em>Hypocrea</em> isolate sequence.</td>
<td>135-136</td>
</tr>
<tr>
<td>Figure No</td>
<td>Figure Captions</td>
<td>Page</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Fig 2.1:</td>
<td>Model of soil humic acid (adapted from Stevenson 1994).</td>
<td>10</td>
</tr>
<tr>
<td>Fig 3.1:</td>
<td>Location of the three Forest areas on Nadia District, West Bengal.</td>
<td>25</td>
</tr>
<tr>
<td>Fig 3.2:</td>
<td>Annotation sheet for description of Basidiomycetes (after Lodge et al 2004).</td>
<td>27</td>
</tr>
<tr>
<td>Fig 3.3:</td>
<td>Molecular structure of high molecular weight dyes used in the study.</td>
<td>35-36</td>
</tr>
<tr>
<td>Fig 4.1:</td>
<td>Some of the pictures of forest areas and collection of fungal flora.</td>
<td>44</td>
</tr>
<tr>
<td>Fig 4.2:</td>
<td>Number of LDFs recorded during different months of study (May-October 2014).</td>
<td>45</td>
</tr>
<tr>
<td>Fig 4.3:</td>
<td>Number of LDF species belonging to different families.</td>
<td>49</td>
</tr>
<tr>
<td>Fig 4.4:</td>
<td>Taxa S and Individuals index value range in different plots of Bethuadahari Wildlife Sanctuary.</td>
<td>54</td>
</tr>
<tr>
<td>Fig 4.5:</td>
<td>Shannon and Brillouin index value range in different plots of Bethuadahari Wildlife Sanctuary.</td>
<td>54</td>
</tr>
<tr>
<td>Fig 4.6:</td>
<td>Taxa S and Individuals index value range in different plots of Ranaghat Forest.</td>
<td>57</td>
</tr>
<tr>
<td>Fig 4.7:</td>
<td>Taxa S and Individuals index value range in different plots of Ranaghat Forest.</td>
<td>58</td>
</tr>
<tr>
<td>Fig 4.8:</td>
<td>Taxa S and Individuals value range in different plots of Zafarnagar Forest.</td>
<td>60</td>
</tr>
<tr>
<td>Fig 4.9:</td>
<td>Shannon and Brillouin indices range in plots of Zafarnagar Forest.</td>
<td>61</td>
</tr>
<tr>
<td>Fig 4.10:</td>
<td>Mean Shannon and Brillouin values of three Forests.</td>
<td>61</td>
</tr>
<tr>
<td>Fig 4.11:</td>
<td>Some of the fungal culture isolates.</td>
<td>65</td>
</tr>
<tr>
<td>Fig 4.12:</td>
<td>Different species of <em>Agaricus</em>- <em>A. sylvaticus</em> (a); <em>A. campestris</em> (b); <em>A. bernardii</em> (c); <em>A. semotus</em> (d) and <em>Agaricus</em> sp-1 (e).</td>
<td>79</td>
</tr>
<tr>
<td>Fig 4.13:</td>
<td>Different LDFs- <em>Macrolepiota mastoidea</em> (a); <em>Lepiota</em> spp. (b &amp; c); <em>Marasmius siccus</em> (d); <em>Volvariella taylori</em> (e) and <em>Coprinus comatus</em> (f).</td>
<td>80</td>
</tr>
<tr>
<td>Fig 4.14:</td>
<td>Different LDFs- <em>Hypholoma caponoides</em> (a); <em>Laccaria lacata</em> (b &amp; c); <em>Lentinus tigrinus</em> (d); <em>Mycena maculate</em> (e) and <em>Podoscypha elegans</em> (f).</td>
<td>81</td>
</tr>
<tr>
<td>Fig 4.15:</td>
<td>Different LDFs- <em>Geastrum triplex</em> (a); Mycelia mat of <em>Schizophyllum commune</em> (b); <em>S. commune</em> like fungi in woody litter (c); Mycelia mat of <em>Schizophyllum</em> sp. (d); <em>Hypocrea lixii</em> on litter (e) and wood (f).</td>
<td>82</td>
</tr>
<tr>
<td>Fig 4.16:</td>
<td>Spore Prints of some LDFs.</td>
<td>83</td>
</tr>
<tr>
<td>Fig 4.17:</td>
<td>Spores of some LDFs.</td>
<td>83</td>
</tr>
<tr>
<td>Fig 4.18:</td>
<td>Effect of temperature on laccase activity of <em>P. elegans</em>.</td>
<td>91</td>
</tr>
<tr>
<td>Fig 4.19:</td>
<td>Effect of pH on laccase activity of <em>P. elegans</em> at 30°C.</td>
<td>91</td>
</tr>
<tr>
<td>Fig 4.20:</td>
<td>Effect of different concentrations of VA on laccase activity of <em>P. elegans</em> at 30°C and pH 6.5.</td>
<td>92</td>
</tr>
<tr>
<td>Fig 4.21:</td>
<td>Effect of different temperature on laccase of <em>S. commune</em>.</td>
<td>94</td>
</tr>
<tr>
<td>Fig 4.22:</td>
<td>Laccase activity of <em>S. commune</em> at different pH at 30°C.</td>
<td>94</td>
</tr>
<tr>
<td>Fig 4.23:</td>
<td>Effect of different concentrations of VA on laccase of <em>S. commune</em> at 30°C and pH 4.5.</td>
<td>95</td>
</tr>
<tr>
<td>Fig 4.24:</td>
<td>Effect of different temperature on laccase of <em>Schizophyllum</em> sp.</td>
<td>96</td>
</tr>
<tr>
<td>Fig 4.25:</td>
<td>Laccase activity of <em>Schizophyllum</em> sp. at different pH at 30°C.</td>
<td>97</td>
</tr>
<tr>
<td>Fig 4.26:</td>
<td>Laccase activity of <em>Schizophyllum</em> sp. at different concentrations of VA at 30°C and pH 5.5.</td>
<td>97</td>
</tr>
<tr>
<td>Fig 4.27:</td>
<td>Effect of different temperature on laccase of <em>H. lixii</em>.</td>
<td>99</td>
</tr>
<tr>
<td>Fig 4.28:</td>
<td>Effect of different pH on laccase of <em>H. lixii</em> at 30°C.</td>
<td>99</td>
</tr>
<tr>
<td>Fig 4.29:</td>
<td>Effect of VA concentrations on laccase of <em>H. lixii</em> at 30°C and pH 4.5.</td>
<td>100</td>
</tr>
<tr>
<td>Fig 4.30:</td>
<td>Decolourization of 0.1% dye by <em>P. elegans</em> at different days and mean decolourization.</td>
<td>102</td>
</tr>
<tr>
<td>Fig 4.31:</td>
<td>Decolourization of 0.25% dye by <em>P. elegans</em> at different days and mean decolourization.</td>
<td>103</td>
</tr>
<tr>
<td>Fig 4.32:</td>
<td>Decolourization of 0.5% dye by <em>P. elegans</em> at different days and mean decolourization.</td>
<td>104</td>
</tr>
<tr>
<td>Fig 4.33:</td>
<td>Decolourization of 0.1% dye by <em>S. commune</em> at different days and mean decolourization.</td>
<td>106</td>
</tr>
<tr>
<td>Fig 4.34:</td>
<td>Decolourization of 0.25% dye by <em>S. commune</em> at different days and mean decolourization.</td>
<td>107</td>
</tr>
<tr>
<td>Fig 4.35:</td>
<td>Decolourization of 0.5% dye by <em>S. commune</em> at different days and mean decolourization.</td>
<td>108</td>
</tr>
<tr>
<td>Fig 4.36:</td>
<td>Decolourization of 0.1% dye by <em>Schizophyllum</em> sp. at different days and mean decolourization.</td>
<td>110</td>
</tr>
<tr>
<td>Fig 4.37:</td>
<td>Decolourization of 0.25% dye by <em>Schizophyllum</em> sp. at different days and mean decolourization.</td>
<td>111</td>
</tr>
<tr>
<td>Fig 4.38:</td>
<td>Decolourization of 0.5% dye by <em>Schizophyllum</em> sp. at different days and mean decolourization.</td>
<td>112</td>
</tr>
<tr>
<td>Fig 4.39:</td>
<td>Decolourization of 0.1% dye by <em>H. lixii</em> at different days and mean decolourization.</td>
<td>114</td>
</tr>
<tr>
<td>Fig 4.40:</td>
<td>Decolourization of 0.25% dye by <em>H. lixii</em> at different days and mean decolourization.</td>
<td>115</td>
</tr>
<tr>
<td>Fig 4.41:</td>
<td>Decolourization of 0.5% dye by <em>H. lixii</em> at different days and mean decolourization.</td>
<td>116</td>
</tr>
<tr>
<td>Fig 4.42:</td>
<td>Decolourization of different dyes.</td>
<td>117</td>
</tr>
<tr>
<td>Fig 4.43:</td>
<td>The chromatogram of forward (1F) sequencing reactions in <em>P. elegans</em>.</td>
<td>120</td>
</tr>
<tr>
<td>Fig 4.44:</td>
<td>The chromatogram of reverse (4R) sequencing reactions in <em>P. elegans</em>.</td>
<td>121</td>
</tr>
<tr>
<td>Fig 4.45:</td>
<td>Phylogenetic Tree of <em>P. elegans</em>.</td>
<td>124</td>
</tr>
<tr>
<td>Fig 4.46:</td>
<td>Phylogenetic Tree of <em>S. commune</em>.</td>
<td>129</td>
</tr>
<tr>
<td>Fig 4.47:</td>
<td>Phylogenetic Tree of <em>Schizophyllum</em> sp.</td>
<td>133</td>
</tr>
</tbody>
</table>