

REFERENCES

1. Allen, B. R., Charles, M. and Coughlin R. W. Improvement in stability of an enzyme reactor for the hydrolysis of cornstarch to glucose. **Biotechnol. Bioeng.** 1979, **21**, 689 – 706
2. Aken, B. V., Ledent, P., Naveau, H. and Agathos, S. N. Co-immobilization of manganese peroxidase from *Phlebia radiata* and glucose oxidase from *Aspergillus niger* on porous silica beads. **Biotechnol. Letts.** 2000, **22**, 641-646
3. Baker, E. L., Landrigan, P. L., Field, P.H., Basteys, B. J., Bertozzi, P. E. and Skinner, G. Phenol poisoning due to contaminated drinking water. **Arch. Environm. Health.** 1978, **33**, 89 - 94.
4. Brenna, O. and Bianchi, E. Immobilised laccase for phenolic removal in must and wine. **Biotechnol. Letts.** 1994, **16**, 35 - 40
5. Buswell, J. A. Fungal degradation of lignin, in **Handbook of Applied Mycology. Vol. I, Soil and plants**, (Arora, A. K., Rai B., Mukerji, G. and Knudsen, G., eds) New York Marcel Dekker. 1991, 425 – 480
6. Birnbaum, S., Larsson, P. -O. and Mosbach, K. In **Solid-Phase Biochemistry**, (Scouten, W. H. ed.) J. Wiley & Sons. New York. 1983, pp. 679 - 762.
7. Bucke, C. Immobilized enzymes and cells, Pt. B', in **Methods in Enzymology**, 1987, **135**. (Mosbach, K. ed) Academic Press, Orlando. pp 175 – 189
8. Cabral, J. M. S., Cardoso, J. P., Novais, J. M. Influence of coupling conditions on activity and operational stability of glucoamylase immobilized on titanium (iv) – activated controlled pore glass. **Enzyme Microbiol. Technol.** 1981, **3**, 41 - 46

9. Carleysmith, S. W., Dunnill, P. and Lilly, M. D. Kinetic behavior of immobilized penicillin acylase. **Biotechnol. Bioeng.** 1980, **22**, 735 - 756
10. Cerniglia, C. Biodegradation of polycyclic aromatic hydrocarbons. **Curr. Opin. Biotechnol.** 1993, **4**, 331 - 338
11. Cheetham, P. S. J. Principles of industrial enzymology: basic utilization of soluble and immobilized enzymes in industrial processes, in **Handbook of Enzyme Biotechnology**, (Wiseman, A., ed) Ellis Horwood Limited, Chichester, 1985, pp. 54 - 146
12. Chefetz, B., Chen, Y. and Hadar, Y. Purification and characterization of laccase from *Chaetomium thermophilum* and its role in humification. **Appl. Environ. Microbiol.** 1998, **64**, 3175 - 3179
13. Chellapandian, M. and Sastry, C. A. Immobilization of alkaline protease on vermiculite. **Bioprocessing Bioeng.** 1994, **8**, 33 - 38
14. Chivukula, M. and Renganathan, V. Phenolic azo dye oxidation by laccase from *Pyricularia oryzae*. **Appl. Environ. Microbiol.** 1995, **61**, 4374 - 4377
15. Cheung, D. S. M. and Marshal, K. C. Antigenic and some kinetic properties of three p-diphenoloxidase isoenzymes of *Trametes versicolor*. **Biochim. Biophys. Acta.** 1969, **178**, 177 - 180
16. Clutterback, A. J. Absence of laccase from yellow-spored mutants of *Aspergillus nidulans*. **J. Gen. Microbiol.** 1972, **70**, 423 - 435
17. Clutterback, A. J. The genetics of conidiophore pigmentation in *Aspergillus nidulans*. **J. Gen. Microbiol.** 1990, **136**, 1731 - 1738

18. Collins, P. J. and Dobson, A. D. W. Regulation of laccase gene transcription in *Trametes versicolor*. **Appl. Environ. Microbiol.** 1997, **63**, 3444 - 3450
19. Collins, P. J., Kotterman, M. J. J., Field, J. A. and Dobson, A. D. W. Oxidation of anthracene and benzo[a]pyrene by laccase from *Trametes versicolor*. **Appl. Environ. Microbiol.** 1996, **62**, 4563 - 4567
20. Cotrell, I. W. and Kovacs, P. **Handbook of Water Soluble Gums and Resins**, (Ed.) Davidson, R. L. MacGraw - Hill, New York, 1980, chapter 2
21. Cripps, C., Bumpus, J. A. and Aust. S. D. Biodegradation of azo and heterocyclic dyes by *Phanerochaete chrysosporium*. **Appl. Environ. Microbiol.** 1990, **56**, 1113 - 1118
22. Cuatrecasas, P. and Arfinsen, C. B. Affinity chromatography. **Ann. Rev. Biochem.** 1971, **40**, 259 - 278
23. Davis, S. and Burns, R. G. Decolorization of phenolic effluents by soluble and immobilized phenol oxidases. **Appl. Microbiol. Biotechnol.** 1990, **32**, 721 - 726
24. Davis, S. and Burns, R. G. Covalent immobilisation of laccase on activated carbon for phenolic effluent treatment. **Appl. Microbiol. Biotechnol.** 1992, **37**, 474 - 479
25. Dedeyan, B., Klonowska, A., Tagger, S., Tron, T., Iacazio, G., Gil, G., and Petit, J. L. Biochemical and molecular characterization of a laccase from *Marasmius quercophilus*. **Appl. Environ. Microbiol.** 2000, **66**, 925 - 929
26. De Vries, O. M. H., Kooistra, W. H. C. F. and Wessels, G. H. Formation of an extracellular laccase by *schizophyllum commune* dikaryon. **J. Gen. Microbiol.** 1986, **132**: 2817 - 2836,

27. Ditter, J. K., Patel, N. J., Dhawale, S. W. and Dhawale, S. S. Production of multiple laccase isoforms by *Phanerochaete chrysosporium* grown under nutrient sufficiency. **FEMS Microbiol Lett.** 1997, **149**, 65 - 70
28. Dubernet, M., Ribereau-G. P., Lerner, H. R., Harel E. and Mayer, A. M. Purification and properties of laccase from *Botrytis cinerea*. **Phytochemistry.** 1977, **16**, 191 - 193
29. EPA (US Environmental Protection Agency) Best management practices for pollution prevention in the textile industry. EPA, office of research and development. U.S. EPA/625/R-96/004.
30. Erarslan, A. and Guiray, A. Kinetic investigation of penicillin G acylase from a mutant strain of *Escherichia coli* ATCC 11105 immobilized on oxirane - acrylic beads. **J. Chem. Tech. Biotechnol.** 1991, **51**, 181 - 195.
31. Fahraeus, G. and Ljunggren, H. Substrate specificity of a purified fungal laccase. **Biochim. Biophys. Acta .** 1961, **46**, 22 - 32
32. Fahraeus, G. and Reinhammar, B. Large scale production and purification of laccase from cultures of the fungus *Polyporus versicolor* and some properties of laccase A. **Acta. Chem. Scand.** 1967, **21**, 2367 - 2372
33. Froehner, S. C. and Eriksson, K. E. Purification and properties of a *Neurospora crassa* laccase. **J. Bacteriol.** 1974, **120**, 458 - 465
34. Froehner, S. C. and Eriksson, K. -E. Properties of the glycoprotein laccase immobilized by two methods. **Acta. Chem. Scand.** 1975, **29**, 691 - 694

35. Galliano, H., Gas, Seris, J. L. and Boudet, A. M. Lignin degradation by *Rigidoporous lignosus* involves synergistic action of two oxidizing enzymes: Mn peroxidase and laccase. **Enzyme Microb. Technol.** 1991, **3**, 478 – 482
36. Garzillo, A. M. V., Colao, M. C., Caruso, C., Caporale, C., Celletti, D. and Buonocore, V. Laccase from the white – rot fungus *Trametes trogii*. **Appl. Microbiol. Biotechnol.** 1998, **49**, 545 -551
37. Gerhartz, W. Enzyme in industry, VCH, Weinheim, New York. 1990
38. Germann, U. A., Miiller, G., Hunizker, P. E. and Lerch, K. K. Characterization of two allelic forms of *Neurospora crassa* laccase. **J. Biol. Chem.** 1988, **263**, 885 – 896
39. Ghindilis, A. L., Gavrilova, V. P. and Yaropolov, A. I. Laccase based biosensor for determination of polyphenols : Determination of catechols in tea. **Biosensors and Bioelectronics.** 1992, **7**, 127 – 131
40. Goldstein, L. A new polymine carrier for immobilization of proteins of water insoluble derivatives of pepsin and trypsin. **Biochim. Biophys. Acta.** 1973, **327**, 132 – 137
41. Goosen, F. A., Geraldine, M. O' Shea, Matheus, F. A. and Sun, M. Prolonged survival of transplanted islets of langerhans encapsulated in a biocompatible membrane. **Biochim. Biophys. Acta.** 1984, **804**, 133 - 136
42. Harkin, J. M. and Obst, J. R. Syringaldazine an effective reagent for detecting laccase and peroxidase in fungi. **Experientia.** 1973, **29**, 381 – 386
43. Hartmeier, W. **Immobilized Biocatalysts.** Berlin : Springer – Verlag. 1988

44. Holwerda, R. A., Wherland, S. and Gray, H. B. Electron transfer reactions of copper proteins. **Annu. Rev. Biophys. Bioeng.** 1976, **5**, 363 – 396
45. Hulst, A. C. and Tramper, J. Immobilized plant cells: a literature survey. **Enzyme Microb. Technol.** 1989, **11**, 546 – 558
46. Hutzinger, O. The handbook of environmental chemistry. Springer – Verlag. Berlin, Heidelberg. **3**, 188
47. Ivan, Veliky, A. and Robert, Mclean, J. C. **Immobilized Biosystems**. Theory and Practical Applications. 1994, 32 – 45
48. Iwasaki, H., Matsubara, T. and Mori, T. A fungal laccase, its properties and reconstitution from its protein and copper. **J. Biochem.** 1967, **61**, 814 - 818
49. Jackson, M. L. Cation exchange determinations for soils, in **Soil and Chemical analysis**, Prentice Hall of India, Put. Ltd., New Delhi. 1967, 57 – 67
50. Joel, D. M., Marbach, I. and Mayer, A. M. Laccase in Anacardiaceae. **Phytochemistry.** 1978, **17**, 796 - 797
51. Jonsson, M., Petterson, E. and Reinhammar, B. The Isoelectric spectra of fungal laccase A and B. **Acta. Chem. Scand.** 1968, **22**, 2135 – 2140
52. Karhunen, E., Niku-Paavola, M. L., Viikari, L., Haltia, T., Vander-Meer, R. A. and Duine, J. A. A novel combination of prosthetic groups in a fungal laccase ; PQQ and two copper atoms. **FEBS Lett.** 1990, **267**, 31 – 36
53. Kennedy, J. F., Pike, V. W. Water insoluble papain conjugates of titanium (iv) – activated supports. **Enzyme Microb. Technol.** 1979, **1**, 31 – 36

54. Kennedy, J. F., Pike, V. W. Significant abilities of titanium (IV) – activated glass fibre paper and its papain conjugates to chill – proof beer. **Enzyme Microb. Technol.** 1980, **2**, 288 - 294
55. Kirk T. K., Kelman, A. Lignin degradation is related to the phenoloxidases of selected wood decaying basidiomycetes. **Phytopathology**, 1965, **55**, 735 – 745
56. Kirk, T. K. and Shimada, M. Lignin biodegradation: The microorganisms involved and physiology and biochemistry of degradation by white-rot fungi, in **Biosynthesis and Biodegradation of Wood Components**, (Higuchi, T., ed.) Academic Press, Orlando, 1985, pp. 579 – 605
57. Kirk, T. K. and Farrell, R. L. Enzymatic “combustion”: the microbial degradation of lignin. **Annu. Rev. Microbial.** 1987, **41**, 465 – 505
58. Klei, H. E., Sundstrom, D. W. and Gargano. Immobilization of glucose oxidase on macro reticular ion exchange resins. **Biotechnol. Bioeng.** 1978, **20**, 611 – 617
59. Kobayashi, T., Miyama, H., Kawata, S., Nosaka, Y. and Fuji, N. Immobilization of enzymes on electrostatic medium of positively charged dimethylamino nylon gel. **J. Appl. Polym. Sci.** 1992, **46**, 2183- 2188
60. Kojima, Y., Isukuda, Y., Kawai, Y., Tsukamoto, A., Sugiura, J., Sakaino, M. and Kita, Y. Cloning sequence analysis and expression of ligninolytic phenoloxidase genes of the white-rot basidiomycete *Coriolus hirsutus*. **J. Biol. Chem.** 1990, **265**, 15224 – 15230
61. Lanouette, K. H. Treatment of phenolic wastes. **Chem. Eng.** 1977, **88** (22), 99 - 106.

62. Lehman, E., Harel, E. and Mayer, A. M. Copper content and other characteristics of purified peach laccase. **Phytochemistry**. 1974, **13**, 1713 - 1717.
63. Leatham, G. F. and Stahmann, M. A. Studies on the laccase of *Lentimus edodes*: specificity, localization and association with the development of fruiting bodies. **J. Gen. Microbiol.** 1981, **125**, 147 - 157
64. Leonowicz, A. and Grzywnowicz, K. Quantitative estimation of laccase forms in some white-rot fungi using syringaldazine as a substrate. **Enzyme Microb. Technol.** 1981, **3**, 55 - 58
65. Leonowicz, A., Sarkar, J. M. and Bollag, J-M. Improvement in stability of an immobilized fungal laccase. **Appl. Microbiol. Biotechnol.** 1988, **29**, 129 - 135.
66. Maeda, H., Tsaro, G. T. and Chen, L. F. Glucoamylase immobilized on diethylaminoethyl-cellulose beads in column reaction. **J. Ferment. Technol.** 1979, **57**, 238 - 242
67. Malmstrom, B. G., Reinhammar, B. and Vaungard, T. The state of copper in stellacyanin and laccase from the lacquer tree *Rhus vernicifera*. **Biochim. Biophys. Acta.** 1970, **205**, 48 - 57
68. Malovik, V., Yaropolov, A. I. and Varfolomeev, S. D. Oxidation of lignins and their components by oxygen in the presence of laccase from *Polyporus versicolor*: Lignin detection by enzyme electrode. **Collection Czechoslovac Chem. Column.** 1984, **49**, 1390 - 1394
69. Mayer, A. M., Marbach, I., Marbach, A. and Sharon, A. Amino acid composition and molecular weight of *Botrytis cinerea* laccase. **Phytochemistry**, 1977, **16**, 1051 - 1052

70. McLaren, A. D. The adsorption and reactions of enzymes and proteins on kaolinite. **J. Phys. Chem.** 1954, **58**, 129 - 131
71. Messing, R. A. and Weetall H. H. Relationship of pore size and surface area to quantity of stabilized enzyme bound to glass. **Enzymologia**, 1970, **39**, 12 - 14
72. Milstein, O., Nicklas, B. and Hutlerman, A. Oxidation of aromatic compounds in organic solvents with laccase from *Trametes versicolor*. **Appl. Microbiol. Biotechnol.** 1989, **31**, 70 - 74
73. Miyama, H., Kawata, M. and Nosaka, Y. Immobilization of enzyme on dimethylaminated nylon gels. **Biotechnol. Bioeng.** 1985, **27**, 1403 - 1410
74. Molitoris, H. P., Van Breeman, J. F. L., Van Bruggen, E. F. J. and Esser, K. The phenoloxidase of the ascomycete *Podospora anserina* X. Elecfrib. Microscopic studies on the structure of laccases I, II and III. **Biochim Biophys. Acta.** 1972, **271**, 286 - 291
75. Molitoris, H. P. and Esser, K. The phenoloxidases of the ascomycete *Podospora anserina* V. Properties of laccase I after further purification. **Arch. Microbiol.** 1970, **72**, 267 - 297
76. Mosbach, K. Enzymes bound to artificial matrixes. **Scientific American**, 1971, **224**, (3), 26 - 33
77. Mosbach, K. (Ed.) **Methods in Enzymology** vol. 135, Academic Press, New York.
78. Nakamura, T and Ogura, Y. In the **Biochemistry of copper** (Peisach, J., Aisen, P. and Blumberg, W. E. Eds.), Academic Press, New York. 1966, pp. 389 - 405

79. Nemat, G. and Karimian, M. K. Use of hexadecyl fractosil as a hydrophobic carrier for adsorptive immobilization of proteins. **Biotechnol. Bioeng.** 1986, **28**, 1037 -1043
80. Neujahr, H. Y. Enzyme probe for catechol. **Biotechnol Bioeng.** 1980, **22**, 913 - 918.
81. Omura, T. Studies on laccases of lacquer trees. Comparison of laccases obtained from *Rhus vernicifera* and *Rhus succedanea*. **J. Biochem.** 1961, **50**, 264 - 268
82. Palmieri, G., Giardina, P., Desiderio, B., Marzullo, L., Giamberini, M. and Sannia, G. A new enzyme immobilization procedure using copper alginate gel: Application to a fungal phenol oxidase. **Enzyme Microb. Technol.** 1994, **16**, 151 - 158
83. Palmieri, G., Giardina, P., Bianco, C., Fontanella, B. and Sannia, G. Copper induction of laccase isoenzymes in the ligninolytic fungus *Pleurotus ostreatus*. **Appl. Environ. Microbiol.** 2000, **66**, 920 - 924.
84. Paul, S. A. and Uyeda, K., Functional groups on enzymes suitable for binding to matrices. **Methods in Enzymology. XLIV.** 1976, Immobilized Enzymes.
85. Pickard, M. A., Roman, R., Tinoco, R. and Duhalt-V. R. Polycyclic aromatic hydrocarbon metabolism by white rot fungi and oxidation by *Corioloopsis gallica* UAMH 8260 laccase. **Appl. Environ. Microbiol.** 1999, **65**, 3805 - 3809
86. Puvanakrishnan, R. and Bose, S. M. Studies on immobilization of trypsin on sand. **Biotechnol. Bioeng.** 1980, **22**, 919 - 928

87. Puvanakrishnan, R. and Bose, S. M. Immobilization of pepsin on sand: Preparation, characterization and application. **Indian Journal of Biochem. Biophys.** 1984, **21**, 323 – 326
88. Quijoch, F. A. and Richards, F. M. Intermolecular cross linking of a protein in the crystalline state: Carboxypeptidase – A. **Proc. Nat. Acad. Sci. USA**, 1964, **52**, 833 - 839
89. Rama, R., Mougin, C., Boyer, F-D., Kollmann, A., Malosse, C. and Sigoillot, J-C. Biotransformation of benzo[a]pyrene in bench scale using laccase of *Pycnoporus cinnabarinus*. **Biotechnol. Letts.** 1998, **20**, 1101 - 1104
90. Rehm, H. J. and Reed, G. **Biotechnology.** (Kennedy, J. F. ed.), 1987, 7A VCH
91. Reinhammar, B. Purification and properties of laccase and stellacyanin from *Rhus vernicifera*. **Biochim. Biophys. Acta.** 1970, **205**, 35 - 47
92. Reinhammar, B. Laccase, in **Copper proteins and copper enzymes**, (L. Lontie, ed.) 1984, **3**, CRC Press Inc. Boca Raton, Fla
93. Reyes, P., Pickard, M. A. and Duhalt, R. V. Hydroxybenzotriazole increases the range of textiles dyes decolorized by immobilized laccase. **Biotechnol. Letts.** 1999, **21**, 875 – 880
94. Ruiz, A. I., Malave, A. J., Felby, C. and Griebenow, K. Improved activity and stability of an immobilized recombinant laccase in organic solvents. **Biotechnol. Letts.** 2000, **22**, 229-233
95. Saloheimo, M., Niku-Paavola, M. L. and Knowles, J. K. C. Isolation and structural analysis of the laccase gene from the lignin-degrading fungus *Phlebia radiata*. **J. Gen. Microbial.** 1991, **137**, 1537 – 1544

96. Schliephake, K. and Lonegran, G. T. Laccase variation during dye decolourisation in a 200 litres packed bed bioreactor. **Biotechnol. Lett.** 1996, **18**, 881- 886
97. Sefton, M. V. and Broughton, R. L. Microencapsulation of erythrocytes **Biochim. Biophys. Acta.** 1982, **717**, 473 – 477
98. Sjoblad, R. D. and Bollag, J. M. Oxidative coupling of aromatic compounds by enzymes from soil microorganisms, in **Soil Biochemistry**. **5.** (Paul, E.A. and Ladd, J. V.) Dekker, New York. pp. 113 – 152.
100. Slomezynski, D., Nakas, J. P. and Tanenbaum, S. W. Production and characterization of laccase from *Botrytis cinerea*. **Appl. Environ. Microbiol.** 1995, **61**, 907 - 912
101. Sugiura, J. M., Sakaino, Y., Kojima, K., Tsujioka, Y., Mutoh, Y., Shinohara and Koide, K. Purification and properties of phenoloxidases produced by white-rot fungi and molecular cloning of phenol oxidase genes. In **International Seminar on Lignin Enzymic and Microbial Degradation**. 1987, pp. 317-320 International Symposium on Wood and Pulping Chemistry, Paris, INRA Publications, Versailles, France.
102. Tarafdar, J. C. and Chhonkar, P. K., Urease clay interactions: I – Adsorption of urease on clays saturated with different cations. **J. Indian Soc. Soil. Sci.** 1982, **30**, 27 –32
103. Tanaka, H., Matsumura, M. and Veliky, I. A. Diffusion characteristics of substrates in Ca-alginate gel beads. **Biotechnol. Bioeng.** 1984, **26**, 53 – 38.

104. Thurston, C. F. The structure and function of fungal laccases. **Microbiol.** 1994, **140**, 19 – 26
105. Turner, E. M. Phenoloxidase activity in relation to substrate and development stage in the mushroom *Agaricus bisporus*. **Trans. Brit. Myco. Soc.** 1974, **63**, 541 – 547
106. Vasdev, K., Kulad, R. C. and Saxena, R. K. Decolorization of triphenylmethane dyes by the bird's nest fungus *Cyathus bulleri*. **Curr. Microbiol.** 1995, **30**, 268 – 272
107. Vesterberg, O. and Svensson, H. Isoelectric focusing in pH gradients. **Acta Chem. Scand.** 1966, **20**, 820 -834
108. Von Hunolstein, C., Valenti, P., Visca, P., Antonini, G., Nicolini, L. and Orsi, N. Production of laccases A and B by a mutant strain of *Trametes versicolor*. **J. Gen. Appl. Microbiol.** 1986, **32**, 185 – 191
109. Weetall, H. H. Storage stability of water-insoluble enzymes covalently coupled to organic and inorganic carriers. **Biochim. Biophys. Acta.** 1970, **212**, 1-7.
110. Wood, D. A. and Goodenough, P. W. Fruiting of *Agaricus bisporus*. Changes in extracellular enzyme activities during growth and fruiting. **Arch. Microbiol.** 1977, **32**, 185 – 191
111. Wood, D. A. Production and properties of extracellular laccase of *Agaricus bisporus*. **J. Gen. Microbiol.** 1980, **117**, 327 – 338
112. Worrall, J. J., CHET, I. and Hittermann, A. Association of rhizomorph formation with laccase activity in *Armillaria sp.* **J. Gen. Microbiol.** 1986, **132**, 2527 - 2533

113. Wosilait, W. D., Nason, A. and Terell, A. J. Pyridine nucleotide – quinone reductase. Purification and properties of the enzyme from pea seeds. **J. Biol. Chem.** 1954, **206**, 255-282
114. Yaropolov, A. L., Skorobogat'ko, O. V., Vartanov, S. S. and Varfolomeyev, S. D. Laccase properties, catalytic mechanism and applicability. **Appl. Biochem. Biotechnol.** 1994, **49**, 257 – 280
115. Yaver, D. S., Xu, F., Golightly, E. J., Brown, K. M., Brown, S. H., Schneider, P., Halkier, T., Mondorf, K. and Dalboge, H. Purification, characterization, molecular cloning and expression of two laccase from white rot basidiomycete *Trametes villosa*. **Appl. Environ. Microbiol.** 1996, **62**, 834 – 841
116. Zaborsky, O.R. (1973). **Immobilized Enzyme**. CRC Press, Cleveland, Ohio. 1 – 3.
117. Zonazi, N., Romette, J-L. and Thomas, D. Purification and properties of two laccase isoenzymes produced by *Botrytis cinerea*. **Appl. Biochem. Biotechnol.** 1986, **15**, (3), 213 – 225