

---

## REFERENCES

- Agosin, E. & Odier, E. (1985) Solid-state fermentation, lignin degradation and resulting digestibility of wheat straw fermented by selected white-rot fungi. *Appl. Microbiol. Biotechnol.* **21**, 397-403.
- Aidoo, K.E., Hendry, R. & Wood, B.J.B. (1982) Solid substrate fermentation. *Adv. Appl. Microbiol.* **28**, 201-237.
- Andersen, S.O., Kerkut, G.A. & Gilbert, L.I. (1985) *Comprehensive Insect Phys. Biochem. Pharm.* **3**, 59-74.
- Almeida, F.O., Bueno, R. & Bononi, V.L.R. (1993) Some basidiomycetes from mangrove in Sao Paulo State. *Hoehnea.* **20**, 87-92.
- Anon (1995) Sarawak officer gets Ph.D in sago palm cultivation. *Report in the New Straits Times*, 24<sup>th</sup> July.
- Archana, A. & Satyanarayan, A.T. (1997) Xylanase production by thermophilic *Bacillus licheniformis* A99 in solid-state fermentation. *Enzy. Microb. Technol.* **21**, 12-17.
- Archenbach, H. & Blumm, E. (1991) Investigation of the pigments of *Pycnoporus sanguineus*- pycnosanguin and new phenoxazin-3-ones. *Arch. Pharm (Weinheim).* **324**, 3-6.
- Avneesh, D.S., Vikineswary, S. & Noorlidah, A. (2000) Extraction of enzymes from spent mushroom compost. In 4<sup>th</sup> UNESCO National Workshop on Promotion of Microbiology in Malaysia, 26<sup>th</sup> August. University of Malaya Kuala Lumpur.
- Bailey, M.J., Biely, P. & Poutanen, K. (1992) Interlaboratory testing of methods for assay of xylanase activity. *J. Biotechnol.* **23**, 257-270.
- Bajpai, P., Bhardwaj, N. K., Bajpai, P.K. & Jauhari, M.B. (1994) The impact of xylanases on bleaching of eucalyptus Kraft pulp. *J. Biotechnol.* **38**, 1-6.
- Banat, I.M. Nigam, P. Singh, D. & Marchant, R. (1996) Microbial decolorization of textile-dye-containing effluents: a review. *Biores. Technol.* **58**, 217-227.
- Bao, W., O' Malley, D.M., Whetten, R. & Sederoff, R.R. (1993) A laccase associated with lignification in Loblolly pine xylem. *Sci.* **260**, 672-674.

---

Barrett, F.M. (1987) Characterization of phenoloxidases from larval cuticle of *Sacrophaga bullata* and a comparison with cuticular enzymes from other species. *Can. J. Zool.* **65**, 1158-1166.

Bastawde, K.B. (1992) Xylans structure, microbial xylanases, and their mode of action. *World J. Microbiol. Biotechnol.* **8**, 353-368.

Bintoro, H.M.H. (1995) To accelerate sago pith residue decomposition to be a green manure. In: *Acta Horticulture* No. 389. (Subhadrabandu, S. & Sdoodee, S. eds.) pp. 261-267. Fifth International Sago Symposium, Hat Yai, Songkhla, Thailand, 27-29 Jan. 1994.

Bisaria, R., Madan, M. & Bisaria, V.S. (1987) Biological efficiency and nutritive value of *Pleurotus sajor-caju* cultivation on different agro-wastes. *Biol. Wastes* **19**, 239-255.

Bollag, J.M., Shuttleworth, K.L. & Anderson, D.H. (1988) Laccase-mediated detoxification of phenolic compounds. *Appl. Environ. Microbiol.* **54** (12), 3086-3091.

Boominathan, K. & Reddy, C.A. (1992) Fungal degradation of lignin. In: *Handbook of Applied Mycology Vol. 4: Fungal Biotechnology*. (D.K. Arora, R.P. Elander & K.G. Mukerji eds) pp. 763-822. Marcel Dekker, New York.

Bourbonnais, R., & Paice, M.G. (1990) Oxidation of non-phenolic substrates. An expanded role for laccase in lignin biodegradation. *FEBS Lett.* **167**, 99-102.

Bourbonnais, R., Paice, M.G., Freiermuth, P., Bodie, E. & Borneman, S. (1997) Reactivities of various mediators and laccases with Kraft pulp and lignin model compounds. *Appl. Environ. Microbiol.* **63**, 4627-4632.

Bourbonnais, R., Leech, D & Paice, M.G. (1998) Electrochemical analysis of the interactions of laccase mediators with lignin model compounds. *Acta Biochem. Biophys.* **1379**, 388-390.

Bradford, M.M. (1976) A rapid and sensitive method for quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Anal. Biochem.* **72**, 248-254.

Buchert, J., Tenkanen, M., Kantelinen, A. & Viikari, L. (1994) Application of xylanases in the pulp and paper industry. *Biores. Technol.* **50**, 65-72.

Buchholz, K., Puls, J., Godelmann, B. & Dietrichs, H.H. (1980) Hydrolysis of cellulosic wastes. *Proc. Biochem.* **16**, 37-43.

Buckley, K.F. & Dobson, A.D.W. (1998) Extracellular ligninolytic enzyme production and polymeric dye decolorization in immobilized cultures of *Chrysosporium lignorum*. *Biotechnol. Lett.* **20**, 301-306.

---

Bujang, K.B., Apun, K. & Sallah, M.A. (1996) A Study in the Production and bioconversion of sago waste. *Proceedings of Sixth International Sago Symposium*, 9-12 December, Perkanbaru Indonesia pp. 195-201.

Buswell, J.A., Cai, Y. & Chang, S.T. (1995) Effect of nutrient nitrogen and manganese on manganese peroxidase and laccase production by *Lentinula (Lentinus) edodes*. *FEMS Microbiol. Lett.* **128**, 81-88.

Call, H.P. & Muckle, I. (1997) History, overview and applications of mediated lignolytic systems, especially laccase-mediator-systems (lignozyme (R)-process). *J. Biotechnol.* **53**, 163-202.

Cannel, M. & Moo-Young, M. (1980) Solid-state fermentations systems. *Proc. Biochem.* **15**, 2-7.

Castro E. Silva, A., Esposito, E., Ferraz, A. & Duran, N. (1993) Decay of *Parkia oppositifolia* in Amazonian by *Pycnoporus sanguineus* and potential use for effluent decolorization. *Holzforschung*. (cited in Esposito *et al.*, *J. Biotechnol.* **29**, 219-228).

Chang, S.T. & Miles, P.G. (1991) Recent trends in world production of cultivation edible mushrooms. *J. Mushrooms.* **504**, 15-18.

Chew, T.Y. & Shim, Y.L. (1990) A survey of sago processing wastes. *Report to the Environmental Biotechnology, National Biotechnology Council, Mardi Malaysia*.

Chew, T.Y. & Shim, Y.L. (1993) Management of sago processing waste. In: *Waste management in Malaysia: Current status and prospects for bioremediation. A monograph prepared by the Environmental Biotechnology Research Group of the National Working Group on Biotechnology*. (Yeoh, B.G. *et al.* eds.). Ministry of Science, Technology and the Environment, Kuala Lumpur, Malaysia, pp. 159-167.

Coughlan, M.P. & Hazlewood, G.P. (1993)  $\beta$ -1,4-d-Xylan-degrading enzyme systems: biochemistry, molecular biology and applications. *Biotechnology Applied Biochemistry* **17**, 259-289.

Crestini, C. & Argyropoulos, D.S. (1998) The early oxidative biodegradation steps of residual Kraft lignin models with laccase. *Bioorg. Med. Chem.* **6**, 2161-2169.

De Almeida Siqueira, E.M., Mizuta, K. & Giglio, J.R. (1997) *Pycnoporus sanguineus*: a novel source of  $\alpha$ -amylase. *Mycol. Res.* **101**(2), 188-190.

Destroy, R.W. & Hesseltine, C.W. (1978) Availability and utilization of agricultural and agro-industrial wastes. *Proc. Biochem.* **13**, 2-8.

---

Diamantidis, G., Effosse, A., Potier, P. & Bally, R. (2000) Purification and characterization of the first bacterial laccase in the rhizospheric bacterium *Azospirillum lipoferum*. *Soil Biol. Biochem.* **32** (7) 919-927.

Dodson, P.J., Evans, C.S., Harvey, P.J. & Palmer, J.M. (1987) Production and properties of an extracellular peroxidase from *Coriolus versicolor* which catalyzes C $\alpha$ -C $\beta$ -cleavage in a lignin model compound. *FEMS Microbiol. Lett.* **42**, 17-22.

Doelle, H.W. (1994) *Microbial Process Development*. World Scientific Singapore. pp.308.

D'Souza, T.M., Boominathan, K & Reddy, C.A. (1996) Isolation of laccase gene-specific sequences from white rot and brown rot fungi by PCR. *Appl. Environ. Microbiol.* **62**, 3739-3744.

Duran, N. (1992) Reduction of chemical oxygen demand in bleach plant effluent by a combination of photochemical and biological method. In: *Proceedings of 2<sup>nd</sup> Symposium Chemistry*. Lignin and other wood components, (Duran, N. & Esposito, eds) Campinas, S.P.3, 323-333.

Dutton, G. (1992) *Chem. Bus.*, Jul/Aug, 30-32. (Cited in Srinivasan, M.C. & Meenakshi, V.R. (1999) *Curr. Sci.* **77**, 137-142.

Eggert, C., Temp, U. & Eriksson, E.L. (1996) The ligninolytic system of the white rot fungus *Pycnoporus cinnabarinus*: purification and characterization of the laccase. *Appl. Environ. Microbiol.* **62**, 1151-1158.

Elizabeth, R., Michael, A.P. & Rafael V.D. (1999) Industrial dye decolorization by laccase from ligninolytic fungi. *Current Microbiology.* **38**, 27-32.

Esposito, E., Canhos, V.P. & Duran, N. (1991) Screening of lignin-degrading fungi for removal of color from Kraft mill wastewater with no additional extra carbon-source. *Biotechnol. Lett.* **13**, 571-576.

Esposito, E., Innocentini, M. L.H., Andre, F. A., Canhos, V.P. & Duran, N. (1993) Phenoloxidases and hydrolases from *Pycnoporus sanguineus* (UES-2050 strain): applications. *J. Biotechnol.* **29**, 219-228.

F.A.O. (1985) *Animal Production Yearbook*. Vol. **39**, Food and Agriculture Organization, Rome, Italy.

Faure, D., Boullant, M.L. & Bally, R. (1994) Isolation of *Azospirillum lipoferum* 4T Tn5 mutants affected in melanization and laccase activity. *App. Environ. Microbiol.* **60** (9), 3412-3415.

Francis, R.C., Lai, Y.Z., Dence, C.W. & Alexander, T.C. (1991) Estimating the concentration of phenolic hydroxyl groups in wood pulps. *Tappi J.* **74**, 219-224.

---

Freitag, M. & Morrell, J.J. (1992) Changes in selected enzyme activities during growth of pure and mixed cultures of the white-rot decay fungi *Trametes versicolor* and the potential biocontrol fungus *Trichoderma harzianum*. *Can. J Microbiol.* **38**, 317-323.

Fu, S.Y., Yu, H.S., Buswell, J.A., Fu, S.Y. & Yu, H.S. (1997) Effect of nutrient nitrogen and manganese on manganese peroxidase and laccase production by *Pleurotus sajor-caju*. *FEMS. Microbiol. Lett.* **147**(1), 133-137.

Galliano, H., Gas, G., Seris, J.L. & Boudet, A.M. (1991) Lignin degradation by *Rigidoporus lignosus* involves synergistic action of two oxidizing enzymes: Mn peroxidase and laccase. *Enzy. Microb. Technol.* **13**, 478-482.

Gazzano, S. (1990) Notes on xylophilous basidiomycetes from Uruguay: IV polyporaceae and hymenochaeteceae from a native forest in Montevideo Department. *Commun Bot. Mus. Hist. Natl. Montevideo*. **5**, 1-4.

Gerhartz, W. (1990) *Enzymes in industry: production and application*. (Gerhartz, W. ed.) Weinheim; Basel, Switzerland, pp.321

Getha, K. (1995) *Growth and production of the phototrophic bacterium Rhodospseudomonas palustris strain B1 in sago starch processing wastewater*. M. Phil. Thesis. University of Malaya. Kuala Lumpur.

Glenn, J.K. & Gold, M.H. (1985) Purification and characterization of an extracellular Mn (II)-dependent peroxidase from the lignin-degrading basidiomycete, *Phanerochaete chrysosporium*. *Arch. Biochem. Biophys.* **242**, 329-341.

Glenn, J.K., Morgan, M. A., Mayfield, M.B., Kuwahara, M. & Gold, M.H. (1983) An extracellular H<sub>2</sub>O<sub>2</sub>-requiring enzyme preparation involved in lignin biodegradation by the white rot basidiomycete *Phanerochaete chrysosporium*. *Biochem. Biophys. Res. Commun.* **114**, 1077-1083.

Gold, M.H. & Alic, M. (1993) Molecular biology of the lignin-degrading basidiomycete *Phanerochaete chrysosporium*. *Microbiol. Rev.* **57**, 605-622.

Golovleva, L.A., Maltseva, O.V., Myasoedova, N.M & Leontievsky, A.A. (1986) *Panus tigrinus* 144-degrading lignin In: *proceedings of the 3<sup>rd</sup> International Conference on Biotechnology in the Pulp and Paper Industry, Stockholm* (June 16-19), STFI, Stockholm, pp. 28-30.

Gutierrez, A., Caramelo, L., Prieto, A., Martinez, J. & Martinez, A.T. (1994) Anisaldehyde production and aryl-alcohol oxidase and dehydrogenase activities in ligninolytic fungi of the genus *Pleurotus*. *Appl. Environ. Microbiol.* **60** (6), 1783-1788.

- 
- Hadar, Y., Z. Kerem & Gorodecky, B. (1993) Biodegradation of lignocellulosic agricultural wastes by *Pleurotus ostreatus*. *J. Biotechnol.* **30**, 133-139.
- Hamer, G. & Egli, T. (1991) Feedstocks. In: *Biotechnology-the Science and the Business*. (V. Moses & R. E. Cape eds). Harwood Academic Publishers. pp. 211-224.
- Harkin, J.M. & Obst, J.R. (1973) Syringaldazine, an effective reagent for detecting laccase and peroxides in fungi. *Experientia* **29**, 381-387.
- Harun, B.R. (1995) A study of financial evaluation of a typical sago smallholding in Mukah, Sarawak. Final year project for B. Sc. (Agribusiness) Degree, Universiti Pertanian Malaysia.
- Hata, Y., Ishida, H., Kojima, Y., Ischikawa, E.K.A., Suginami, K. & Imayasu, S. (1997) Comparison of two glucoamylases produced by *Aspergillus oryzae* in solid-state culture (*Koji*) and in submerged culture. *J. Ferment. Bioeng.* **84**, 532-537.
- Hatakka, A.L., Tervila-Willo, A.L.M. & Niku-Paavola, M.L. (1986) Production and properties of ligninases of the white-rot fungus *Phlebia radiata* In: *proceedings of the 3<sup>rd</sup> International Conference on Biotechnology in the Pulp and Paper Industry, Stockholm* (June 16-19), STFI, Stockholm, pp. 154-156.
- Hatakka, A. (1994) Lignin-modifying enzymes from selected white rot fungi production and role in lignin degradation. *FEMS. Microbiol. Rev.* **13**, 125-135.
- Hesseltine, C.W. (1965) A millennium of fungi: food and fermentation. *Mycologia* **57**, 149-197.
- Higuchi, T. (1982) Biodegradation of lignin: Biochemistry and potential applications. In: *New Trends in Research and Utilization of Solar Energy through Biological Systems*. (H. Mislin and R. Bachofen eds.) pp. 87-94. Birkhauser Verlag, Basel.
- Higuchi, T. (1990) Lignin biochemistry: biosynthesis and biodegradation. *Wood Sci. Technol.* **24**, 23-63.
- Higuchi, T. (1993) Biodegradation mechanisms of lignin by white-rot basidiomycetes. *J. Biotechnol.* **30**, 1-8.
- Horigome, T., Sakaguchi, E., Takamura, Y., Bintaro, M.H., Haryanto, B., Tandil, E.J. & Marangkey, M.P. (1991) The feeding value of pith and pith residue from sago palms. In: *Proceedings of 4<sup>th</sup> International Sago Symposium, Towards greater advancement of the sago industry in the '90s* 6-9<sup>th</sup> August (1990), Kuching, Sarawak, Malaysia: Ministry of Agriculture & Community Development.

---

Javier, D.B., Faustino, S., Mario, D.B., Guillermo, R.C & Rajni, H.K. (1998) Purification and characterization of thermostable xylanase from *Bacillus amyloliquefaciens*. *Enzy.Microb.Technol.* **22**,42-49.

Jonsson, L., Johansson, T., Sjostrom, K & Nyman, P.O. (1987) Purification of ligninase isozymes from white-rot fungus *Trametes versicolor*. *Acta Chem. Scand.* **B 41**, 766-769.

Joseph, W., Paul, W., Karen, K. & Michael, R.L. (1994) Cellulose pretreatments of lignocellulosic substrates. *Enzy. Microb. Technol.*, **16**, 1002-1004.

Karunanandaa, K., Fales, S.L., Varga, G.A. & Royse, D.J. (1992) Chemical composition and biodegradability of crop residues colonized by white-rot fungi. *J. Sci. Food Agric.* **60**, 105-112.

Kawai, S., Umezawa, T. & Higuchi, T. (1988) Degradation mechanisms of phenolic  $\beta$ -1 lignin substructure model compounds by laccase of *Coriolus versicolor*. *Arch. Biochem Biophys.* **262**, 99-110.

Kawai, S., Asukai, M., Ohya, N., Okita, K., Ito, T & Ohashi, H. (1999) Degradation of non-phenolic  $\beta$ -O-4 substructure and of polymeric lignin model compounds by laccase of *Coriolus versicolor* in the presence of 1-hydroxybenzotriazole. *FEMS Microbiol. Lett.* **170**, 51-57.

Kersten, P.J., Kalyanaraman, B., Hammel, K.E., Reinhammar, B. & Kirk, T.K. (1990) Comparison of lignin peroxidase, horseradish peroxidase and laccase in the oxidation of methoxybenzenes. *J. Biochem.* **268**, 475-480.

Kirk, T.K. (1983) Degradation and conversion of lignocelluloses. In: *The Filamentous fungi. Fungal Technology.* (J.E. Smith, R. Berry & B. Kristiansen eds.) **4**, 266-295. Edward, London.

Kirk, T.K. & Farrell, R.L. (1987) Enzymatic combustion-The microbial degradation of lignin. *Ann. Rev. of Microbiol.* **41**, 465-505.

Kueh, H.S. & Jong, F.S. (1993) Sago palm as a possible plantation crop in Sarawak. *The Planter* **69 (811)**, 486-498.

Kueh, H.S. & Lim, E.T. (1993) The sago palm- the plant and its uses. *Encyclopaedia of Food Science, Food Technology and Nutrition.* Academic Press, London.

Kumaran, S., Sastry, C.A. & Vikineswary, S. (1997) Laccase, cellulase and xylanase activities during growth of *Pleurotus sajo caju* on sago *hampas*. *World J. Microbiol. Biotechnol.* **13**, 43-49.

---

Kumaran, S. (1996) Enzyme activities of *Pleurotus sajor-caju* during solid substrate fermentation of *sago hampas*. M. Phil. Thesis. University of Malaya. Kuala Lumpur.

Lachenal, B., Sevillano, R.M., George, H. & Chirat, C. (1999) Understanding the structure of residual lignin. A Key to progress in pulping and bleaching. In: *Proceedings of the 10<sup>th</sup> International Symposium on Wood and Pulping Chemistry*, Yokohama, Japan. 1, 354-357.

Lambias, M.R. (1988) Biodegradation of the effluent of a bleached pulp in plant. *Microbiol. Rev.* (S.P.) 19, 425-429.

Laptane, S. & Chahal, D.S. (1993) *Abstr. Gen. Meet. Am. Soc. Microbiol.* 327. (Cited in Pandey *et al.*, 1999. *Curr. Sci.* 77 (1), 149-162).

Leatham, G.F. & M.E. Himmel (1991) *Enzymes in biomass conversion*. American Chemical Society Symposium Series 460. pp.xiii.

Leatham, G.F., Forrester, I.T. & Mishra, C. (1991) Enzymes from solid substrates recovering extracellular degradative enzymes from *Lentinula edodes* culture grown on commercial wood medium. In: *Enzymes in Biomass Conversion*, ACS Symposium Series 460. (G.F. Leatham & M.E. Himmel eds.), pp. 95-110, American Chemical Society, Washington DC.

Leonowicz, A. & Grzywnowicz, K. (1981) Quantitative estimation of laccase forms in some white-rot fungi using syringaldazine as a substrate. *Enzy. Microb. Technol.* 3, 55-58.

Ling, S.K. (1994) Biochemical changes associated with growth of *Pleurotus sajor-caju* on oil palm frond parenchyma tissue. M. Biotech. Thesis, University of Malaya, Kuala Lumpur.

Linko, M., Poutanen, K. & Viikari, L. (1989) New development in the application of enzymes for biomass producing. In: *Enzyme systems for Lignocellulose Degradation* (M.P. Coughlan ed.) pp. 331-346, Elsevier Applied Science, London.

Lobos, S., Larrain, J., Salas, L., Cullen, D & Vicuna, R. (1994) Isozymes of manganese-dependent peroxidase and laccase produced by the lignin-degrading basidiomycete *Ceriporiopsis subvermispora*. *Microbiol.* 140, 1691-1698.

Machuca, A & Duran, N. (1993) *Appl. Biochem. Biotechnol.* 43, 37-44. (Cited in *Widely Biotechnology Encyclopedias* (1999). 3, 1545-1554).

Madan, M., Vasudevan, P. & Sharma, S. (1987) Cultivation of *Pleurotus sajor-caju* on different wastes. *Biological wastes* 22(4) 241-250.



---

Malathi, S. & Chakraborty, R. (1991) Production of alkaline protease by a new *Aspergillus flavus* isolate under solid-substrate fermentation conditions for use as a depilation agent. *Appl. Environ. Microbiol.* **57**, 712-716.

Mastitah, M.D., Zulfadhly, Z. & Bhatia, S. (1999) Ability of *Pycnoporus sanguineus* to remove copper ions from aqueous solution. *Art. Cells, Blood Subs., and Immob. Biotech.* **27** (5&6), 429-433.

Michael, C.F. & Stephen, W.D. (1999) Encyclopedia of Bioprocess Technology: Fermentation, Biocatalysts and Bioseparation. *Widely Biotechnology Encyclopedias*. **3**, 1545-1554.

Miessner, M., Crescenzi, O., Napolitano, A., Prota, G., Andersen, S.O. & Peter, M.G. (1991) *Helv. Chim. Acta.* **74**, 1205-1212. (Cited in *Widely Biotechnology Encyclopedias* (1999). **3**, 1545-1554).

Miller, G.L. (1959) Use of dinitrosalicylic acid reagent for determination of reducing sugars. *Analytical Chemistry* **31**, 426-428.

Moo-Young, M., Moreira, A.R. & Tengerdy, R.P. (1983) Principles of solid-substrate fermentation. In: *The Filamentous Fungi*. (J.E. Smith, D.R. Berry & B. Kristiansen eds.) **4**, 117-144, Edward Arnold, London.

Morris, P.I. & Cooper, P. (1998) Recycled plastic/wood composite lumber attacked by fungi. *J. Forest Products* **48** (1), 86-88.

Morais, M.H., Ramos, A.C. & Oliveira, J.F.S. (1996) Biodegradation of lignin. *Silva-Lusitana* **4** (2), 217-236.

Moroshi, N. (1991) Laccases of the ligninolytic fungus *Coriolus versicolor*. In: *Enzymes in Biomass Conversion*. (G.F. Leatham & M. E. Himmel eds.) ACS Symposium Series 460. American Chemical Society, Washington DC. pp.207-224.

Moyson, E. & Verachtert, H. (1991) Growth of higher fungi on wheat straw and their impact on the digestibility of the substrate. *Appl. Microbiol. Biotechnol.* **36**, 421-424.

Mudgett, R.E. (1986) Solid-state fermentation. In: *Manual of Industrial Microbiol. Biotechnol.* (A.L. Demain & N.A. Solomon eds.), pp. 66-83. American Society for Microbiology, Washington D.C.

Muralidhara, R., Crawford, D.L. & Anthony, L. P III. (1987) Extracellular enzyme activities during lignocellulose degradation by *Streptomyces* spp.: a comparative study of wild - type and genetically manipulated strains. *Appl. Environ. Microbiol.* **53**, 2754-2760.

Nagra, S.S., Chawla, J.S. & Chopra, A.K. (1999) Feeding value of fermented guar meal in White Leghorn chicks. *J. Ind. Animal Nutrition.* **16** (1), 77-80.

---

Nissen, A.M., Anker, L., Munk, N & Lange, N.K. (1992) Xylanases for the pulp and paper industry. In: *Prog. Biotech. Xylans and Xylanases* (Visser, J., Beldman, G., Kusters-van Someren, M.A & Voragen, A.G.J. eds.) Elsevier, Amsterdam 7, 325-337.

Olsen, H.S. (1995) Enzymes in food processing. In: *Biotechnol: a multi volume comprehensive treatise. Enzymes, biomass, food and feed*, (H. -J. Rehm and G. Reed in corporation with A. Puhler & P. Stadler eds.) 9, 663-736. VCH Verlagsgesellschaft mbH, Weinheim (Federal Republic of Germany).

O'Malley, D.M., Whetten, R., Bao, W., Chen, C.L. & Sederoff, R. (1993) *Plant. J.* 4, 751-757. (Cited in *Widely Biotechnology Encyclopedias* (1999). 3, 1545-1554).

Ortega, G.M., Martinez, E.O., Gonzalez, Betancourt, D. & Otero, M.A. (1993) Enzyme activities and substrate degradation during white-rot fungi growth on sugar-cane straw in a solid state fermentation. *World J. Microbiol. Biotechnol.* 9, 210-212.

Orth, A.B., Royse, D.J. & Tien, M. (1993) Ubiquity of lignin-degrading peroxidases among various wood-degrading fungi. *Appl. Environ. Microbiol.* 59, 4017-4023.

Paice, M.G., Bernier J.R.R. & Jurasek, L. (1988) Viscosity enhancing bleaching of hardwood kraft pulp by xylanase from a cloned gene. *Biotechnol. Bioeng.* 32, 235-239.

Pandey, A., Selvakumar, P., Soccol, C.R. & Nigam, P. (1999) Solid-state fermentation for the production of industrial enzymes. Special Section: Fermentation- Science and Technology. *Curr. Sci.* 77 (1), 149-162.

Pandey, A. & Soccol, C.R. (1998a) Bioconversion of Biomass. A case study of lignocellulosics bioconversions in solid state fermentation. *Braz. Arch. Biol. Technol.* 42, 379-390.

Pandey, A., Soccol, C.R., Nigam, P., Soccol, V.T., Vandenberghe, L.P.S. & Mohan, R. (2000) Biotechnological potential of agro-industrial residues: II Cassava bagasse. *Biores. Technol.* 74, 69-80.

Pandey, A. & Soccol, C.R. (1998b) Potential application of cellulosic residues for the production of bulk chemicals and value added products. In: *Trends in Carbohydrate Chem.* (Soni, P.L. & Kumar, V. eds.) Vol. 5. Surya International Publications. Dehradun, India.

Paridah, M.T. (1992) The potential of utilization of sago waste in the paper and wood industry. Paper presented at *Workshop on Sago Industry*, 21 February, Sibul, Sarawak, Malaysia.

---

Pelaez, F., Martinez, M.J. & Martinez, A.T. (1995) Screening of 68 species of basidiomycetes for enzyme involved in lignin degradation. *Mycol. Res.* **99**, 37-42.

Perry, C.R., Matcham, S.E., Wood, D.A. & Thurston, C.F. (1993) The structure and function of laccase protein and its synthesis by the commercial mushroom *Agaricus bisporus*. *J. Gen. Microbiol.* **139**, 171-178.

Pointing, S.B., Jones, E.B.G. & Vrijmoed, L.L.P. (2000) Optimization of laccase production by *Pycnoporus sanguineus* in submerged liquid culture. *Mycologia* **92** (1), 139-144.

Pointing, S.B. & Vrijmoed, L.L.P. (2000) Decolorization of azo and triphenylmethane dyes by *Pycnoporus sanguineus* producing laccase as the sole phenoloxidase. *World J. Microbiol. Biotechnol.* pp. 317-318.

Pointing, S.B., Bucher, V.V.C. & Vrijmoed, L.L.P. (2000) Dye decolorization by sub-tropical basidiomycetous fungi and the effect of metals on decolorizing ability *World J. Microbiol. Biotechnol.* **16**, 199-205.

Pongsapan, P., Tangdilintin, F.K., Pantjawidjaja, S. & Situru. (1984) Penggunaan berbagai tingkat ampas sago dalam ransum sapi peranakan ongole yang sedang tumbuh. (The utilization of some levels of sago waste in rations for growing angole yang grades. *Ilmu dan Peternakan* **1**(5), 163-166. (In Malay with English abstract).

Potthast, A., Rosenau, T., Kosma, P. & Fischer, K. (1999) Chemistry and Kinetics of the laccase-system mediator system. In: *Proceedings of the 10<sup>th</sup> International Symposium on Wood and Pulping Chemistry*, Yokohama, Japan. **1**, 596-601.

Ragukumar, C., Ragukumar, S., Chandramohan, D., D'Souza, T.M. & Reddy, C.A. (1994) Laccase and other lignocellulose modifying enzymes of marine fungi isolated from the coast of India. *Botanica Marina* **37**, 515-523.

Raimbault, M. & Alazard, D. (1980) Culture method to study fungal growth in solid fermentation. *J. Eur. Appl. Microbiol. Biotechnol.* **9**, 199-209.

Reade, A.E. & McQueen, R.E. (1983) Investigation of white-rot fungi for the conversion of poplar into a potential feedstuff for ruminants. *Can. J. Microbiol.* **29**: 457-463.

Reddy, C.A. & D'Souza, T.M. (1994) Physiology and molecular biology of lignin peroxidases of *Phanerochaete cryosporium*. *FEMS Microbiol. Rev.* **13**, 137-152.

Reinhammer, B. & Malstrom, B.G. (1981) "Blue" copper containing oxidases. In *Copper Proteins (Metal Ions in Biology)* **3**, 109-149. (T.G. Spiro ed.) New York: John Wiley and Sons.

---

Renuvathani. (2002) Bioconversion of lignocellulosic agro-residues via solid substrate fermentation for bulk enzymes. M. Biotech. Thesis (to be submitted). University of Malaya, Kuala Lumpur.

Rodriguez, S., Santoro, R., Cameselle, C. & Sanroman, A. (1997) Laccase production in semi-solid state cultures of *Phanerochaete chrysosporium*. *Biotechnol. Lett.* **10**, 95-998.

Roy-Arcand, L. & Archibald, F.S. (1991) Direct dechlorination of chlorophenolic compounds by laccases from *Trametes (Coriolus) versicolor*. *Enzy. Microb. Technol.* **13**, 194-203.

Royer, J.C. & Nakas, J.P. (1989) Xylanase production by *Trichoderma longibrachiatum*. *Enzy. Microb. Technol.* **11**, 405-410.

Sbaghi, M., Jeandet, P., Bessis, R. & Leroux, P. (1996) *Plant Pathol.* **45**, 139-144. (Cited in *Widely Biotechnology Encyclopedias* (1999). **3**, 1545-1554).

Schiesser, A., Ruzzi, M., Ercoli, L. & Burla, G. (1992) Optimization of the process stages for enzymatic hydrolysis and fermentation of lignocellulosic materials - growth conditions for lignin degradation by *Trametes trogii*. In: *Cellulose Hydrolysis and Fermentation. Proceedings of a CEC Workshop* (Jan 1992-Brussels) (Coombs, J. & Grassi, G. eds.), pp. 146-154. CPL Scientific Ltd., United Kingdom.

Schliephake, K., Lonergan, G.T., Jenes, C.L. & Mainwaring, D.E. (1993) Decolorization of a pigment plant effluent by *Pycnoporus cinnabarinus* in a packed-bed bioreactor. *Biotechnol. Lett.* **15**, 1185-11888.

Shaikh, S.A., Khire, J.M. & Khan, M.I. (1997) *J. Microb. Biotechnol.* **19**, 239-245. (Cited in Pandey *et al.*, 1999. *Curr. Sci.* **77** (1), 149-162).

Shannon, M.J.R. & Bartha, R. (1988) Immobilisation of leachable toxic soil pollutants by using oxidative enzymes. *Appl. Environ. Microbiol.* **54**, 1719-1723.

Shim, Y.L. (1992) *Utilization of sago 'hampas' by microfungi*. M. Biotech. Thesis. University of Malaya.

Shuttleworth, K.L. & Bollag, J.M. (1986) Soluble and immobilized laccase as catalysts for the transformation of substituted phenols. *Enzy. Microb. Technol.* **8**, 171-177.

Smania, A.JR., Smania, E.F.A., Cruz, F.S & Benchetrit, L.C. (1995) Growth and production phases of *Pycnoporus sanguineus*. *Rev. Microbiol.*, Sao Paulo. **26**(4), 302-306.

---

Smania, E.F.A., Smania, A. Jr., & Loguercio-leite, C. (1998) Cinnabarin synthesis by *Pycnoporus sanguineus* strains and antimicrobial activity against bacteria from food products. *Revista de Microbiologia*. **29**, 317-320.

Socol, C.R. & Krieger, N. (1998) Brazilian experiments for the valorization of agro- industrial residues by solid state fermentation. *Adv. Biotechnol.* pp.25-40.

Srinivasan, C., D'Souza. T.M., Boominathan, K. & Reddy, C.A. (1995) Demonstration of laccase in the white rot basidiomycete *Phanerochaete chrysosporium* B-K-M-F1767. *Applied and Environmental Microbiology* **61**, 4274-4277.

Tengerdy, R.P. (1996) Cellulase production by solid-state fermentation *J. Sci. Resd.* **55**, 313-316.

Tengerdy, R.P. (1998) Solid state fermentation for enzyme production. (Pandey A. ed.) In: *Adv. Biotechnol.* New Delhi: Educational Publishers and Distributers. pp.13-16.

Thomas, B.R, Yonekura, M., Morgan, T.D., Czapla, T.H., Hopkins, T.L. & Kramer, K.J. (1989) A trypsin-solubilized laccase from pharate pupal integument of the tobacco hornworm, *Menduca sexta*. *Insect Biochem.* **19**, 611-622.

Thurston, C.F. (1994) The structure and function of fungal laccases. *Microbiol.* **140**, 19-26.

Tien, M. & Kirk, T.K. (1983) Lignin-degrading enzyme from the Hymenomycete *Phanerochaete chrysosporium* Burds. *Sci.* **221**, 661-663.

Tien, M. & Kirk, T.K. (1984) Lignin-degrading enzyme from *Phanerochaete chrysosporium*: purification, characterization, and catalytic properties of a unique H<sub>2</sub>O<sub>2</sub>-requiring enzyme. *Proceedings National Academic Science. USA.* **81**, 2280-2284.

Tuen, A.A. (1994) Effect of partially replacing commercial concentrate with sago pith meal on dry matter intake and digestion by goats. *Malaysian. Appl. Biol.* **22**, 137-142.

Vikineswary, S. & Nadaraj, P. (1992) Fermentation of sago processing residue *hampas* by submerged fungal cultures. In: *Proceedings of National Symposium of Fermentation Technology: Fermentation in Food and Agricultural Biotechnology*, pp.118-121.26-27 Aug, Subang, Kuala Lumpur, Malaysia.

Vikineswary, S. & Shim, Y.L. (1996) Growth and starch degrading activity of *Myceliophthora thermophila* in solid-substrate fermentation of sago *hampas*. *Asia Pacific J. of Molecular Biol. Biotechnol.* **4**, 85-89.

---

Vimala, D.P., Rifat, A., Noorlidah, A., Parameswari, S. & Vikineswary, S. (2000) Lignin peroxidase, laccase and xylanase profiles during solid substrate fermentation of selected agro-residues. In: *Proceedings of 23<sup>rd</sup> Symposium of the Malaysian Society for Microbiology* (November 19-21), Aseania resort langkawi Malaysia, pp.223-224.

Waldner, R., Leisola, M & Fiechter, A. (1986) Production of extracellular ligninolytic enzymes by different white-rot fungi. In: *Proceedings of the 3<sup>rd</sup> International Conference on Biotechnology in the Pulp and Paper Industry, Stockholm* (June 16-19), STFI, Stockholm, pp. 150-151.

Williamson, P.R. (1994) Biochemical and molecular characterization of the diphenol oxidase of *Cryptococcus neoformans*: Identification as a laccase *J. Bacteriol.* **176**, 656-664.

Weiland, P. (1988) Principles of solid state fermentation. In: *Treatment of Lignocellulosics with White Rot Fungi*. (F. Zadrazil & P. Reiniger eds.), pp. 64-76. Elsevier Applied Science, London.

Wong, K.K.Y., Tan, L.U.L. & Saddler, J.N. (1988) Multiplicity of  $\beta$ -1, 4-xylanase in microorganisms: Functions and applications. *Microbial. Rev.* **52**, 305-317.

Wood, D.A. (1980) Inactivation of extracellular laccase during fruiting of *Agaricus bisporus*. *J. Gen. Microbiol.* **117**, 339-345.

Wood, D.A., Matcham, S.E. & Fremor, T.R. (1988) Production and function of enzymes during lignocellulose degradation. In: *Treatment of Lignocellulosics with White Rot Fungi*. (F. Zadrazil & P. Reiniger eds.), pp. 43-49. Elsevier Applied Science, London.

Wood, T.M. (1989) Mechanisms of cellulose degradation by enzymes from aerobic and anaerobic fungi. In: *Enzyme Systems for Lignocellulose Degradation* (M.P. Coughlan ed.) pp. 17-35. Elsevier Applied Science, London.

Xu, H., Lai, Y.Z., Slomczynski, D., Nakas, J.P. & Tanenbaum, S.W. (1997) Mediator-assisted selective oxidation of lignin model compounds by laccase from *Botrytis cinerea*. *Biotechnol. Lett.* **19**, 957-960.

Yoshida, H. (1883) Chemistry of Lacquer (Urushi) part 1. *J. Chem. Society* **43**, 472-486, (Cited in Thurston, C.F. (1994) *Microbiol.* **140**, 19-26).

Zadrazil, F. (1977) The conversion of straw into feed by Basidiomycetes. *Eur. J. Appl. Microb.* **4**, 273-281.

Zadrazil, F. (1985) Screening of fungi for lignin decomposition and conversion of straw into feed. *Angew. Bot.* **59**, 433-452.

---

Zadrazil, F. & Reiniger, P. (1988) *Treatment of lignocelulosics with white rot fungi*. Elsevier Applied Science, London and New York, pp. 122.

Zadrazil, F., Kamra, D.N., Isikuemhen, O.S. & Schuchardt, F. (1996) Bioconversion of lignocellulose into ruminant feed with white rot fungi. *J. Appl. Anim. Res* **10**, 105-124.

Zalewska, S.J. & Urbanak, H. (1981) Cellulase and xylan degrading enzyme of *Fusarium avenaceum*. *Archives of Microbiology* **129**, 247-250.

Zulphilip, H.T., Azudin, M.N., Hussaini, S.H. & Lim, K.E.T. (1991) Production and utilization of sago starch in Malaysia-an overview. In: *Proceedings of 4<sup>th</sup> International Sago Symposium, Towards greater advancement of the sago industry in the 90's*. 6-9<sup>th</sup> August, 1990, Kuching, Sarawak, Malaysia: Ministry of Agriculture & Community Development.