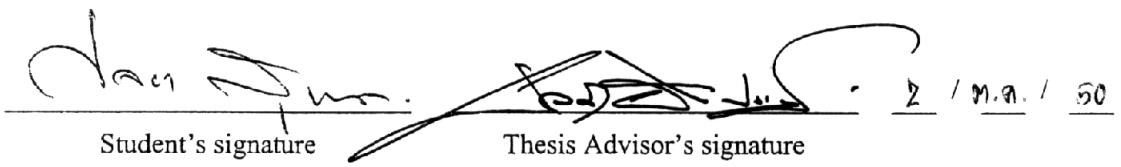
Solaya Suksa-ard 2007: Molecular Cloning of Ligninase Gene from White-rot Fungi for Strain Improvement. Doctor of Philosophy (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Mr. Chawalit Hongprayoon, Ph.D. 93 pages.

Lignolytic enzymes play important roles in pulp and paper industry and xenobiotic compounds degradation. Molecular genetics studies of lignolytic enzymes can lead to strain improvement for desired property. In this research, lignolytic fungi were screened and selected for the highest enzyme activity strain. Based on ITS ribosomal DNA sequences comparison, the selected fungus was found to be *Ganoderma* sp. The cDNA encoding manganese peroxidase was isolated from mRNA pool of the fungus by using nucleotide sequences at 5' end of manganese peroxidase from *Ganoderma formosanum* and *Ganoderma australe* as a primer. Four clones were found to have peroxidase gene. Clone E1-2 contained promoter sequence at 5' terminal with TATA box, CAT box and start codon at 144-149, 306-311 and 326-330 and 599-601 nucleotide positions, respectively. The metal response element was found at nucleotide position 162-167 between TATA box and CAT box. Based on amino acid comparison of lignolytic enzymes from white-rot fungi, the clone E5-2 was found to be a fragment of manganese peroxidase with Glu62, Val65 and Asp142 interacted with Mn^{2+} at manganese binding site while Arg70, Arg72 and Arg136 were the residues near heme group.



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