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Isolation, Identification and Characterization of 1,2-Dichlorobenzene Degrading Bacteria from Consortium

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Abstract : In this research, enrichment culture using an inorganic liquid medium collected soil contaminated with 1,2-dichlorobenzene (1,2-DCB) in Sendai, Japan, was added 1,2-DCB as the sole carbon source to create a stable consortium. The purpose of this research is to analysis dominant microorganisms in the stable consortium and enzyme system which play a role in the degradation of DCBs. The consortium is now at 30 generation and is still being cultured. By the result of PCR-DGGE and clone library, two bacteria are dominant. The bacteria named sk1 was isolated. 40mg/l of 1,2-DCB and 40mg/l of 1,4-DCB were completely degraded after 32 hours and 50 hours, respectively, but no degradation occurred in the case of 1,3-DCB. By PCR, tecA1 (α-subunit of DCB dioxygenase) gene which plays a role degrading DCB to DCB dihydrodiol, and tecB (dehydrogenase) gene which plays a role degrading DCB dihydrodiol to dichlorocatechol were amplified from strain sk1. Bacteria named sk100 was also isolated. 40mg/l of 1,2-DCB was completely degraded after 32 hours, but no degradation occurred in case of 1,3-DCB and 1,4-DCB. By the result of the catalytic core region of dioxygenase amplified by PCR, gene played a role degrading DCB was analyzed. The results of this study concluded that the isolated strains which have not been reported are able to degrade 1,2-DCB stably, and the characterization of degradation and the genomic analysis which is now in progress is helpful to have an overall view of this microbial degradation.

Keywords : DCB, 1,2-DCB degrading strains, DCB dioxygenase, enrichment culture
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