

Biodegradation of polyethylene by an *alkB* cloned recombinant cell

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Polyethylene is highly hydrophobic and chemically inert, and microbes on the earth surface have not yet been fully evolved to digest the artificially made plastics. Microbes biodegrading pristine polyethylene have never been isolated so far, and thereby we employed an alkane, i.e., hexadecane, whose basic chemical structure is identical to that of polyethylene, as a model compound for the investigation of the polyethylene biodegradation and the relevant genes.

A mesophilic bacterium being active for the PE biodegradation was isolated from a soil at a Yellow Sea beach of the Korea peninsula where the serious crude oil contamination had taken place. The isolated strain was identified through the 16S rDNA sequencing, and 1356 out of 1400 bp coincided with those of *Pseudomonas* sp.

The viability analyses of the *alkB* cloned recombinant cell demonstrated that the cells survived the 1st screening in the LB plate containing ampicillin, and that the white colonies were detected after the 2nd blue/white screening.

In order to see whether the *alkB* from *Pseudomonas* sp. E4 is also active for the biotransformation of PE whose molecular weight is well over that of triacontane, the activity of the *alkB* cloned recombinant cell was examined toward the PE biodegradation in the compost under controlled conditions. The recipient cell, *E. coli* BL21, was not active at all toward the LMWPE biodegradation. In contrast, the *alkB* cloned recombinant cell was as active as *Pseudomonas* sp. for the mineralization of the PE. Therefore it was concluded that *alkB* was well cloned to *E. coli* BL21 and that the host cell acquired the activity for the mineralization of LMWPE.

Biography

Mal Nam Kim completed his Ph.D from Compiegne University, France. She has been a professor at Sangmyung University, Korea, since 1982. Hyun Jeong Jeon is a Ph.D student at Sangmyung University.

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