Cloning, Nucleotide Sequence and Expression of Fluorobenzene Dioxygenase from *Labrys portucalensis* strain F11

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Cis-dihydrodiols are intermediates in the microbial metabolism of a large number of aromatic hydrocarbons. These molecules are interesting as potential chiral building blocks for various applications. Labrys portucalensis strain F11 is able to grow aerobically with fluorobenzene as the sole source of carbon and energy. Fluorobenzene degradation proceeds via ortho-cleavage pathway with formation of4-fluoro-cis-benzene-1,2-dihydrodiol by fluorobenzene dioxygenase in the first step (Figure 1) [1].

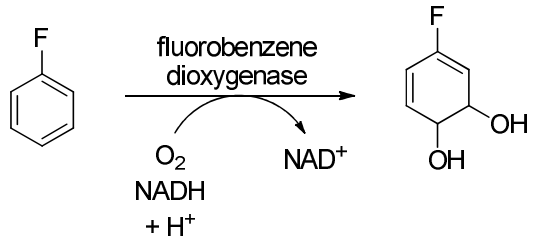

Figure 1. Conversion of fluorobenzene into 4-fluoro-cis-benzene-1,2-dihydrodiol by fluorobenzene dioxygenase from L. portucalensis strain F11.

A partial nucleotide sequence of the gene cluster involved in fluorobenzene degradation was determined. Sequencing results revealed the presence of four genes, namely the gene coding for 1,2-catechol dioxygenase and all three genes encoding fluorobenzene dioxygenase (alpha and beta subunit of the dioxygenase component and the oxidoreductase component). The three fluorobenzene dioxygenase genes were cloned into different vectors and transformed into several E. coli strains, resulting in 16 different recombinants. These recombinants are now being tested for expression by SDS-PAGE analysis and for the production of 4-fluoro-cis-benzene-1,2-dihydrodiol from fluorobenzene.

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References

[1] M. F. Carvalho, M. I. M. Ferreira, I. S. Moreira, P. M. L. Castro, D. B. Janssen, *Appl. Environ. Microbiol.*, 2006, 72, 7413