The Microbial Metabolism of Biphenyl

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Pure cultures of Gram-negative bacteria were isolated from tropical and temperate soils capable of utilizing biphenyl as sole carbon source in an otherwise mineral salts medium. 2,3-Dihydroxybiphenyl was detected and isolated from the culture; this was cleaved by a particulate fraction from biphenyl-grown cells to give α-hydroxy-β-phenylmuconic semialdehyde [(m.p. 122°C, $\lambda_{max.}$ 350nm (acid) and 430nm (alkali)]. A soluble cell-free extract converted this initial ring-fission product into phenylpyruvate through some, as yet, unidentified intermediates. The subsequent metabolic pathways of phenylpyruvate are known. Unsubstituted biphenyl is therefore hydroxylated in the 2,3-positions, to be followed by a '*meta*'-type cleavage between C-2 and C-4 of the aromatic ring; this is to be contrasted with the fate of naphthalene, where a '*meta*'-type fission occurs between the angular carbon atom and C-1 of 1,2-dihydroxynaphthalene (Davies & Evans, 1964). Several plant aromatic polymers contain the biphenyl type bond (e.g. the biflavanoids).

Multicomponent mixtures of chlorinated biphenyls are used in the plastics industry, and their persistence in the environment is giving cause for concern; it may be possible to select those with the desired properties and still be biodegradable.

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Davies, J. I. & Evans, W. C. (1964). *Biochem. J.* **91**, 251.

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