

Isolation of a Bacterial Community with High Removal Efficiencies of the Insecticide Bendiocarb

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Abstract : Bendiocarb is a known toxic xenobiotic that presents acute and chronic risks for freshwater invertebrates and estuarine and marine biota; thus, the treatment of water contaminated with the insecticide is of concern. In this paper, a bacterial community with the capacity to grow in bendiocarb as its sole carbon and nitrogen source was isolated by enrichment techniques in batch culture, from samples of a composting plant located in the northeast of Mexico City. Eight cultivable bacteria were isolated from the microbial community, by PCR amplification of 16 rDNA; *Pseudoxanthomonas spadix* (NC_016147.2, 98%), *Ochrobacterium anthropi* (NC_009668.1, 97%), *Staphylococcus capitis* (NZ_CP007601.1, 99%), *Bosea thiooxidans* (NZ_LMAR01000067.1, 99%), *Pseudomonas denitrificans* (NC_020829.1, 99%), *Agromyces* sp. (NZ_LMKQ01000001.1, 98%), *Bacillus thuringiensis* (NC_022873.1, 97%), *Pseudomonas alkylphenolia* (NZ_CP009048.1, 98%). NCBI accession numbers and percentage of similarity are indicated in parentheses. These bacteria were regarded as the isolated species for having the best similarity matches. The ability to degrade bendiocarb by the immobilized bacterial community in a packed bed biofilm reactor, using as support volcanic stone fragments (tezontle), was evaluated. The reactor system was operated in batch using mineral salts medium and 30 mg/L of bendiocarb as carbon and nitrogen source. With this system, an overall removal efficiency (η_{bend}) rounding 90%, was reached.

Keywords : bendiocarb, biodegradation, biofilm reactor, carbamate insecticide

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