Identification and Characterization of Three Novel Strains of Bacteria that Can be Used for Bioremediation of Cyclic Alkane and Aromatic Hydrocarbons and Polyhydroxyalkanoates

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Three different bacterial strains were isolated from the contaminated TAP (Tris Acetate Phosphate) media plates of the green micro-alga Chlamydomonas reinhardtii. These bacterial strains were named based on the Chlamydomonas strains they contaminated: CC4533, Clip 185, and LMJ.SG0182. These bacterial strains were able to grow on the algal media plates because they could utilize acetate as an alternative carbon source like Chlamydomonas. Several microbiological tests were conducted to characterize the bacteria biochemically. We amplified and sequenced partially the 16S rRNA gene sequences of these three bacterial strains. The sequencing data showed that these three bacteria are novel strains of bacterial species: Sphingobium sp. strain MK41, Microbacterium binotii, and an uncultured bacterium clone LIB091_C05_1243 that is closely related to the genus Acidovorax sp. We tested the abilities of these three bacterial strains to utilize cyclic alkanes, poly- and monocyclic aromatic hydrocarbons, car and lawn mower engine fresh and used oils, and polyhydroxyalkanoates as the sole carbon source on TP (Tris Phosphate) + 0.1% ammonium chloride media plates. The results show that all three strains have the potential for bioremediation of toxic chemicals, with CC4533 being the most promising candidate. We will be presenting our molecular, biochemical and physiological results.