BIODEGRADATION OF ORGANOPHOSPHATE PESTICIDE TETRACHLORVINPHOS BY BACTERIA ISOLATED FROM AGRICULTURAL SOILS IN MÉXICO

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When pesticides are dispersed in the environment, they become pollutants, with ecological effects that require remediation. Pollution is caused by both, excessive and continuous use of pesticides and begins when these compounds enter the environment. The quality of soils, ground water, continental and coastal waters as well as the air, is affected by pesticide contamination. Pesticides in soil and water can be biodegraded and is the primary mechanism of pesticide breakdown and detoxification in many soils (Surekha *et al.* 2008). Isolation of indigenous bacteria capable of metabolizing pesticides provide environmentally friendly means of *in situ* detoxification (Richins *et al.* 1997, Mulchaldani *et al*. 1999). Contaminated environments have resulted through time in the evolution of autochthonous microbial populations; therefore, these sites are the most appropriate ecological niches for the isolation of strains able to degrade these compounds (Oshiro *et al*. 1996, Ortiz-Hernández *et al*. 2001, Horne *et al.* 2002). The **purpose of this study** was to describe the isolation and characterization of a tetrachlorvinphos (TCV) degrading bacterial consortium from agricultural soils, with potential use in bioremediation. Metabolite analysis was also carried out. **Methods**. We isolated microorganisms from soils collected from a commercial cornfield in central Mexico, which had been treated with organophosphate pesticides. The soil was a Vertisol type and was considered as microorganism's source in a culture supplemented with TCV pesticide as the only carbon source. A consortium bacterium was isolated and evaluated for hydrolysis TCV capacity. For growth and degradation experiments, the isolated consortia and pure colonies were used. The cells were seeded in MM with TCV and maintained in agitation. These cultures were subsampled every 12 h and extracted twice with equal volumes of ethyl acetate as extracting reagent. Each one of these extractions was analyzed by gas chromatography coupled to a mass spectrometry. Cell growth was measured spectrophotometrically by measuring the OD_{600}. To characterize and identify the isolated bacteria, a BBL Crystal system was used, as well as additional biochemical tests. **Results and conclusions**. A bacterial consortium degrading TCV was isolated from agricultural soil. This consortium was composed by six pure strains which were presumptively identified as *Stenotrophomonas malthophilia, Proteus vulgaris, Vibrio metschinkouii, Serratia ficaria, Serratia* spp. and *Yersinia enterocolitica.*. Growth curve experiments showed that the bacterial consortium was able to grow in mineral medium containing TCV as the only carbon source. However, only one pure strain was able to remove TCV in mineral medium, but all of them removed this pesticide in rich medium. Hydrolysis products were *1-(2,4,5) trichlorophenylethanone*. These data indicate that the isolated strains can be used for the wastes biodegradation or bioremediation of this pesticide contaminated soil or water.

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