

Microbial consortium in in situ remediation of DDT residues-affected soil

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Abstract

Organochlorinated pesticides (OCPs), such as DDT are characterized as highly persistent and mobile in environment, with high bioaccumulation capacity. The use of those chemicals has been banned in the United States and Europe for decades (Tsai, 2014). Despite this, OCPs-affected ecosystems are detected in several countries, even in the XXI century. Malusa et al. (2020) reported the presence of DDT in more than 80% of soil samples originating from organic farms in Poland. The objective was to determine the impact of microbial consortium on DDT biodegradation in soil. BacFung microbial consortium consisting of *Bacillus* sp., *Pseudomonas* sp., *Azotobacter* sp. and *Trichoderma* sp. was used for soil inoculation. Soil conditions were improved by grass sowing. The research was conducted at a playground in Tivat (Montenegro), and the size of the total examined area was 3,000 m² divided into 13 sub-units. The concentration of DDT and its metabolites (DDE - dichlorodipenyldichloroethylene and DDD - dichlorodipenyldichloroethane) was measured by GC/MS technique. The initial DDT concentration in soil sub-units varied from 0.005 to 20.5 mg/kg. The sum of DDT+DDD+DDE (Σ DDT) concentrations varied from 0.024 to 22.7 mg/kg (average concentration was 1.69 mg/kg). After the application of BacFung microbial consortium, the decline of DDT amount in soil sub-units was observed (from 0.005 to 0.057 mg/kg); Σ DDT was 0.020 to 0.2 mg/kg (average value 0.055 mg/kg). The accumulation of DDD and DDE, as initial degradation products of DDT, was observed.

These results showed that microbial consortium BacFung can be used in removal of DDT from polluted environment.

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