



Monitoring the ethalfluralin biodegradation with certain bactofungi mixed culture

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ABSTRACT

In this study, the biodegradation of ethalfluralin ($C_{13}H_{14}F_3N_3O_4$), which is the most preferred herbicide in sunflower farming in Thrace region in Turkey, is investigated. Bacteria and fungi were isolated in soil samples obtained in Thrace region, and a mixed culture was prepared using equal volume of microorganism cultures. Five different apparatuses, including sterile agricultural soil were setup and ethalfluralin in 1,500 $\mu\text{g/L}$ concentration was added to each apparatus, and they were watered for 6 weeks with sterilized tap water. Drained water was then collected, and the filtrates were measured for chemical oxygen demand (COD), biochemical oxygen demand (BOD_5), total organic carbon (TOC) and ethalfluralin. Furthermore, pH and dissolved oxygen (DO) concentration were measured. Study results demonstrated that the highest biodegradation was observed in the soil sample that contained 10 mL mixed microorganism culture and ethalfluralin. In this filtrate, ethalfluralin, COD, BOD_5 and TOC removals were measured as 92%, 85%, 82% and 97% respectively. The DO level remained between 3.00 and 4.50 mg/L in the first 3 weeks for all cultures. After the third week, it increased to 5.8 mg/L in the 5 mL culture mixture and to 7.1 mg/L in the 2 mL culture mixture. pH results demonstrated, an increase during the first 3 weeks and pH values decreased for all culture mixture media due to the formation of carbonic acid.

Keywords: Biodegradation; Ethalfluralin; Chemical oxygen demand; Biochemical oxygen demand; Total organic carbon
