Abstract

In the first-year research, microorganisms including bacteria and fungi were isolated and screened from soils contaminated with 3 groups of pesticides namely; pyrethroid, organophosphate and carbamate. The representative substances for each pesticide group were cypermethrin, chlorpyrifos and carbaryl, respectively. All the isolates were tested for their tolerance to the pesticides and then the tolerant isolates were evaluated for their tolerant to two heavy metals; arsenic and cadmium. Then the tolerant isolates were evaluated for their effectiveness in degrading the 3 groups of pesticides. A total of 118 and 29 isolates of bacteria and fungi were isolated from soils of 7 selected areas (25 mg/L). All these isolates were evaluated for their tolerant to higher concentration of each group of pesticides (25 to 150 mg/L). From this evaluation, only 10 bacterial and 2 fugal isolates were able to grow well in all concentrations of the 3 pesticides. These bacterial and fungal isolates were selected to test their ability in arsenic and cadmium tolerant. Among bacterial isolates, the results indicated that only bacterial isolate 17 showed highest potential to tolerate the two types of heavy metals with the MIC of 500 and 500 mg/L of As(III) and $CdCl_2$, respectively. Fungal isolate number 24 showed ability to grow at all concentration of As(III) with MIC of ≥1000 mg/L. Less growth of this isolate in media containing $CdCl_2$ was observed and the MIC of cadmium for isolate 24 was 250 mg/L. In addition, the spores morphology of fungal isolate 24 resembled that of genus *Fusarium*, which could be a pathogenic or non-pathogenic species therefore this isolate should be tested for its pathogenicity before further investigations. From our results, we selected bacterial isolate 17 and fungal isolate 24 to test their efficiency in degrading pesticides. The analytical results indicated that, on the average, at chemical concentration of 25 mg/L, bacteria showed higher efficiency in degrading cypermethrin and carbaryl (92.5 and 100%, respectively) than fungi (17.9 and 99.4%, respectively) while fungi gave higher efficiency (99.6%) in degrading chlorpyrifos than bacteria (51.2%). The same tendency of degradation efficiency was observed at chemical concentration of 125 mg/L but with reduction of about half of efficiency percentage obtained at 25 mg/L.