ABSTRACT

The current study was an attempt to deal with the application of indigenous bacterial strain to make domestic wastewater usable as irrigation water. The first part of the study deals with bioremediation approach for domestic wastewater (DWW). The wastewater sample was taken from the main discharge point at end of Mohni Road, Band Road Lahore. The physicochemical parameters of the domestic wastewater sample were analysed to predict the quantity of contaminants present in the domestic wastewater before and after the biotreatment experiment i.e. colour, odour, temperature, pH, electrical conductivity (EC), salinity, turbidity, biochemical oxygen demand (BOD), chemical oxygen demand (COD), dissolved oxygen (DO) biodegradability index (BI), total dissolved solids (TDS), total suspended solids (TSS), decolourization percentage, heavy metals (Cd, ,Cr, Cu, Zn, Pb, Ni, Mn, Fe and As) and nutritional components (N, P, K and I). The second part of the study was to evaluate the impact of untreated and biotreated domestic wastewater on seed germination and growth of two rice cultivars PK 386 and Basmati 515 in hydroponic culture. Different seed germination parameters were observed: final germination percentage (FGP), germination capacity (GC), germination energy (GE), germination index (GI), speed of germination (SG), germination value (GV), germination velocity (GVe), mean germination time (MGT), peak value (PV), and germination vigour index (GVI). Different growth parameters were observed such as total number of seeds tested, total number of germinated seeds, total number of days, number of germinated seeds at 4th day, 10th day and final day, percentage of seeds germination on 7th day and final day. Different morphological parameters such as average shoot length, average root length, average seedling length, average dry weight of shoot, average dry weight of root, average dry weight of seedling, average fresh weight of shoot, average fresh weight of root and average fresh weight of seedling were calculated in both seed germination and hydroponic growth experiment. The results showed a considerable reduction in phytotoxicity in rice plants grown in biotreated domestic wastewater. Furthermore, the dry and fresh weights of plants irrigated with biotreated domestic wastewater were more than untreated domestic wastewater. The results supported the utility of the bacterial isolate for domestic wastewater treatment prior to crop irrigation.