

Phytoremediation of heavy metals using Qatari flora

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ABSTRACT

Phytoremediation is a natural phenomenon utilizing plants species to reduce or remove organic and inorganic pollutants from contaminated soil, water and sediment sources. Several studies were conducted to demonstrate the phytoremediation potentials of plants species, some of which are also found in Qatar as native or invasive plants. This study investigates the phytoremediation potentials of *Zygophyllum qataranse* and *Salsola imbricata* irrigated with a synthetic wastewater typical of oil and gas industry in a mixture of regular and peat moss soil at varying concentrations of heavy metals under greenhouse controlled conditions. Young seedlings of approximately similar weight and height were obtained from Qatar University field and used as starting materials. As an initial observation of tolerance to heavy metal stress, growth parameters such as height and number of branches were monitored and recorded throughout the experimental period of 42 days and a comparison was made for treatment and control plants in both species. Results indicated that the two species *S. imbricata* and *Z. qataranse* showed different patterns in response to the different heavy metals stress. Overall growth rate was (0.1; n = 4) for *S. imbricata* and (0.01; n = 4) for *Z. qataranse*, one way analysis of variance (ANOVA) confirmed no difference in the effect of the three variable heavy metals concentration used among the two plants, both species also exhibited differences in terms of above the ground biomass, *S. imbricata* recorded high leaves biomass compared to *Z. qataranse*, additionally, the leaves of this plant showed no visible signs of stress as opposed to that of *Z. qataranse*, which appears red after four weeks of irrigation. The root system in *S. imbricata*, forming typical rhizosphere may have played a key role in the better utilization of the surrounding organic contaminants with the aid of possible activity of associated microbes. Although both thrive in the same habitat naturally, there may actually be differences in their uptake and or tolerance mechanism. Consequently, the analysis and evaluation of measured growth parameters (Height and branches) indicates the potential of both plants as good phytoremediation agents. Further analysis of heavy metal concentration, which is currently ongoing to determine the bio-concentration and translocation factors of the metals between the roots and shoot tissues promise to prove further insight in to this study.

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