ABSTRACT

Lithium is an emerging pollutant of concern as it can inhibit plant growth and yield significantly. Present study evaluated the effects of various lithium concentrations on growth, physiology and structural changes in leaves and shoots of *Conocarpus erectus* and *Cassia fistula.* The objective was to observe comparative responses of two plant species treated with lithium stress. Uniform sized seedlings of *Conocarpus erectus* and *Cassia fistula* seedlings were applied with varying lithium concentrations (1.22, 2.44, 4.86, and 9.79 g/ L) and plant growth (height, number of leaves and branches), morphological (leaf area, minor and major veins length), anatomical (number of stomata, number of vessels in shoot, and area of vessels in shoot) and physiological parameters (photosynthetic, transpiration rate and stomatal conductance) were measured. It was found that *Conocarpus erectus* at lower lithium concentrations showed positive relationship with plant growth, and photosynthetic rate. However, morphological and anatomical parameters decreased in all treatments of *Conocarpus erectus.* Whereas, *Cassia fistula* showed significant decline in physio-anatomical and morphological characters in all treatments. Maximum lithium concentration i.e., 888 mg/ kg in T4 and 625 mg/ kg in T4 was observed in the leaves of *Conocarpus erectus* and *Cassia fistula* respectively. Maximum K^+ concentration (42800 mg/ kg in T4) was found in root of *Conocarpus erectus* and shoot (85400 mg/ kg in T3) of *Cassia fistula*. Water use efficiency and electrical conductivity in both species were highly dependent on lithium concentration. Water use efficiency increased as Li^+ stress increased in *Conocarpus erectus*, but decreased in *Cassia fistula* under the same conditions. *Conocarpus erectus* with high water use efficiency adapted to Li^+ stress by focusing on survival, rather than investing energy in growth. *Conocarpus erectus* showed better survival rate as compared to *Cassia fistula,* indicating its potential for phytostabilization of lithium in soil.