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Growth and accumulation of NaCl of *Avicennia marina* seedlings under varying salinity conditions: Implications on desalination potential

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Growth and accumulation of NaCl by *Avicennia marina* seedlings were investigated to identify desalination potentials of this mangrove species in rehabilitating highly saline inter-tidal soils. Seeds of *A. marina* were planted in plastic pots with coir dust and they were kept in containers with water of varying salinities i.e. 0 % (de-ionized water), 50 %, 75 % and 100 % which were prepared by mixing seawater and de-ionized water as required. Fifteen replicates were used for each treatment. Each medium was replenished every month with a water-soluble fertilizer (Albert's solution). Salinity level in each container was maintained by daily addition of de-ionized water and solution and the water was replaced monthly by freshly prepared solution to ensure that seawater would not become foul. All plants were grown in plant house under natural temperature and light at the University of Kelaniya. Tolerance to salt stress of seedlings of *A. marina* were compared in terms of a few parameters of growth, such as height of the shoots, total leaf production and leaf area, which were measured every week over nine months. Dry mass was measured every three months after harvesting, by drying samples to constant weight at 80 ^{0}C. Percentage NaCl content in samples of leaves, shoots and roots were measured by using aqueous extractions of tissue samples and titrating with 0.01 N $AgNO_3$ in the presence of potassium thiocynate as an indicator and thereby calculated the NaCl content of the seedlings. Tukey's Honestly Significant Difference test was performed to determine treatments causing significant effects on growth. *A. marina* seedlings demonstrated best growth at 50 % salinity. The growth rate and percentage germination of seeds were 0.22 g/month and 80 % respectively for 50 % sea water. There was no statistically significant difference ($p< 0.05$) on growth performance at the other salinity levels, implying that *A. marina* would grow at different salinity levels. The NaCl content in seedlings increased substantially with increasing salinity and the NaCl accumulation rate of the seedling of 100 % sea water was 464.67 micro mol/ g/ month. There was no correlation ($p<0.05$) between internal NaCl salt content in seedlings and growth performances of seedlings. Results of the present study confirms the ability of *A. marina* to successfully grow under a wide range of salinity conditions and to accumulate salt in the seedlings, implying that it is one of best candidate species (as seedlings) that can be used to rehabilitate highly saline inter- tidal areas.

Keywords: *Avicennia marina, growth*, accumulation of NaCl, salinity, desalination

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