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Effects of paper mill wastewater on seedling growth and the antioxidant system of reeds

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The effects of different concentrations of wastewater (chemical oxygen demands of 300, 175 and 50 mg·L⁻¹) from a paper mill on seedling growth and the antioxidant system in reeds were tested in experimental pools that simulated the wetland ecosystem of the Liaoning Shuangtai estuary in China. Root length, biomass and moisture content but not shoot moisture content and plant height significantly increased with increases in wastewater concentration. At a concentration of 300 mg·L⁻¹, shoot biomass increased by 52.5% and root biomass increased by 73.05% over the control. Malondialdehyde (MDA) content, production rate of superoxide anions (O₂^{•-}) and hydrogen peroxide (H₂O₂) content all decreased with increasing concentration. At 300 mg·L⁻¹, MDA content, production rate of O₂^{•-} and H₂O₂ content were 0.34, 0.24 and 0.16 times respectively, those of the control in leaves and were 0.25, 0.19 and 0.17 times respectively, those of the control in roots. Superoxide dismutase, peroxidase and catalase activities and ascorbic acid and glutathione contents in leaves and roots significantly increased with increasing concentrations of wastewater. These results suggest that a concentration of 300 mg·L⁻¹ could improve the activities of antioxidant enzymes inhibit the generation of reactive oxygen species and reduce the generation of MDA, thus effectively alleviating the damage caused by salinity in wetland soil.

Biography

Haifu Li has completed her MSc from Shenyang Agricultural University and working in this University since 2013. He is the leading researcher of Liaoning Shuangtai estuary wetland station, a national Ecological observation & research station. He has published more than 10 papers and serving as a Secretary of College of Water Conservancy.

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