

The effect of flue gas desulfurization (FGD) gypsum on soil improvement of estuary wetland in Yangtze River delta, China

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Soil desalination of estuary wetlands by natural processes of rain washing and plant community succession needs several decades. Using flue gas desulfurization (FGD) gypsum as soil amendments can accelerate this natural process of desalination by calcium ions (Ca^{2+}) replacing exchangeable sodium within a couple of years. Field experiments in estuary wetland in Yangtze River Delta have been conducted with FGD gypsum at rates equivalent to 0, 15, 30, 45, 60 T ha^{-1} since 2011. Local annual rainfalls of 2011 and 2012 were 950 mm and 1000 mm respectively, less than average. The total salt content of top soil was 28.97~44.96 g/kg varied with rainfall. The dominated halophytes were reed and spartina. The results showed that one year after FGD gypsum treatment, desalination effect of top soil (0~30cm) was significant, desalination rate being up to 50%. Species number and coverage of herbaceous plants other than reed and spartina increased with increasing rates of FGD gypsum ($P<0.05$). Some halophytic herbs like *Suaeda glauca*, *Herba taraxaci*, *Artemisia lavandulaefolia*, and even *Medicago sativa* and *Alternanthera philoxeroides* were found in the 2×2 m sample plots. Survival rates of woody and shrubby plants on FGD gypsum treatment sites were also significantly higher than that of controls ($P<0.05$). The measurement also indicated that FGD gypsum is able to enhance exchangeable capacity of Ca, increasing salt leaching efficiency, and then promoting plant diversity and succession. It is expected that safe levels of FGD gypsum can be applied effectively to remediate saline soil of estuary wetland on a large scale.

Biography

Xiaoping Li graduated from University of California (Davis) with Ph.D. degree of Ecology in 1998 and then joined EPA Center for Ecological Health Research as post graduate researcher. He had served as deputy director of Shanghai Academy of Environmental Science for 5 years, and now is a professor of State Key Lab of Estuarine & Coastal Research, East China Normal University. He has involved in many national projects of ecological restoration in China, and published more than 40 papers in reputed journals.

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