Mukkram Ali Tahir et al., J Environ Anal Toxicol 2018, Volume 8
DOI: 10.4172/2161-0525-C4-020

Formulation of new generation silicate fertilizer from P industry waste to sustain rice crop production under salt stress environment

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Rice is a main staple diet of people throughout the globe. Although, rice is highly susceptible to salinity and its yield is severely limited under salt stress environment. However, one favorable characters of rice is Si accumulator plant. We investigated effect of new generation Si fertilizer (produce from the waste of phosphate industry mainly consists of amorphous silica, KOH, coal and aluminum chloride) on two contrasting rice varieties. The produced smart Si fertilize are solidified, dried, granulated and calcined to remove toxic compounds and enhance end product's solubility. IRRI-9 (coarse rice) and super basmatti-2000 (fine rice) was grown under saline environment. 26 days old uniform sized rice nursery seedlings were transplanted in pots filled with non-saline (ECe=1.66 dS m-1) and saline soil (induced ECe=6 dS m-1) under flooded conditions. New generation Si-fertilizer was used @ 0, 75 and 150 mg Si kg-1 soil. Plants were grown up till maturity stage and different physiochemical parameters were estimated. Both biological and paddy yields of rice were reduced significantly ($p<0.05$) in salinity stress; however less reduction was observed in coarse as par to fine rice. Si fertilizer amendment in growth environment significantly ($p<0.01$) enhanced SDW (4-folds) in reference to control and similarly paddy yield of rice also enhanced (3-folds). Na concentrations in shoots were negatively correlated ($r=-0.90$, $p<0.01$) with shoot dry matter, increased selective K uptake and reduced Na uptake or translocation may be one of possible strategies to induce salinity tolerance by Si nutrition in rice.

Biography

Mukkram Ali Tahir has completed his PhD from University of Agriculture, Pakistan. He is the Assistant Professor of Soil and Environmental Science, University of Sargodha. He has published more than 40 papers in reputed journals and signed MOU with national and international institutes. He has filed two patents on the waste management of agro sectors.

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