



Effects of Amendment of Biochar and Pyroligneous Solution from wheat straw pyrolysis on Yield and soil and crop salinity in a Salt stressed cropland from Central China Great Plain

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Crop production has been subject to salt stress in large areas of world croplands. Organic and/or bio-fertilizers have been applied as soil amendments for alleviating salt stress and enhancing crop productivity in these salt-stressed croplands. While biochar production systems using pyrolysis of crop straw materials have been well developed in the world, there would be a potential measure to use materials from crop straw pyrolysis as organic amendments in depressing salt stress in agriculture. In this paper, a field experiment was conducted on the effect of biochar and pyroligneous solution from cropstraw pyrolysis on soil and crop salinity, and wheat yield in a moderately salt stressed Entisol from the Central Great Plain of North China. Results indicated that: biochar and pyroligneous solution increased soil SOC, total nitrogen, available potassium and phosphorous by 43.77%, 6.50%, 45.54% and 108.01%, respectively. While Soil bulk density was decreased from 1.30 to 1.21g cm⁻³; soil pH (H₂O) was decreased from 8.23 to 7.94 with a decrease in soluble salt content by 38.87%. Wheat yield was doubled over the control without amendment. In addition, sodium content was sharply declined by 78.80% in grains, and by 70.20% and 67.00% in shoot and root, respectively. Meanwhile, contents of potassium and phosphorus in plant tissue were seen also increased despite of no change in N content. Therefore, the combined amendment of biochar with pyroligneous solution would offer an effective measure to alleviate the salt stress and improving crop productivity in world croplands.

Keywords: biochar, salt affected soils, wheat, crop productivity, salinity