The Effects of Applying Wastewater Biosolids on Bio Energy Polyculture Test Plots and Various Varieties of Switchgrass, a Two Part Study

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With an interest in agriculture and renewable energy, I merged them into a two-part study to determine if biosolids from a wastewater treatment plant would enhance the growth of CP 25 Bioenergy Mix and eleven varieties of switchgrass. Because biosolids contain nitrogen, I hypothesized there would be enhanced growth. I applied biosolids to twenty four randomized test plots, conducted height checks, obtained soil samples which I prepared at the University of Minnesota utilizing 2N KCL to determine the amount of nitrogen in the soil. Using a homemade device, I collected cuttings, separated legumes from the grasses and weighed them before and after drying in a lab oven. The areas with biosolid additions, on average had more nitrogen in the soil. When biosolids were added to pretreated urea ground, plants grew taller and had more mass. I found an interesting difference between the legume and grass weights, with the grass benefitting from increased nitrogen. Grasses preferred a urea/biosolid combination. Legumes benefitted more from biosolids, than urea. For these reasons, I accept my hypothesis that biosolids generally enhanced the growth of the test plots. Concurrently, I conducted a home study with eleven switchgrass varieties by preparing the soil with 0 grams, 5 grams, 10 grams and 15 grams of biosolid. In the switchgrass study, I found mixed results when comparing fullness, height and dry weight. Growth of each variety was either not affected, enhanced or was negatively affected. Therefore, I reject my hypothesis as the amount of biosolid affected each variety differently.

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