THE POTENTIAL FOR BIOCHAR TO MITIGATE THE IMPACT OF CLIMATE CHANGE

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The United Arab Emirates produces over 44 million date palm trees yearly, where date palm is mainly used as source of food and shelter. Each tree generates approximately 20 Kilograms of palm frond waste per year and this waste is currently sent to landfills. In this study, we proposed that in the arid climate and soil conditions found in the UAE, this date palm waste could be converted to biochar and used to improve the water holding capacity of UAE soils. Therefore, the aim of this study was to test whether amendments of date palm frond (DPF) and its biochar could improve the water holding capacity of soils. A mesocosm design and a plant growth experiment were used in the laboratory to assess the treatments under UAE summer temperature conditions. For the mesocosm, there were 6 different biochar and DPF treatments (1%, 3%, 6%, 12%, 15% and 18% biochar or DPF in soil) along with the controls (sharp sand, DPF biochar and DPF). The experiment was divided into 3 cycles (wet, dry, and dry without water bowl (wow)). The impact of the experimental treatments was assessed using ANOVA. Both Biochar and DPF had no significant effect during the first two cycles (wet and dry) but during the third cycle, the DPF appeared to have better water holding capacity than Biochar. A plant growth experiment was conducted with 6 different treatment (controls - sand, DPF and Biochar; and Biochar at 1%, 6% and 15%). Cat grass was used as a quick growing crop with its height and leaf area monitored while the soil was monitored for its moisture and pH. Water was irrigated during the first 3 weeks then the soil treatments left to dry. The results show the greatest growth for 1% Biochar. The processes are being investigated using thermal gravimetric analysis (TGA) to assess water binding capacity and strength of the Biochar, DPF and soil.

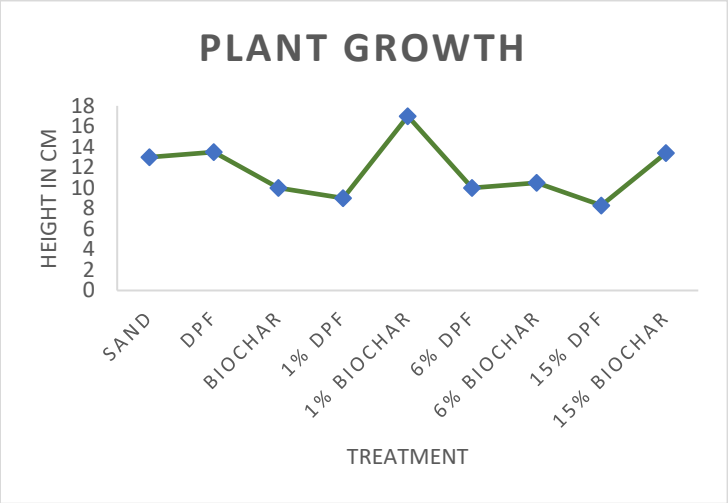

Figure 1 – Plant growth results showing the 1% Biochar is the highest growth

EFFECT OF BIOCHAR ADDITION TO METAL-CONTAMINATED SOIL