Low-Cost Sugarcane Bagasse Waste to Improve Soil Moisture Retention in Agriculture

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Global warming with higher earth temperatures nowadays has increased the rate of evapotranspiration while 60% of water gets wasted during irrigation. Consequently, frequent irrigation becomes necessary to maintain soil moisture for healthy plant growth. The aim of this study is to utilize sugarcane bagasse as a low-cost bioabsorbent to help retain soil moisture. Experiments were carried out to determine the percentage of water absorbed by dry sugarcane bagasse and to compare the ability to retain soil moisture by mixing 2%, 4%, 6%, 8% and 10% of sugarcane bagasse to soil samples under normal (32oC – 34oC) and extreme (38oC – 40oC) conditions. A duration of 24 weeks was used to investigate the time taken for sugarcane bagasse to decompose in the soil. By Least Squares analysis, the total mass of water absorbed is directly proportional to the mass of dry sugarcane bagasse with the mean percentage of 278% of water absorbed. It was also statistically significant ($p<0.05$) that the average percentage of soil moisture retained increases with the increase in the percentage of sugarcane bagasse in the soil. The results showed that the soil mixtures became less efficient in retaining soil moisture after 16 and 20 weeks respectively for the soil with 2% and 4% sugarcane bagasse. For the 6%, 8% and 10% sugarcane bagasse-soil mixture, the average percentage of soil moisture dropped to 45% - 52% after 24 weeks. Hence, sugarcane bagasse is viable to be used as an eco-friendly bio-absorbent to improve the soil moisture retention capacity conserving water for a sustainable society.

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