Influence of abattoir wastewater irrigation on plant growth and dry matter yield of selected plant species under field conditions

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A field experiment was conducted to study the effects of two wastewater types and loading rates on plant dry matter yield. In this experiment, seven crops (sunflower (Helianthus annuus), sugar beet (Beta vulgaris), canola (Brassica napus L.), alfalfa (Medicago sativa), maize (Zea mays), napier grass (Pennisetum purpureum) and giant reed (Arundo donax) were used with two loading rates (400mm yr-1 ha-1; 800mm yr-1 ha-1) with three replications. All the plots were harvested at the same time. Overall, the plots irrigated with 800mm wastewater (abattoir wastewater-AWW and Municipal wastewater-MWW) showed significantly higher yield than the plots irrigated with 800mm tap water (TW) in all the plots of seven plant species used. The overall trend in biomass yield for three water types and loading rates followed AWW 800mm > AWW 400mm > MWW 800mm > MWW 400mm > and TW 800mm treatment, for all the crops. In comparison with TW irrigation (800mm), AWW (800mm) showed a 270 % higher DM yield (total biomass yield). Similarly, a significant increase in biomass yield was found for the two loading rates of MWW 400mm (26.7%) and 800mm (39.5%) compared to TW treatment in sunflower plots. The overall biomass data for the sunflower suggests that the trend in yield is as follows: AWW 800mm > AWW 400mm > MWW 800mm > MWW 400mm > TW 800mm treatment. The percentage increase in DM yield for sugar beet showed a 74.3% higher biomass yield in AWW (800 mm) and MWW showed a 41% more biomass compared to TW. In canola, compared to TW irrigation (800mm), AWW (800mm) showed a 82 % higher DM yield, which was highest among the seven crops used. Improved management can reduce the incidence of nutrient loss from wastewater irrigated soils by calculating input and output ratio to avoid nutrient loss and seepage. Growing plants at the land treatment site with nutrient-rich wastewater can be a sustainable and economic method for disposal and management of wastes.