

Spatial distribution of macro and micro elements and soil fertility of a land treatment site

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The aim of the study was to investigate the spatial distribution of micro and macro elements in a long-term abattoir wastewater irrigated site. The study area is situated at 89.7 km, North of Adelaide. The latitude and longitude of the study area are 34°8'26.60"S and 138°11'7.35"E, the range is 749 m and the elevation of the treatment site is generally flat ranging from 13.5m Australian Height Datum (AHD) to 14.5m AHD. This study site was irrigated with abattoir wastewater (AWW) since 1995. Abattoir wastewater irrigated soil samples (112) were collected from the land treatment site and compared with nearby control soil (CTRL). The soil irrigated with abattoir wastewater had a significant increase in the nutrient content both macro (N, P, K) and micronutrients (Ca, Mg, Zn, Fe, Al, Bo) compared to the non-irrigated control samples over a period of time. The TN concentration of currently irrigated (CI) soils increased about 70% as compared to control in 2012. Similarly, TP increased to about 677 %. A similar response was found in between the years as well. In the same site, the TN content increased to about 36.5 % and TP increased up to 556 % as compared to CTRL soil in 2010, which was never been irrigated with nutrient enriched abattoir wastewater. The increased nitrate level in the soil can lead to nitrate leaching and cause groundwater pollution. Adopting effective cropping system can improve the nutrients addition in soil by uptake and minimize the future impacts caused by excessive nutrient load. As a clear evidence of there being unacceptable impacts on the soil health of the site due to nutrient input (wastewater), there is a chance for nutrients leaching to groundwater. A proper wastewater irrigation management plan is essential to improving nutrients availability and uptake in plants grown in this area.