Sludge compost as a fertiliser for crop growth

Mr James Macfarlane[1], Dr Deborah Pritchard[1], Dr Sarita Bennett[1], Mr Scott McPhee
[1]*Curtin University*

The agricultural land application of biosolids (treated sewage sludge) is the predominant end-use of biosolids produced from metropolitan wastewater treatment plants in Western Australia. The use of biosolids is regulated by the Western Australian guidelines for biosolids management to ensure minimal risk to human health and the environment. Biosolids supply essential plant nutrients; loading rates typically based on providing adequate nitrogen for crop growth. Nutrient availability in sludge-compost, produced by combining partially treated sewage sludge from regional wastewater treatment plants with straw and animal manures, is less understood. The nutrient content of sludge-compost is less than for biosolids, and therefore may require higher loading rates and/or the addition of inorganic fertiliser to optimise plant growth. This study measured the addition of four rates of sludge-compost (equivalent to 0, 4, 8, 12 dry t/ha) and an inorganic basal fertiliser treatment on vegetative wheat growth and nutrient uptake. The experiment was conducted in the glasshouse in pots containing 3.5kg of sand in a randomised block design and replicated thrice. The addition of increasing rates of sludge-compost improved vegetative growth of wheat compared to the nil control over 7 weeks duration. The dry matter of wheat shoots at 53 days from sowing in sludge-compost applied at 4, 8, 12 dry t/ha measured 12.1, 15.8 and 18.2 g/pot, respectively compared with 8.2 g/pot in the nil sludge compost treatment. Wheat growth was highest in the inorganic fertiliser treatment (23.5 g/pot) indicating that the rate of sludge-compost was too low and/or additional nutrients were required to maximise plant growth. Nutrient analysis of dry matter of wheat shoots at harvest are being analysed to determine critical nutrient levels for the sludge-compost rates used. The findings will enable recommendations concerning sludge-compost loading rates to be made to further test under field conditions.