RP2008 BENEFICIAL RE-USE OF BIOSOLIDS – ODOUR MANAGEMENT

Research Question

Biosolids are a commonly overlooked aspect of the waste management systems in our cities. In Sydney our biosolids are transported long distances before they are applied to land. The odorous nature of biosolids is the barrier for their local beneficial re-use.

By thinking of biosolids as a product rather than a waste, systems can be optimised to produce low odour biosolids. Thereby reducing community exposure to nuisance emissions and reducing carbon emissions from biosolids management.



Figure 1: Biosolids are the end-product of wastewater treatment, they are currently transported long distances for disposal.

Methodology

An indepth database of emissions throughout the biosolids processing train of 8 wastewater treatment plants were analysed and added to throughout the project. The database contains a comprehensive set of odorant and sensorial measurements complemented with plant operational data.

A case-study was conducted at a fullscale plant in 2015 and 2016 investigating the effect of anaerobic digestion and dewatering.

Results and Conclusions

Digester monitoring:

Anaerobic digesters stabilise the biosolids and produce methane. Methane is used on site to produce electricity and heat. The effect of digester operation on biosolids was evaluated in a long term study. Key odorants, typical temporal variations and effect of instability were identified.

Dewatering optimisation:

Centrifugal dewatering produces high solids biosolids, reducing volumes to be transported to land. Optimising centrifuge performance can achieve higher total solids and a lower odour product. Parameters such as scroll torque and weir depth were identified as key parameters to reduce hydrogen sulfide emissions from the biosolids while achieving higher total solids



Figure 3: Key odorants emitted from biosolids produced during the monitoring period.

Anticipated impact

A Biosolids Odour Wheel has been produced based on odorants detected in biosolids. Odour wheels aid communication and can be used as a tool to manage biosolids emissions onsite.



Figure 4: The Biosolids Odour Wheel can be used to identify causes of nuisance odours, aiding onsite biosolids management

Next steps

The use of aerobic vs anaerobic digestion has been identified in this study as a source of variation in types of odorants emitted from biosolids. This will be investigated further.

Further information

For further information about this project and others please visit UNSW's Odour Laboratory at www.odour.unsw.edu.au

or the CLC for LCL website at www.lowcarbonlivingcrc.com.au

Alternatively, feel free to contact the primary researcher.

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