

5<sup>th</sup> World Convention on

# RECYCLING AND WASTE MANAGEMENT

September 11- 12, 2017 Singapore

## Reuse of activated sludge as water retention substrate for combating desertification

Y H Liu<sup>1, 2</sup>, W H O Wai<sup>2</sup> and H Chua<sup>1</sup><sup>1</sup>Technological and Higher Education Institute of Hong Kong, Hong Kong<sup>2</sup>The Hong Kong Polytechnic University, Hong Kong

Desertification has been a worldwide environmental problem due to the loss of land productivity, essentially water retention capacity. In wastewater treatment aspect, dewatering and disposal of excessive activated sludge are always annoying issues that increase capital and operational cost for the treatment plant. As a win-win strategy, this study aims to develop a novel growing medium, the Eco-Soil, produced from the combination of arid sand and thickened activated sludge, to rebuild the land productivity from the margin of the arid area. This paper presents the hydraulic properties of the Eco-Soil under Sand-Sludge Volumetric Ratio (SSVR) of 100:0, 80:20, 60:40, 40:60 and 80:20 and the comparison with commercial potting soil to find out fundamental theories for in-deep study, such as numeric modeling and micro-ecosystem. Dry bulking density, particle density, porosity, particle size distribution, field capacity and saturated moisture content, residual moisture content and permeability were analyzed to find out numerical relationship of these properties affected with respect of SSVR. The Eco-Soil properties were compared with that of the commercial potting soil and agricultural references. Thereafter, the seed germination index analysis was carried out to study the phytotoxicity of Eco-Soil under various SSVRs. Based on the comprehensive analysis; Eco-Soil of SSVR 60:40 and 40:60 showed suitable physical properties and plant affinity for anti-desertification.

### Biography

Y H Liu has completed his PhD from The Hong Kong Polytechnic University, Hong Kong. He is currently a Teaching Fellow in the Technological and Higher Education Institute of Hong Kong. He holds over 10 publications in rated journals and has in-charged over 15 water and wastewater consultancy projects in Hong Kong and China Mainland.

yhliu@vtc.edu.hk

**Notes:**