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Our Ref: BD. 320/452/01/55 **Date:** 14th April 2021

TO: The Public

REF: ANNOUNCEMENT OF VIVA VOCE EXAMINATION OF A PhD CANDIDATE, MR. EDWIN NDIBALEMA RICHARD (REG. NO.: P255/T17)

Please, refer to the heading above,

The **School of Materials Energy Water and Environmental Science (MEWES)** of the **Nelson Mandela African Institution of Science and Technology (NM-AIST),** wishes to announce the VIVA-VOCE Examination of **Mr. Edwin Ndibalema Richard,** a PhD candidate in **Environmental Engineering** by Research and Thesis.

The VIVA VOCE examination is scheduled on:

Wednesday, 28th April 2021 in Room L 2 from 11:00 am to 2:00 pm

Research Title: "Sustainable Municipal Solid Wastes Management for Resource Recovery"

Abstract:

The Municipal solid wastes (MSW) in most cities of the developing countries is collected for the disposal with little emphasis on resources recovery, despite high organic and moisture contents it contains. This thesis focused on the optimization of the AD process for enhancing resource recovery from the organic fraction municipal solid wastes (OFMSW). Firstly, the effects of fungal *(Pleurotus ostreatus)* towards enhancing the resource recovery of banana leaves wastes (BL) was studied. Secondly, the study investigated the pre-treatment of the BL using banana winery wastewater from bottle-washing (BW) as a medium to improve methane yield. Next, edible clay soils (ECS) was evaluated for enhancing biogas recovery of food wastes (FW). Finally, environmental impacts (EI) of AD and other MSW management scenarios in the Arusha City of Tanzania were analyzed and compared. All the AD experiments were carried out in batch reactors.

The EI were analyzed using life cycle analysis methodology. Fungal treatment resulted in the biogas yield of 282 mL g^{-1} VS^{-1} which was lower as compared to the untreated BL. However, the cost analysis revealed that due to the production of edible mushrooms, the fungal treatment has a high economic value and therefore, favored before the AD process. BW-pre-treatment of BL resulted in increased methane yield by 193% compared to non-pretreated BL. The ECS supplementation resulted in a cumulative methane yield of 344.69 L CH_4 kg^{-1} VS^{-1} which was about 26.9% increase as compared to the reactor with no ECS supplementation. Evaluations on environmental impacts revealed that AD process outranked the current management option (Landfill) with the least environmental burdens. The identified strategies to optimize the AD process are recommended for further analysis in various OFMSW.

You are all welcome

Prof. Revocatus Machunda.
Dean - MEWES