

In recent years, the use of agro-industrial residues as feedstocks for biogas production has gained great attention worldwide due to limited reserves of fossil fuels. The sisal industry in Tanzania generates large quantities of sisal leaf decortication residues (SLDR) with good potential for biomethane production. However, the process is limited by the lignocellulosic nature of SLDR, making it not effectively degraded under anaerobic conditions. The effects of biological pretreatment of SLDR under solid state fermentation with a ligninolytic CCHT-1 strain and *Trichoderma reesei* at different inoculation rates and incubation periods to improve methane production were investigated. The methane production potential of the pretreated substrate was determined in batch anaerobic bioreactors. SLDR was pre-treated with CCHT-1 for 4 days at an inoculation rate of 10% (wet weight inoculant/SLDR) gave methane yield of $0.203 \pm 0.019 \text{ m}^3 \text{ CH}_4/\text{kg VS}_{\text{added}}$, while pre-treatment of SLDR with *T. reesei* for 8 days at an inoculation rate of 25% (wet weight inoculant/SLDR) gave methane yield of $0.192 \pm 0.024 \text{ m}^3 \text{ CH}_4/\text{kg VS}_{\text{added}}$. This was an increment of between 24 to 30% in methane yield, compared to $0.145 \pm 0.015 \text{ m}^3 \text{ CH}_4/\text{kg VS}_{\text{added}}$ obtained for the untreated samples. In conclusion, the results demonstrated the suitability of biological pre-treatment method using fungi for enhanced anaerobic digestion of SLDR.