

## **Co-digestion of rice straw leachate and domestic wastewater for biogas production with addition of urea as nitrogen source**

### **ABSTRACT**

This study investigates the methane production by anaerobic co-digestion of rice straw leachate (RSL) and domestic wastewater (WW). The experiment was conducted at a controlled mesophilic temperature of 38°C in Continuous Glass Reactor (CGR) for a period of approximately 12 weeks. The process performance was evaluated based on the efficiency of COD removal and methane production in relation to other parameters such as pH, (organic loading rate) OLR and alkalinity. This study confirmed that the rate of COD removal for co-digestion of WW and RSL achieved the stable condition at 89.33%, meanwhile the digestion of RSL with addition of urea was at 76.00%. The addition of urea into RSL, showed the synergistic effect in anaerobic digestion as the removal rate of COD increased from 61.33% to 76.00%. Meanwhile, methane production reached the highest value of 0.154 L/CH<sub>4</sub> at day 32 with the COD conversion ratio of 81.33%. SEM analysis showed a change in surface structure of the granules and it was confirmed by EDX analysis that there was some light metal crystallisation and salt agglomeration on the sludge granule surface.

**Keyword:** Anaerobic co-digestion; Chemical oxygen demand; methane production; nitrogen and rice straw leachate