

## **Continuous Production of Organic Acids from Palm Oil Mill Effluent with Sludge Recycle by the Freezing-Thawing Method**

### **Abstract**

The performance of the anaerobic treatment of palm oil mill effluent for organic acids production at a short retention time of less than 5 days was assessed by incorporating a sludge recycle system with no pH control except by adding calcium carbonate. The system could be operated successfully for a 3.5-day retention time at pH 5. The sludge solids in the treated effluent were separated by a freezing-thawing technique and it was partly recycled back to the reactor. The thawed clarified POME solution contained a low SS of 2,200–3,500 mg/L. The organic acids production with a concentration of 10–14 g/L was essentially similar to the treatment for a 5-day retention time without a sludge recycle. Hence by incorporating a sludge recycle system with the freezing-thawing method, the retention time for the treatment could be reduced without affecting the organic acids generation.

**Keyword:** Organic Acids, Palm Oil Mill Effluent, Anaerobic Treatment, Recycle, Freezing-Thawing