

## **Presence of residual oil in relation to solid particle distribution in palm oil mill effluent**

### **ABSTRACT**

The production of palm oil requires a large amount of water, which subsequently turns into wastewater known as palm oil mill effluent (POME). Because of its high organic content, there has been debate over how to utilize POME for oil recovery. POME is usually mainly comprised of water (95 to 96%), total solids (4 to 5%), suspended solids (2 to 4%), and oil (0.6 to 0.7%). The lignocellulosic particles in POME are highly oleophilic and capable of absorbing oil. Therefore, the objective of this study was to understand the presence of residual oil and try to relate with the oil loss in POME and to identify the solid particles in POME and their correlations. Microscopic observations showed that most of the oil droplets available in POME were less than 100  $\mu\text{m}$  in size. If given the opportunity to settle, the highest quantity of oil droplets and solid particles was in the bottom layer, followed by the middle layer, and lastly the upper layer. In cases where the contact angle of water was less than  $45^\circ$  on POME solids, the absorption rate was  $0.11 \pm 0.03 \mu\text{L/s}$  and  $0.09 \pm 0.01 \mu\text{L/s}$ , respectively. This study concluded that the oil losses in POME were partly due to the absorption of oil by the fibers.

**Keyword:** Palm oil mill effluent (POME); Residual oil; Oil loss; Settling velocity; Stokes law; Solid particles