

## **BELT FILTER REDUCES GHG EMISSIONS FROM POME**

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### **ABSTRACT**

At palm oil mills, the wastewater (POME) is a significant source of methane, which is a strong greenhouse gas; it plays a substantial role when calculating the life cycle GHG emissions of crude palm oil. Solids or dry matter content of POME entering the pond system is approximately 5%, a significant part of it being carbon. Much carbon is also present in soluble form.

To avoid the need to shut down the operation for dredging of ponds, KLK has introduced a belt filter press system to remove organic matter continuously from the pond system. The belt filter press is a device used for chemically enhanced solid-liquid separation. It separates effluent into a filtrate and a solid press cake. The filter cake can be used as organic fertilizer in the plantation.

Case study measurements lasted for 8 weeks during January and February 2017. Methane emissions were measured from five ponds: one pond with belt filter; one pond with earlier use of belt filter; and three normal ponds for the baseline. In addition, total organic carbon (TOC) and dry matter were analyzed from POME inlet, discharge and belt filter cake. Compared to the complexity and uncertainty of methane measurements, analysing TOC from the press cake is a simple method in estimating the GHG formation potential of POME.

The study demonstrated that solids separation with belt filter system leads to reduced GHG emissions. The removed carbon's reductive effect to GHG emissions was in the same level than what was observed in actual methane measurements in the pond treated with belt filter press. A GHG emission reduction of 50 % was observed in the pond with a belt filter press.

In the case study, the 3.3% of carbon in a daily amount of 27 tons of removed belt press cake could potentially form 21 tons CO<sub>2e</sub>, if left in the pond (conversion factor of 23.1 from carbon to CO<sub>2e</sub>). Thus, the belt filter press leads to considerable reduction in the GHG emissions of a palm oil mill: 130 kgCO<sub>2e</sub>/tCPO in the case study mill. Further reduction could be achieved by increasing the belt filter press capacity e.g. by installing two belt filters and feeding them simultaneously from two ponds.