



## Low frequency ultrasound treatment of palm oil mill effluent for solubilization of organic matter

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### ABSTRACT

Palm oil is one of the most widely consumed edible oils in the world. Its production requires a huge amount of water and subsequently generates a large volume of wastewater called palm oil mill effluent (POME). POME contains large amount of slowly degradable compounds, which have an undesirable impact on the efficiency of biological treatment processes. Ultrasound treatment assists organic compounds disintegration and improves their solubility. Hence, this study investigates the effect of low frequency ultrasound treatment on solubilization of POME organic matter. Possible mechanisms of ultrasonic treatment are also discussed. Ultrasonication was applied at low frequency (20 kHz) with various ultrasonication amplitudes and durations. The results indicated that the energy used for ultrasonication strongly influences the physical and chemical characteristics of POME. Based on the optimum specific energy of 25,136 J/g total solids, maximum particle size reduction was 77%, soluble chemical oxygen demand (SCOD) increased by 20% and degree of solubilization achieved was 15.5%.

*Keywords:* Disintegration; Organic matter; Palm oil mill effluent; Solubilization; Ultrasound

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