

Supplementary Material (SM)

Determinants of Physicochemical Composition of Palm Oil Mill Effluent – Implications on Environment and Bio-digester Treatment Design

Tambe, E.B.^{1,*}, Okonkwo, A.U.², Mbuka-Nwosu, I.E.³, Cookey, C.O.⁴, Agbe, E.⁵, Onwusa, S.C.⁶, Ekpe, I.N.⁷, Evuen, U.F.⁸, Okpoghono, J.⁸

¹ Department of Environmental Management & Toxicology, Delta State University of Science and Technology, Ozoro, Nigeria

² Department of Environmental Management, Chukwuemeka Odumegwu Ojukwu University, Uli, Nigeria

³ Department of Environmental Management, Federal University of Technology, Owerri, Nigeria

⁴ Department of Crop Science and Technology, Federal University of Technology, Owerri, Nigeria

⁵ Department of Environmental Management, Delta State University of Science and Technology, Ozoro, Nigeria

⁶ Department of Mechanical Engineering, Delta State University of Science and Technology, Ozoro, Nigeria

⁷ Department of Civil and Water Resources Engineering, Delta State University of Science and Technology, Ozoro, Nigeria

⁸ Department of Biochemistry, Delta State University of Science and Technology, Ozoro, Nigeria

*Corresponding author: tambe_besong2001@yahoo.com

SM 1 Comparing seasonal composition of POME with regulatory guidelines for wastewater disposal

Parameters	Wet season	Dry season	Reference		
			[33]	[34]	[35]
pH	11.728±.467	4.106±0.030	6-9	6.5-8.5	6.5-8.5
TSS	14,421.748±2,431.870	974.344±29.764	50	30	1,500
DO	14.868±2.028	2.830±0.045	-	4.0	4.0
BOD	52.042±1.669	233.125±10.674	50	3.0	6.0
COD	280.205±38.059	3,731.250±154.574	250	-	30.0
Total N	347.918±7.371	468.925±31.315	10	-	-
Total P	127.890±1.478	26.476±6.339	2	-	-
Cd	0.071±0.008	0.023±0.002	-	0.1	0.01
Cr	0.047±0.009	1.010±.087	-	2	0.5
Cu	0.349±0.038	8.973±2.040	-	1.0	0.01
Fe	2.760±0.362	2.633±0.467	-	10	-
Mn	0.436±0.051	6.164±1.041	-	10	-
Ni	0.898±0.066	0.099±0.019	-	0.3	0.1
TDS	4,905.048±163.375	230,757.681±30,395.805	-	1200	-
Ca	159.680±11.199	0.000±.000	-	-	180
Mg	137.818±10.348	0.001±0.001	-	-	40

SM 2 Correlation between pH with metal leaching in POME

	Test statistic	pH	Mn	Ni	Fe	Cu	Cr	Cd
pH	Pearson correlation	1	-.684**	.685**	.123	-.592**	-.858**	.585**
	Sig. (2-tailed)		.000	.000	.468	.000	.000	.000
	N	37	37	37	37	37	37	37

**. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

SM 3 Maximum acceptable concentration (mg L⁻¹) of influent inorganics to bio-digester

Parameters	Wet season (low crop production season)	Dry season (High crop production season)	Maximum acceptable concentration (mg L ⁻¹) from influent to digester	Reference
Ni	0.898±0.066	0.099±0.019	100-1,000	[42]
Fe	2.760±0.362	2.633±0.467	5	[23]
Cu	0.349±0.038	8.973±2.040	1-10	[23]
Cr	0.047±0.009	1.010±.087	5-50	[23]
Cd	0.071±.008	0.023±0.002	0.02	[23]
K	4.143±0.321	367.689±78.585	200-400	[41]
Ca	159.680±11.199	0.000±.000	8,000	[42]
Mg	137.818±10.348	0.001±0.001	1000	[23]