

ISOLATION AND CHARACTERIZATION OF BACTERIA
FROM EXTENDED AERATION WASTEWATER
TREATMENT PLANTS

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Abstract

In this study, three different wastewater treatment plants (STP1, STP2 and STP3) were sampled in Klang Valley. STP1 exhibited the best activated sludge health with healthy Sludge Volume (SV), Mixed Liquor Suspended Solids (MLSS) and Mixed Liquor Volatile Suspended Solids (MLVSS). STP2 were constantly disrupted by the mechanical failures which caused its dissolved oxygen (DO) to decrease whereas STP3 was troubled by the inadequate alkalinity in its mixed liquor causing acidic condition in aeration tank. The acidic condition resulted in pin-floc problem and contributed to high Total Suspended Solids (TSS) and low SV. Influent at STP3 was also found to contain high amount of Copper (Cu) and Lead (Pb). The nutrient removal efficiency was also the highest in STP1 compared to STP2 and STP3. In the enumeration of heterotrophic bacteria, STP1 had higher cfu counts with an average of $3.19 \pm 1.21 \times 10^6$ cfu ml⁻¹ as compared to STP2 ($1.85 \pm 2.00 \times 10^6$ cfu ml⁻¹) and STP3 ($2.72 \pm 5.40 \times 10^5$ cfu ml⁻¹). Some of the common bacteria cultivated from the activated sludge of this study are *Stenotrophomonas maltophilia*, genus *Acidovorax*, genus *Aeromonas*, genus *Staphylococcus* and genus *Bacillus*. STP1 was dominated by γ -Proteobacteria with 44% ($n=22$) whereas STP2 and STP3 were dominated by β -Proteobacteria with 42% ($n=21$) and 40% ($n=16$) respectively.

Abstrak

Dalam kajian ini, tiga loji pengolahan kumbahan (STP1, STP2 dan STP3) telah dipilih di sekitar Klang Valley. STP1 merupakan enapcemar aktif yang terbaik dengan menunjukkan kadar enapcemar (SV), liquir tercampur pepejal terampai (MLSS), liquir tercampur meruap pepejal terampai (MLVSS) yang memuaskan. STP2 kerap mengalami gangguan mekanikal yang menyebabkan kandungan oksigen larut merosot manakala STP3 mengalami gangguan kealkalian pada liquir tercampur yang menyebabkan tangki pengudaraannya bersifat asidik. Keadaan asidik menyebabkan pembentukan floc yang tidak sempurna dan menyebabkan jumlah pepejal terampai (TSS) yang tinggi dan SV rendah. Air sisa di STP3 juga mengandungi kuprum (Cu) dan plumbum (Pb) yang tinggi. STP1 juga mencecah kadar pembuangan nutrien yang tertinggi berbanding dengan STP2 dan STP3. STP1 juga mempunyai bilangan cfu yang tertinggi dengan purata $3.19 \pm 1.21 \times 10^6$ cfu ml⁻¹ berbanding dengan STP2 ($1.85 \pm 2.00 \times 10^6$ cfu ml⁻¹) dan STP3 ($2.72 \pm 5.40 \times 10^5$ cfu ml⁻¹). Antara bakteria umum yang dikenalpasti adalah *Stenotrophomonas maltophilia*, genus *Acidovorax*, genus *Aeromonas*, genus *Staphylococcus* dan genus *Bacillus*. STP1 didominasi oleh bakteria dari kumpulan γ -Proteobacteria dengan 44% ($n=22$) manakala STP2 dan STP3 didominasi oleh bacteria dari kumpulan β -Proteobacteria dengan 42% ($n=21$) dan 40% ($n=16$) masing-masing.

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