LAMPIRAN

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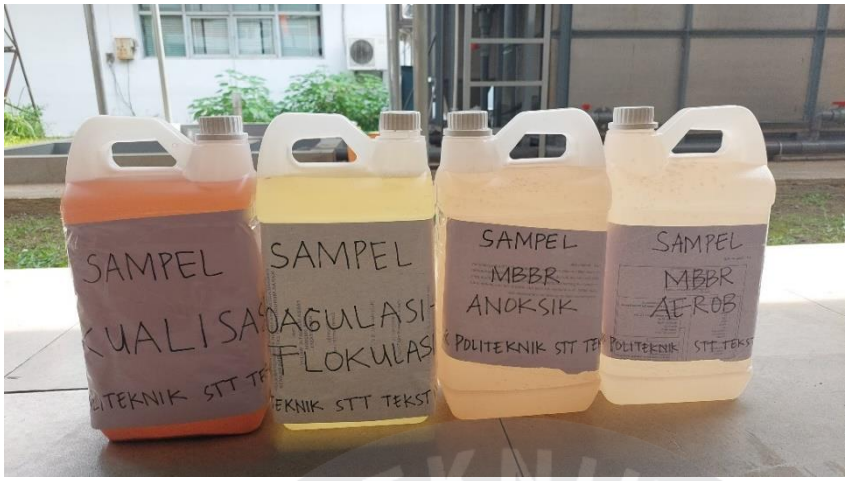
Lampiran 1 Kain Hasil Pencelupan dengan Zat Warna Reaktif menggunakan air Aquades dan Air Hasil Pengolahan Limbah MBBR Anoksik.

Variasi Konsentrasi Zat Warna	Aquades	MBBR Anoksk
1%		
2%		
3%		

Lampiran 1 Dokumentasi IPAL Politeknik STTT Bandung

1. Sampel Limbah yang akan diuji



2. Media MBBR

3. Bak MBBR Anoksik dan Aerob

Lampiran 2 Hasil Pengujian IPAL Politeknik STTT Bandung

Parameter	Ekualisasi	Koagulasi-Flokulasi	MBBR Anoksik	MBBR Aerob
TSS	159.95 mg/L	25.7 mg/L	104.815 mg/L	12.8 mg/L
TDS	522 mg/L	608 mg/L	695.5 mg/L	692 mg/L
pH	7.97	4.86	7.135	7.6
BOD	58.65 mg/L	10.95 mg/L	11.35 mg/L	10.5 mg/L
COD	155.45 mg/L	38.02 mg/L	33.51 mg/L	21.29 mg/L
Amonia	2.157 mg/L	2.3395 mg/L	2.665 mg/L	2.64 mg/L
Krom Total	<0.126	<0.126	<0.126	<0.126
Fe Terlarut	<0.08	<0.6235	<0.08	<0.08
Warna	110.73 mg/L	72.765 mg/L	38.54 mg/L	40.55 mg/L
Kekeruhan	99.245 mg/L	11.535 mg/L	26.51 mg/L	3.505 mg/L
Kesadahan	69.5 mg/L	63.7 mg/L	69.5 mg/L	70.5 mg/L
Temperatur	27°	27°	27°	27°

Lampiran 3 Perhitungan Efesiensi

$$\textbf{Efesiensi} : \frac{\textbf{awal} - \textbf{akhir}}{\textbf{awal}} \textbf{x 100}\%$$

1. TSS

$$\text{Efesiensi} : \frac{159{,}95 - 104{,}815}{159{,}95} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{55{,}135}{159{,}95} \text{x } 100\%$$

Efesiensi : 34,47 %

2. TDS

$$\text{Efesiensi} : \frac{522 - 695{,}5}{522} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{-173{,}5}{522} \text{x } 100\%$$

Efesiensi : -33,237 %

3. TS

$$\text{Efesiensi} : \frac{681{,}95 - 800{,}135}{681{,}95} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{-118{,}185}{681{,}95} \text{x } 100\%$$

Efesiensi : -17,33 %

4. BOD

$$\text{Efesiensi} : \frac{58{,}65 - 11{,}35}{58{,}65} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{47{,}3}{58{,}65} \text{x } 100\%$$

Efesiensi : 80,64 %

5. COD

$$\text{Efesiensi} : \frac{155{,}45 - 33{,}51}{155{,}45} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{121{,}94}{155{,}45} \text{x } 100\%$$

Efesiensi : 78,44 %

6. Warna

$$\text{Efesiensi} : \frac{110{,}73 - 38{,}54}{110{,}73} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{72{,}19}{110{,}73} \text{x } 100\%$$

Efesiensi : 65,19 %

7. Kekeruhan

$$\text{Efesiensi} : \frac{99{,}245 - 26{,}51}{99{,}245} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{72{,}735}{99{,}245} \text{x } 100\%$$

Efesiensi : 73,288 %

8. Kesadahan

$$\text{Efesiensi} : \frac{69{,}5 - 69{,}5}{69{,}5} \text{x } 100\%$$

$$\text{Efesiensi} : \frac{0}{69{,}5} \text{x } 100\%$$

Efesiensi : 0 %

Lampiran 4 Perhitungan Energi Yield

$$\textbf{Energi Yield} = \frac{\textbf{C}_0\textbf{xVx Conversion}}{\textbf{pxt}}$$

Keterangan :

C_0 : Konsentrasi awal (mg/L)

V : Volume (Liter)

Conversion : Efesiensi

P : Daya (kWh)

t : Waktu (jam)

CATATAN :

V MBBR Anoksik : 2,4 m x 2m x 1,75 m = 8,4 m^3

P MBBR Anoksik : Blower 1 dosing pump = 2,25 kWh

t : 1 jam

1. TSS

$$\text{TSS} = \frac{159{,}95\,\frac{\text{mg}}{\text{L}}\text{X } 8400 \text{ L X } 34{,}47\ \%}{2{,}25\ \text{kWh}}$$

$$\text{TSS} = \frac{463{,}132026\ \text{kg}}{2{,}25\ \text{kWh}}$$

$$\textbf{TSS} = \mathbf{205{,}836456\ kg/kWh}$$

2. TDS

$$\text{TDS} = \frac{522\,\frac{\text{mg}}{\text{L}}\text{X } 8400 \text{ L X } (-33{,}237\ \%)}{2{,}25\ \text{kWh}}$$

$$\text{TDS} = \frac{-1457{,}375976\ \text{kg}}{2{,}25\ \text{kWh}}$$

$$\textbf{TDS} = \mathbf{-647{,}722656\ kg/kWh}$$

3. TS

$$\text{TS} = \frac{681{,}95\,\frac{\text{mg}}{\text{L}}\text{X } 8400 \text{ L X } (-17{,}33\ \%)}{2{,}25\ \text{kWh}}$$

$$\text{TS} = \frac{-992{,}728254\ \text{kg}}{2{,}25\ \text{kWh}}$$

$$\textbf{TS} = \mathbf{-441{,}2125573333\ kg/kWh}$$

4. BOD

$$\text{BOD} = \frac{58{,}65\,\frac{\text{mg}}{\text{L}}\text{ X } 8400\text{ L X } 80{,}64\ \%}{2{,}25\ \text{kWh}}$$

$$\text{BOD} = \frac{397{,}281024\ \text{kg}}{2{,}25\ \text{kWh}}$$

$$\mathbf{BOD = 176{,}569344\ kg/kWh}$$

5. COD

$$\text{COD} = \frac{155{,}45\,\frac{\text{mg}}{\text{L}}\text{ X } 8400\text{ L X } 78{,}44\ \%}{2{,}25\ \text{kWh}}$$

$$\text{COD} = \frac{1024{,}253832\text{kg}}{2{,}25\ \text{kWh}}$$

$$\mathbf{COD = 455{,}22\ kg/kWh}$$

6. 6.Warna

$$\text{Warna} = \frac{110{,}73\,\frac{\text{mg}}{\text{L}}\text{ X } 8400\text{ L X } 65{,}19\ \%}{2{,}25\ \text{kWh}}$$

$$\text{Warna} = \frac{606{,}3530508\ \text{kg}}{2{,}25\ \text{kWh}}$$

$$\mathbf{Warna = 269{,}49\ kg/kWh}$$

7. Kekeruhan

$$\text{Kekeruhan} = \frac{99{,}245\,\frac{\text{mg}}{\text{L}}\text{ X } 8400\text{ L X } 73{,}288\ \%}{2{,}25\ \text{kWh}}$$

$$\text{Kekeruhan} = \frac{610{,}97127504\ \text{kg}}{2{,}25\ \text{kWh}}$$

$$\mathbf{Kekeruhan = 271{,}5427889067\ kg/kWh}$$

8. Kesadahan

$$\text{Kesadahan} = \frac{69{,}5\,\frac{\text{mg}}{\text{L}}\text{ X } 8400\text{ L X } 0\%}{2{,}25\ \text{kWh}}$$

$$\text{Kesadahan} = \frac{0\ \text{kg}}{2{,}25\ \text{kWh}}$$

$$\mathbf{Kesadahan = 0\ kg/kWh}$$